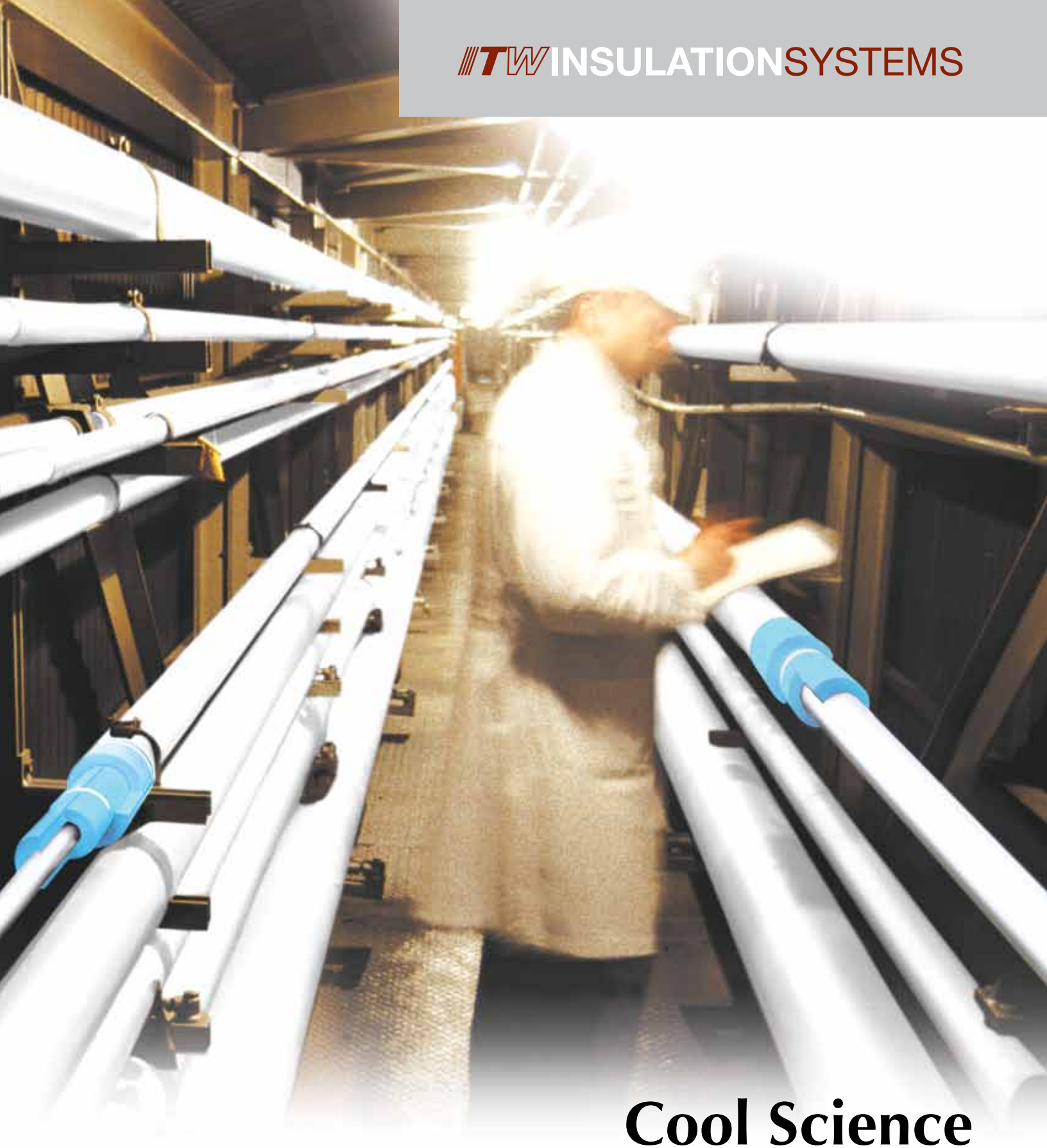
ITW INSULATION SYSTEMS



Cool Science for Cold Service.

Extruded Polystyrene Pipe Insulation Billet (XPS PIB)
Saran CX Vapor Retarder Film and Tape for Pipes, Vessels, Valves, and Fittings

XPS PIB features a 180 day aged k-factor of 0.259 and an R-value of 3.86*. It is well-suited for use within a service temperature range of -297°F to +165°F†.

Attention to Detail.

Longer system life. Efficient, continuous plant operation. Low initial and life-cycle costs. Faster system startup.

Meeting these objectives when designing mechanical pipe insulation systems for cold-service applications requires a systematic approach. And paying attention to the details – such as choosing the right insulation material and vapor retarder – can pay off in the long run.

