

Polyiso Insulation and Water Absorption: Does Moisture Matter?

About Polyiso Insulation

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:

- Quality Mark™ certified LTTR-values for permeable faced products
- Highest R-value per inch of thickness
- Excellent fire test performance
- Moisture resistant
- Dimensional stability
- Superior compressive strength
- Extensive building code approvals
- Cost effective
- Recycled content
- Zero ozone depletion potential
- Virtually no global warming potential
- Preferred insurance ratings
- Nationwide availability
- Thinner walls and roofs with shorter fasteners
- Compatible with most roofing systems

PIMA and polyiso products have received many environmental awards. These include an honorable mention in the Sustainable Buildings Industry Council's (SBIC) 2003 "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."



What is a Cavity Wall?

A cavity wall is two wythes of masonry, separated by a cavity of varying dimension. The masonry wythes may consist of solid brick, structural clay tile, or concrete masonry units and are bonded together with masonry ties. The cavity (ranging from 2 inches to 4 1/2 inches in width) allows spacing for insulation. Combining these elements with a sound structural design, appropriate details, quality materials and good workmanship will result in high performance cavity walls.

Resistance To Moisture Penetration

No single unreinforced 4" wythe of masonry is totally impervious to moisture penetration. A cavity wall is designed and built as a moisture-deterrent system. This system takes into account the possible moisture penetration through the outer wythe. Moisture will penetrate masonry walls where hairline cracks exist between masonry unit and mortar. Water which runs down the exterior wall surface can be drawn towards the inner cavity due to wind pressure exerted on the exterior of the wall and the negative pressure present within the cavity. Providing a clean air space will allow this moisture to flow unobstructed down the cavity face of the outer wythe. Flashing installed at recommended locations will then divert this moisture back to the building's exterior through weepholes. Proper drainage of moisture will reduce the chance of efflorescence and freeze-thaw damage.

Moisture and Insulation

The real enemy of insulation performance is water vapor. If water vapor passes into and condenses in the insulation, the overall thermal performance will decrease. The questions that should be asked are:

- Will water vapor pass into and condense in the wall insulation?
- How can you determine if insulation is prone to water vapor problems?

A material's resistance to water vapor is determined by testing the product via ASTM E96, a measure of water vapor transmission. This method produces permeance ratings, or perms. Typically, polyiso foil-faced sheathings have perm ratings of less than 0.03, or 22 times better than extruded polystyrene. For this reason, polyiso is the best insulation for cavity wall applications. Designers are advised to determine the optimum thickness of polyiso by performing a dew point calculation for the system.

Liquid water should never be present in a building system. If an insulation, polyiso or polystyrene, is submerged in water, the insulation benefit disappears as the water short circuits around the insulation. Insulations

must be kept dry. If minor contact does occur, the foil facings and closed cells of polyiso provide excellent water resistance.

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 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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