

Compressive Strength

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)

Compressive Strength: An Important Physical Property

Construction applications of insulation materials require compressive strengths adequate for durability during installation and use. Polyiso insulation is manufactured to various compressive strengths to meet the intended use and comply with the requirements of product standards; ASTM C1289 *"Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board,"* or CAN/ULC-704.1 *"Standard for Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced."*

The ability of rigid foam board to resist deformation or maintain shape when a force or load is applied is due to the physical property known as compressive strength and provides information about the behavior of polyiso insulation under compressive load. Although the force may be applied in any direction, it is most often measured in the direction of insulation thickness. The value is defined as a unit of force applied over an area. In the customary U.S. measurement system, the value is expressed in the units of pounds per square inch (psi) or pounds per square foot (psf). In the SI system, the units are Newton per meter squared (N/m²) or kilopascal (kPa). Polyiso insulation products are commonly available in the range of 16 psi (110 kPa) to 25 psi (172 kPa) and as high as 140 psi (965 kPa).

Determining Compressive Strength

The compressive strength of polyiso foam insulation is determined in accordance with ASTM D1621 *"Standard Test Method for Compressive Properties of Rigid Cellular Plastics."* The following procedure is used.

A minimum of five specimens, equally spaced across the manufactured width, are obtained from a polyiso insulation board. The test specimens must be square or circular in shape with a minimum of 4 in² (25.8 cm²) and a maximum of 36 in² (232 cm²) size area. After preparation, each specimen is placed between two compression plates, aligned, then a load is applied uniformly over the entire surface of the specimen. The force required to deform the specimen 10 percent in thickness or until a yield point is reached (whichever occurs first) is recorded then divided by surface area of the specimen resulting in the compressive strength. The compressive strength reported and used to determine compliance for a particular product is defined as the average of all tested specimens.



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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