For more than 40 years, industrial and commercial specifiers have counted on the thermal and structural integrity of **XPS PIB (Extruded Polystyrene Pipe Insulation Billet)**. In cold-service applications, the mechanical insulation system has two equally important purposes: Limit heat gain and prevent moisture intrusion. A thermally efficient insulation – one with a low k-factor (high R-value) – helps control temperature variation, thereby reducing the potential for condensation and keeping pipes and equipment at the proper temperatures for refrigeration and other process requirements. The insulation should be closed-cell to resist all forms of moisture, including water vapor.

No other insulating material can equal the performance of **XPS PIB** extruded polystyrene in demanding, cold-service applications, such as ammonia refrigeration. **XPS PIB** extruded polystrene pipe insulation consists of millions of cells extruded together to provide a closed-cell, void-free, durable and highly moisture-resistant foam. The insulation's rigid, closed-cell structure gives it high compressive strength, low friability, and excellent resistance to water vapor and water absorption from freeze-thaw cycling. This closed-cell characteristic allows the **XPS PIB** to maintain its superior thermal performance over long periods of time. Plus, **XPS PIB** pipe insulation is nondusting and nonirritating, and is not a known food source for mold and mildew.

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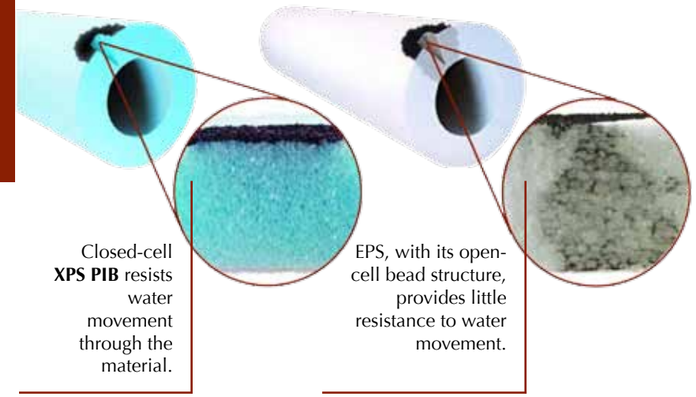
* k-factor expressed in BTU•in/hr•ft2•°F at 75°F mean temperature; R-value expressed in ft2•hr•°F/BTU at 75°F mean temperature.

† For industrial pipe systems that cycle above 165°F but not above 300°F, Trymer* polyisocyanurate pipe insulation is recommended.

XPS PIB offers one of the highest moisture resistances of any insulation.

Extruded Versus Expanded Polystyrene – a Difference You Can See

To demonstrate the water vapor permeability of two materials, a diluted black dye solution was applied to samples of **XPS PIB** (on the left), and expanded polystyrene and EPS, Expanded Polystrene (on the right). After 24 hours, the difference is clear: The porous, open bead structure of EPS enables water-based dye to pass through the material. As EPS absorbs water, its thermal performance is degraded. In comparison, the non-porous, closed-cell structure of **XPS PIB** absorbs almost no water, so its thermal performance remains high. This means **XPS PIB** pipe insulation products will keep insulating despite the high moisture conditions in cold-service applications, such as ammonia refrigeration.



Closed-cell **XPS PIB** resists water movement through the material.

EPS, with its open-cell bead structure, provides little resistance to water movement.

The low water vapor permeance of **Saran CX** Vapor Retarder Film keeps water from entering the pipe insulation system.

Critical Protection With Saran CX

A vapor retarder is an insulation system's first and most important line of defense against moisture. For cold-service applications, ITW offers one of the best vapor retarder systems on the market.

Saran CX Vapor Retarder Film and Tape further enhance the strong physical and thermal integrity of **XPS PIB** pipe insulation, particularly in refrigeration applications. Saran Vapor Retarder Film and Tape products help prevent water absorption and moisture vapor drive into the insulation on all components of the mechanical system – even at elbows and fittings.

In addition, **Saran CX** Vapor Retarder Film and Tape:

- Meet or exceed standard industry requirements for cold system permeance ratings, including ASTM C1136 and ASTM C755
- Will not deteriorate, discolor or shred when exposed to water
- Feature long-term durability and resistance to a wide range of environmental chemicals
- Have great tensile strength and abrasion resistance
- Are compatible with most current vapor retarder film installation methods
- **Saran CX** Tape is easy to install

Why Choose XPS Pipe Insulation Over Cellular Glass?

- **XPS PIB** pipe insulation offers significantly better thermal resistance properties per inch.
- **XPS PIB** pipe insulation offers up to 60 percent savings on installed cost.
- **XPS PIB** pipe insulation provides a lower life-cycle cost, enhancing the contractor's reputation.
- **XPS PIB** pipe insulation does not abrade installer fingers or generate an unpleasant odor.
- **XPS PIB** pipe insulation has less propensity for breakage and damage during installation.

Fitting Form to Function.

