PIMA Technical Bulletin #501

High-Density Polyiso Cover Boards

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)

POLYISO

Surround yourself with the best.

HD Polyiso Cover Boards: The Clear Winner

High-density (HD) polyiso cover boards are an important component in roof systems providing a stable substrate for roofing membranes as well as suitable protection for underlying insulation.

HD polyiso cover boards build on proven technology in a high-density form to deliver a high-performance alternative for the cover board market and provide the following advantages:

- Lightweight for installation efficiencies
- Excellent water resistance
- Easy to cut, no special tools required
- Virtually dust free
- Excellent impact resistance from foot traffic, storms and hail
- Mold resistance
- Long-term durability
- Increased additional R-value

Lightweight

HD polyiso cover boards on average weigh 2/3 to 4/5 less when compared to comparable like-thicknesses of various gypsum products.

Long-term durability

HD polyiso cover boards provide ideal long-term solutions for roofing membrane systems and are included in the ASTM C1289 standard as Type II, Class 4 and 5 products with three grades available.

Image 2. HD polyiso cover board installation. Image courtesy of GAF.

HD Polyiso Cover Boards - ASTM C1289 Type II, Class 4 and 5

Physical Property		Type II	
		Class 4	Class 5
Facer Type		Coated Glass Facer (CGF)[1]	Glass Reinforced Facer (GRF)[2]
Compressive Strength - psi, min		Grade 1: 80; Grade 2: 110; Grade 3: 140	
Dimensional Stability (Thickness) % linear change, max	-40˚F/amb RH	4.0	4.0
	158˚F/97% RH	4.5	4.5
	200˚F/amb RH	4.0	4.0
Dimensional Stability (Length/Width) % linear change, max	-40˚F/amb RH	1.0	1.0
	158˚F/97% RH	1.0	1.5
	200˚F/amb RH	1.0	1.0
Flexural Strength - psi, min		400	300
Break Load - lbf, min		20	15
Tensile Strength - psf, min		2000	2000
Water Absorption - % vol, max		4.0	4.0
Water Vapor Transmission - perm, max		1.5	2.0
Minimum Thermal Resistance @75 +/-˚F		1/4" - 1.0[3]	N/A
		1/2" - 2.0	

Notes for understanding table above:

1. 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.

2. GRF is composed of a blend of cellulosic and glass fibers.

3. 1/4" thick products are only availabe with CGF.

Benefit (carbon footprint)

HD polyiso cover boards can be shipped with approximately three times more square feet per truckload - so fewer trucks are needed. This leads to fuel savings and reduced carbon emissions associated with transportation (assumes 48,000-pound maximum trailer capacity).

	HD Polyiso	1/4" Gypsum	1/2" Gypsum	5/8" Gypsum
Number of SQs per truck load (4 ft x 8 ft boards)	>700	<400	<250	<200
Number of trucks needed per 1,000 SQs	2	3	6	7
Additional trucks required per 1,000 SQs	—	1.5x	3x	3.5x

Benefit (product staging)

HD polyiso cover boards allow for reduced crane time with less hoisting, loading and staging costs. HD polyiso cover boards are easier to carry and maneuver around the roof. Pallets need not be broken or redistributed like gypsum products.

	HD Polyiso 4′ x 8′	**1/4″ Gypsum 4′ x 8′**	**1/2″ Gypsum 4′ x 8′**	**5/8″ Gypsum 4′ x 8′**
# of Pallets or Bundles Per 1,000 SQs	70 to 104*	63	104	130
Hoisting — Fork Lift/Crane (Hours)	6 or less	17	28	35
Loading (Man Hours)	12 or less	33	56	69
Staging (Man Hours)	16 or less	63	83	104

* Varies among manufacturers

Benefit (structural design)

When considering the building structural design, HD polyiso cover boards will contribute less dead load to the roof compared to gypsum boards. This is important since less dead loading can add up to big savings in structural costs.

	HD Polyiso	**1/4″ Gypsum**	**1/2″ Gypsum**	**5/8″ Gypsum**
4 ft x 8 ft Board Weight - lbs	12	38-50	64-88	80-102
Weight per 1,000 SQs - thousands lbs	38	119-157	200-275	250-319
Additional Weight on Roof	—	3x - 4x	5x - 7x	6x - 8x

Increased additional R-value

HD polyiso cover boards provide suitable protection to a roof system while contributing extra R-value. They can provide two to five times more R-value than gypsum-based products contributing to the overall system R-value.

	HD Polyiso	**1/4″ Gypsum**	**1/2″ Gypsum**
Board R-value	1.2 (1/4″) - 2.5 (1/2″)	0.2.5 - 0.36	0.5 - 0.56

Excellent water resistance

The water absorption by volume of HD polyiso cover boards is limited to 4%. HD polyiso cover boards will not rot, dissolve or support mold. They maintain their integrity under adverse weather conditions for the long-term enhancement of the roof system.

	HD Polyiso	1/4" Gypsum	1/2" Gypsum	5/8" Gypsum
Water Absorption - % volume	4%	9% - 12%	8% - 11%	8% - 10%
Water Absorption - lb per 4 ft x 8 ft board	1.7 - 3.3	3.8 - 5.0	6.4 - 8.8	8.0 - 10.2

Virtually dust free

HD polyiso cover boards are a closed-cell high-density polyiso product that contribute less dust than gypsum products when cutting the boards. In addition, HD polyiso cover boards do not cause itching, leading to overall worker satisfaction and improved productivity.

Mold resistance

HD polyiso cover boards are resistant to the growth of mold when tested under the ASTM D3273 standard. This makes HD polyiso cover boards highly suitable for applications prone to elevated moisture conditions.

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

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