PIMA Technical Bulletin #118

Recommended Polyiso Insulation Thicknesses

for Meeting Commercial Roof Prescriptive R-Value Requirements

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

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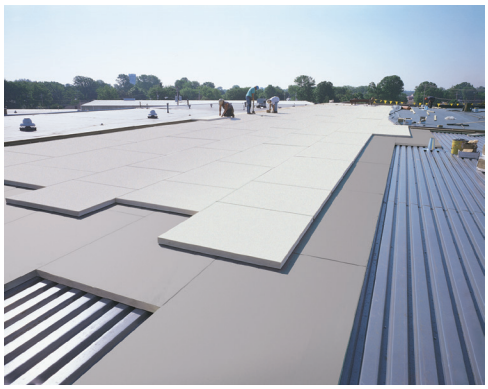


Image 1. Polyiso roof insulation installed in two layers with staggered joints over a steel roof deck.

Polyiso roof insulation is manufactured in a wide range of thicknesses offering flexibility to design professionals when specifying R-values for commercial roof systems. Under the International Energy Conservation Code, continuous roof insulation is generally required to be installed in two or more layers (see C402.2.1). In light of the minimum code requirements for insulation across all compliance pathways and industry best practices, all roof system designs for new and replacement roofs should incorporate a multi-layered, staggered joint continuous insulation system. This technical bulletin provides guidance consistent with this recommendation.

Meeting Prescriptive R-Values with Polyiso Roof Insulation Thickness Options

Minimum prescriptive insulation requirements for low-sloped roofs in the United States (insulation entirely above deck - IEAD) and Canada typically range from R-20 in warmer climate zones to greater than R-40 in colder climate zones (an equivalent U-factor may be specified for the roof assembly). Polyiso roof insulation is typically manufactured in incremental thicknesses from 0.5" to 4.5" with versatile options for meeting energy code requirements. Construction professionals should consult polyiso manufacturers for specific information regarding the relationship between product thickness and system R-values.

A multi-layered, staggered joint polyiso insulation assembly provides the benefits of improved thermal performance and condensation control in roof systems. See PIMA Technical Bulletin #113 on "Multi-layering of Polyiso Roof Insulation" for additional details on energy efficiency benefits. The high R-value per inch of polyiso roof products and the availability of tapered systems provides additional design flexibility for assemblies that incorporate polyiso roof insulation.

The examples below provide various, multi-layered configurations for polyiso roof insulation that satisfy minimum R-value requirements ranging

from R-20 to R-40. This range of R-values represents typical minimum requirements for the majority of climate zones in the United States and Canada. These examples are common for new and replacement roof project specifications. Polyiso roof insulation boards in various thicknesses also can be combined to address project requirements that exceed R-40.

Example 1: Recommended Polyiso Roof Insulation Thicknesses for Meeting Commercial Prescriptive R-Value Requirements.

	R-20	R-25	R-30	R-40
Insulation Only	Two (2) layers of 1.8″ polyiso (3.6″ total)	Two (2) layers of 2.2″ polyiso (4.4″ total)	Two (2) layers of 2.6″ polyiso (5.2″ total)	Two (2) layers of 3.5″ polyiso (7.0″ total)

Notes:

1. Polyiso insulation boards in multiple layers combine to achieve the above-listed R-values.
2. For additional information on jurisdiction-specific prescriptive R-value requirements in the United States, see the PIMA energy code fact sheets available here: https://www.polyiso.org/page/StateEnergyCodeResources1

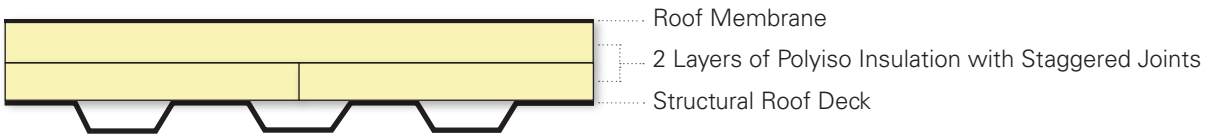


Figure 1. Roof assembly with two layers of polyiso insulation installed with staggered joints.

Example 2: Recommended Polyiso Roof Insulation Thicknesses with HD Polyiso Cover Board for Meeting Commercial Prescriptive R-value Requirements.

The high R-value and light weight of high-density (HD) polyiso cover boards provide important contributions to the design of a durable roof system. A typical 0.5″ thick HD polyiso cover board adds R-2.5 to the total R-value of the roof insulation system.

	R-20	R-25	R-30	R-40
Insulation + HD Cover Board	Two (2) layers of 1.6″ polyiso + 0.5″ HD cover board (3.7″ total)	Two (2) layers of 2.0″ polyiso + 0.5″ HD cover board (4.5″ total)	Two (2) layers of 2.4″ polyiso + 0.5″ HD cover board (5.3″ total)	Two (2) layers of 3.25″ polyiso + 0.5″ HD cover board (7.0″ total)

Notes:

1. Polyiso insulation boards in multiple layers with HD polyiso cover board combine to achieve the above-listed R-values.
2. For additional information on jurisdiction-specific prescriptive R-value requirements in the United States, see the PIMA energy code fact sheets available here: https://www.polyiso.org/page/StateEnergyCodeResources1

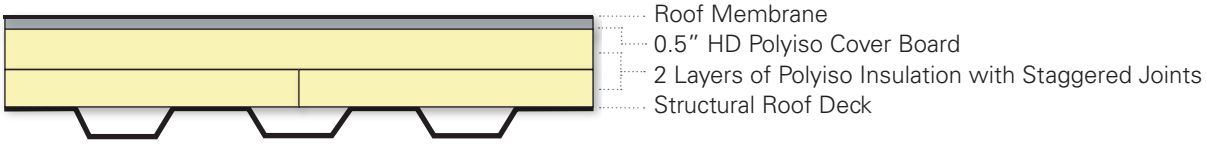


Figure 2. Roof assembly with HD polyiso cover board and two layers of polyiso insulation installed with staggered joints.

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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