XPS PIB is fabricated into various shapes and sizes for pipe rounds, vessel walls and heads, tank sections, valve and fitting covers, and equipment insulation. No matter what form suits your function, **XPS PIB** provides consistent thickness, density, strength, and thermal and moisture resistance.

XPS PIB can be prefabricated to fit any type of valve or pipe – whether flanged, screwed, welded or victaulic – for faster installation and maintenance.

Why Are **Saran CX** Vapor Retarder Film and Tape Better Than ASJ?

- **Saran CX** Vapor Retarder Film and Tape are durable compared to the more fragile all-service jacket (ASJ). The thin aluminum foil layer on ASJ is prone to pin-holes when it is wrinkled during installation and from corrosion after installation. When damaged, ASJ offers no protection against water vapor penetration.
- **Saran CX** Vapor Retarder Film is not known to be a nutrient source for mold and fungus growth and from corrosion after installation. The cellulose in paper-backed ASJ may provide nutrients for fungal growth.
- **Saran CX** Vapor Retarder Tape offers one of the best ways to apply a continuous vapor retarder around fittings and elbows. ASJ is a poor alternative for fittings and elbows due to the delicate and stiff nature of the material.

"Saran 560 Vapor Retarder Film is a very durable vapor retarder jacket and is a better alternative than all-service jacket. It provides much more durability and water resistance for use under aluminum and stainless steel jackets in outdoor applications."

Michael Irlbacher
Extol of Ohio, Inc.
Norwalk, Ohio

Attention to Detail.

XPS PIB has been used in these food and beverage/cold storage applications:

- Anheuser Busch
- BI-LO LLC
- ConAgra
- General Mills Inc.
- Gold Kist Inc.
- Kraft Foods Inc.
- Land O' Lakes
- Miller Brewing
- Nestle Corporation
- Publix Super Markets Inc.
- Rich Products Corporation
- Safeway Stores
- Sara Lee
- Stop & Shop
- Sundale Vineyards
- SUPERVALU INC.
- Tropicana
- Tyson Foods Inc.
- Wal-Mart

Food and Beverage Processing

The rigorous cleaning and sanitizing procedures in food and beverage manufacturing plants can produce extensive humidity and moisture vapor drive. These conditions cause some insulations to "wick" water, thus losing R-value and increasing the potential for mold growth. The closed-cell structure of **XPS PIB** resists moisture and water vapor penetration, maintaining thermal performance to keep food and beverages at just the right temperature.

Together, **XPS PIB** and **Saran CX** Vapor Retarder Film and Tape can stand up to the demands of high-volume production, including the constant moisture assault. At the same time, an **XPS PIB/Saran CX** system is easy to maintain and retains its clean appearance and aesthetic appeal over time.

The low friability of **XPS PIB** makes it an excellent choice for insulating pipes in food and beverage processing facilities.

Saran CX Vapor Retarder Film is approved by the FDA and USDA, and can be left exposed in indoor applications.

XPS PIB meets the criteria of ASTM C578 Type XIII and is one of the best insulation materials for applications with temperatures down to -297°F.

Freezer Rooms/ Cold Storage

Refrigeration temperatures can wreak havoc on some types of insulation systems. The cold pipe surface attracts warm, humid air, which can “drive” through the insulation, carrying water vapor with it. Ice buildup from this vapor and other sources of water can increase the weight on the existing support structure, decreasing operating efficiency and leading to system failure.

When used to insulate refrigeration pipes, vessels and equipment for freezer rooms and cold-storage facilities, the thermal efficiency of **XPS PIB** enables engineers to meet precise temperature requirements without adding excessive weight to the piping system. Since the material retains both its thermal performance and moisture resistance, it continues to prevent vapor drive and ice buildup, and it resists freeze-thaw cycling, further helping to extend system life.

Down to the Last Detail.

When you specify an **XPS PIB** system, you get support from the industry leader. ITW offers an array of resources to help you design and engineer the optimum insulation system.

- ITW Insulation Systems is extremely active in utilizing our technical expertise to provide support and guidance to owners, engineers, fabricators, distributors and contractors. Our experienced sales personnel allows us to inform our customers about the capabilities of our company and products while assisting in locating the appropriate ITW-authorized fabricator who can help meet your specialized requirements.

- Complete product information – technical data sheets, installation guidelines, MSDS

- Continuing education presentations – covering the latest issues in insulation system design

- www.itwinsulation.com – quick and easy access to product data, installation instructions, application information and literature downloads

ITW INSULATION SYSTEMS

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For Sales and Technical Information: 1.800.231.1024 • www.itwinsulation.com

COMBUSTIBLE: Protect product from high heat sources. For more information, consult MSDS or call ITW at 1.800.231.1024
Building and/or construction practices unrelated to insulation could greatly affect moisture and the mold formation. No material supplier including ITW can give assurance that mold will not develop in specific systems

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