

Polyiso Insulation Types

A Guide to the Classification of Polyiso Board Insulation Products

Polyiso is a rigid foam insulation used in over 70% of commercial roof construction, in commercial sidewall construction and in residential construction.

The Benefits of using Polyiso include:

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

PIMA and polyiso products have received many environmental awards. These include an honorable mention in the Sustainable Buildings Industry Council's (SBIC) - "Best Practice" Sustainability Awards Program and the U.S. EPA's Climate Protection Award for the association's leadership in promoting energy efficiency and climate protection. The EPA also awarded PIMA and its members the Stratospheric Ozone Protection Award for leadership in CFC phase-out in polyiso insulation and in recognition of exceptional contributions to global environmental protection.

Rigid polyisocyanurate (polyiso) insulation board is manufactured in a variety of types for use in wall, roof and other building construction applications. These different types of polyiso insulation board are defined within the classification system contained in ASTM C1289 Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board. One of the primary attributes that may be used to differentiate the different classifications of polyiso insulation is the type of facer or facing material used to manufacture each product.

Facers and facing materials serve a variety of functions in the production and use of polyiso insulation. Beginning with the manufacture of polyiso board, they are used to contain the foam core during the production process. After manufacture, they add strength and dimensional stability to the finished insulation board. Facers and facing materials also may serve a number of functions during the working life of the product beyond contributing to strength and dimensional stability. Depending on the type of facer or facing material, these functions may include providing a substrate compatible with other building materials, reducing water absorption and water vapor permeance, restricting air movement, increasing thermal resistance, creating a drainage plane to shed water and adding radiative properties to wall and roof assemblies.

Selecting Polyiso Insulation Types

The specifier or buyer of polyiso insulation may base the selection of a particular product type in part on the attributes of the facer or facing material incorporated into the product. As an example, ASTM C1289 Type I polyiso uses an aluminum foil facer that provides a maximum vapor permeance of 0.3 perms, which is generally considered to be impermeable to water vapor. For the specifier or buyer seeking to install a vapor retarder within a roof or wall assembly, this product may provide the desired vapor retarder, as long as the product is installed in accordance with the manufacturer's instructions to achieve vapor retardancy. In a similar manner, the buyer or specifier seeking a suitable substrate for nailing of shingles or other roof coverings directly over the product may select ASTM C1289 Type V polyiso that uses a facing material of oriented strand board (OSB) or plywood as an upper layer, as long as the product is installed in accordance with the manufacturer's instructions for suitability as a nailable substrate.

In all cases, the proper selection of any type of polyiso insulation shall include the installation of the product in accordance with the written specifications and instructions of the manufacturer. In addition, in



situations where the polyiso insulation is incorporated into a proprietary roof or wall system assembly, the written specifications and instructions of the roof or wall system manufacturer or supplier also shall be followed. Finally, because roof and wall systems are subject to a variety of building codes, the requirements of the building code as adopted by the relevant governing authority also shall be followed.

Types of Facers and Facing Materials

The following generic types of facers typically are used in the manufacturer of polyiso board insulation for building construction applications.

- **Foil Facer (FF).** FF is composed of aluminum foil that may be coated and/or laminated to a supporting substrate. (See Note 1.)
- **Glass Reinforced Facer (GRF).** GRF is composed of a cellulosic fiber felt containing glass fibers. (See Notes 1 and 2.)
- **Coated Glass Facer (CGF).** CGF is composed of coated polymer bonded fibrous glass mats bonded with organic polymer binders and coated with organic polymer, clay, or other inorganic substances. The coating may be applied either to the glass fibers before bonding into mats or after the glass mats are bonded together. (See Notes 1 and 3.)
- **All Glass Facer (AGF).** AGF is composed of uncoated fibrous glass mats bonded with organic polymer binders without an additional coating. (See Notes 1 and 3.)
- **Perlite Board.** Perlite board used as a facer shall conform to ASTM Standard Specification C728.
- **Cellulosic Fiber Board.** Cellulosic fiber board used as a facer shall conform to ASTM Standard Specification C208.
- **Oriented Strand Board (OSB).** OSB used as a facer shall conform to U.S. Voluntary Product Standard PS 2–10.
- **Plywood.** Plywood used as a facer shall conform to U.S. Voluntary Product Standard PS 1-09 or PS 2–10.
- **Glass Mat-Faced Gypsum Board.** Glass mat-faced gypsum board used as a facer shall conform to ASTM Standard Specification C1177/C1177M.

Notes:

1. Because no current ASTM standards are available for FF, GRF, CGF, and AGF products, the definitions provided above rely on generic descriptions of facer and laminate materials currently available in the marketplace using terms common to these products. These facers are produced by a number of different manufacturers in North America, and the properties of the facers themselves may be altered when used to manufacture polyiso boards. In addition, the properties of polyiso boards, such as water absorption, vapor permeance, strength, and dimensional stability may vary depending on the exact composition of a given type of facer. However, in all cases the final product shall always meet the requirements of C1289.
2. Felts are made with organic fibers, inorganic fibers, or mixtures of organic and inorganic fibers.
3. Glass fiber mats are used uncoated or coated.

Polyiso Insulation Product Classification Table

This table provides information regarding the type of facers and/or laminates and typical application for each ASTM C 1289 classification of polyiso board insulation.

| ASTM C1289 Classification | | Facer or Facing Material | Facer or Facing Material | Compressive Strength | Notes |
|---------------------------|-------|--|--------------------------|--|-------|
| Type | Class | Side 1 | Side 2 | | |
| I | 1 | FF both sides | | 16 psi | |
| I | 2 | FF both sides | | 16 psi | |
| II | 1 | GRF both sides | | Grade 1: 16 psi | |
| II | 2 | CGF both sides | | Grade 2: 20 psi | |
| II | 3 | AGF both sides | | Grade 3: 25 psi (Note: All grades apply to Type II Class 1, 2, or 3.) | |
| II | 4 | CGF or AGF both sides | | Grade 1: 80 psi Grade 2: 110 psi Grade 3: 140 psi | 2 |
| III | n/a | Perlite Board | GRF, CGF, or AGF | 16 psi | 1 |
| IV | n/a | Wood Fiber Board | GRF, CGF, or AGF | 16 psi | 1 |
| V | n/a | Oriented Strand Board (OSB) or Plywood | GRF, CGF, or AGF | 16 psi | 1 |
| VII | n/a | Glass Mat-Faced Gypsum Board | GRF, CGF, or AGF | 16 psi | 1 |

1. Orientation of the facer side shall be in accordance with manufacturer instructions for the specific application
2. Available in maximum ½" thickness.

PIMA

For over 20 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 produces technical bulletins in an effort to address frequently asked questions about polyiso insulation. PIMA's technical bulletins are published to help expand the knowledge of specifiers and contractors and to build consensus on the performance characteristics of polyiso. Individual companies should be consulted for specifics about their respective products.

PIMA's membership consists of manufacturers and marketers of polyiso insulation and suppliers to the industry. Our members account for a majority of all of the polyiso produced in North America.

SAFETY

Polyiso insulation, like wood and other organic building materials, is combustible. Therefore, it should not be exposed to an ignition source of sufficient heat and intensity (e.g., flames, fire, sparks, etc.) during transit, storage or product application. Consult the product label and/or the PIMA members' Material Safety Data Sheets (MSDS) for specific safety instructions. In the United States, follow all regulations from OSHA, NFPA and local fire authorities; in Canada, follow all regulations from Health Canada Occupational Health and Safety Act (WHMIS) and local fire authorities.

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



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