

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)
- QualityMark^{CM} certified LTRR-values

Compressive Strength: An Important Physical Property

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. 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 would be expressed in the units of pounds per square inch (psi) or pounds per square foot (psf). In the SI system, the units would be Newton per meter squared (N/m²) or kilo Pascal (Pa).

Measuring the Compressive Strength

The compressive strength of polyiso foam insulation is determined by ASTM D 1621-Standard Test Method for Compressive Properties of Rigid Cellular Plastics. The following procedure is used:

From the center of randomly selected 4'x8' or 4'x4' (1220mm x 2440mm or 1220mm x 1220mm) insulation boards, a 4" (100mm) strip is cut across the width of the board at its center point; this strip is further cut into 4" (100mm) pieces. Each alternative piece is a test specimen for a total of at least five specimens. Sampling the entire width of the board ensures that the sample is representative and illustrates uniformity of the product.

After preparation, each specimen is compressed in the testing machine and the force required to deform the piece 10 percent in thickness or until a yield point (which ever occurs first) is recorded. The compressive strength for a particular product is defined as the average of at least five test results. Polyiso products are commonly available in the range of 16-25 psi (110-172 kPa).

The published values are nominal or typical values due to the variation of manufacturing processes. Most samples should be within 10 percent of the nominal value. Individual companies should be consulted for specific variations. Manufacturers test production materials to ensure continuing quality and determine values for published specifications.

Importance of Compressive Strength

Common construction applications of polyiso insulation require compressive strengths adequate for durability during installation and use.

Wall application requires the product to support flexible siding materials. In roofing, it must withstand limited installation traffic, support fastener loads, and sustain the total roofing system. The results of the tests provide information about the behavior of polyiso insulation under compressive loads and are important to ensure proper performance.



Surround yourself with the best.

Using Compressive Strength Values

The specific compression strength values needed must be determined by the architect, engineer, or designer of a building. The compressive strength value can be used to compare different products or between brands of the same type of product. Polyiso insulation boards are available in a range of compressive strengths. Material specifications for Polyiso Insulations (ASTM C 1289 in United States and CAN/ULC-S704 in Canada), indicate that all polyiso products should have a minimum stated compressive strength of 16 psi (110 kPa). Actual compressive strength may vary above the minimum depending on the manufacturer.

PIMA

For more than 30 years, PIMA (Polyisocyanurate Insulation Manufacturers Association) has served as the unified voice of the rigid polyiso industry proactively advocating for safe, cost-effective, sustainable and energy-efficient construction. PIMA's membership includes manufacturers of polyiso insulation and suppliers to the industry. The products of PIMA's members comprise the majority of the polyiso produced in North America.

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

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