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)
- QualityMark™ certified LTRR-values

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.

<table>
<thead>
<tr>
<th></th>
<th>R-20</th>
<th>R-25</th>
<th>R-30</th>
<th>R-40</th>
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<tbody>
<tr>
<td><strong>Insulation Only</strong></td>
<td>Two (2) layers of 1.8” polyiso (3.6” total)</td>
<td>Two (2) layers of 2.2” polyiso (4.4” total)</td>
<td>Two (2) layers of 2.6” polyiso (5.2” total)</td>
<td>Two (2) layers of 3.5” polyiso (7.0” total)</td>
</tr>
</tbody>
</table>

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](https://www.polyiso.org/page/StateEnergyCodeResources1)

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.

<table>
<thead>
<tr>
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<th>R-20</th>
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<th>R-30</th>
<th>R-40</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Insulation + HD Cover Board</strong></td>
<td>Two (2) layers of 1.6” polyiso + 0.5” HD cover board (3.7” total)</td>
<td>Two (2) layers of 2.0” polyiso + 0.5” HD cover board (4.5” total)</td>
<td>Two (2) layers of 2.4” polyiso + 0.5” HD cover board (5.3” total)</td>
<td>Two (2) layers of 3.25” polyiso + 0.5” HD cover board (7.0” total)</td>
</tr>
</tbody>
</table>

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](https://www.polyiso.org/page/StateEnergyCodeResources1)

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

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

For more than 30 years, the Polyisocyanurate Insulation Manufacturers Association (PIMA) has served as the voice of the rigid polyiso industry, proactively advocating for safe, cost-effective, sustainable, and energy-efficient construction. Organized in 1987, PIMA is an association of polyiso manufacturers and industry suppliers. Polyiso is one of North America’s most widely-used and cost-effective insulation products.

PIMA produces technical bulletins to address frequently asked questions about polyiso insulation. These publications update and inform architects, specifiers, and contractors about and build consensus on the performance characteristics of polyiso insulation. Individual companies can provide specific information about their respective polyiso products.

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