

DYPLAST
products

**POLYISOCYANURATE
VAPOR BARRIERS
MASTICS
JACKETS**

The DyTherm Insulation System delivers the highest thermal performance available on the market, and thus has inherent environmental contributions from reduced energy loss, and resultant reduction in fossil fuel consumption. Associated monetary benefits can be significant! Life Cycle benefits of the DyTherm Systems include not only cost savings but also reduction of Global Warming Potential and Ozone Depletion.

Dyplast's commitment to energy efficiency, sustainability and environmental responsibility is evident in the products and services offered by the Company. For additional information on life cycle analysis and our commitment to environmental sustainability, visit us at www.dyplast.com.



polyisocyanurate
vapor barriers
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Refrigeration Pipe **Insulation Systems**



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The DyTherm[®] Insulation System

SUPERIOR INSULATION SYSTEMS FOR AMMONIA REFRIGERATION EQUIPMENT



Dyplast's core competence is insulation for cryogenic to mid-temperature applications (typically from -297°F to +375°F), perfectly suited for refrigeration systems. Dyplast has long recognized that these demanding environments require a superior insulation, within a well-designed insulation system—properly installed to incorporate protection from hazards of the process environment. Dyplast's experience and research into alternative insulation products for ammonia refrigeration have confirmed that polyisocyanurate rigid foam, particularly ISO-C1[®], represents the optimal core insulant. ISO-C1 has inherent superior thermal efficiencies, while also offering excellent physical properties that complement other components within the system. For instance its water absorption, vapor transmission, and compressive strength characteristics provide additional layers of defence if vapor barrier or jacketing protection is ever breached due to

quality commitment for your insulation needs

DYTHERM REFRIGERATION INSULATION SYSTEMS:

- ISO-C1[®] POLYISOCYANURATE INSULATION
- DYPERM[®] VAPOR BARRIER WRAP (zero-perm)
- DYPERM VAPOR BARRIER TAPE (zero-perm)
- MASTICS, ADHESIVES, SEALANTS
- JACKETING



ISO-C1[®] POLYISO

Dyplast's ISO-C1 series of polyiso rigid foams, produced as bunstock, is based on polyurethane chemistry, yet with a different ratio between the polyhydroxyl alcohol and diisocyanate that yields improved fire/smoke performance and better dimensional stability. Dyplast's ISO-C1 has unique certifications from both UL, FM, and ICC among others, as well as superior thermal efficiencies, moisture resistance, dimensional stability, and compressive strengths when compared to alternatives. ISO-C1 is ideal for process temperature applications from -297°F to +300°F, and is available in densities from 2 to 10 lb/ft³.

- > -297 to +300 °F
- > Densities from 2 to 6 lb/ft³
- > Class 1 insulation per ASTM E84
- > ISO-C1/2.0 has FM/UL documentation
- > ISO-C1/2.0 is covered by an ICC-ES Evaluation Report
- > ISO-C1 Thermal Conductivity (K-factor):
0.16 initial; 0.18 aged

mechanical abuse. Dyplast's ISO-C1 has industry-leading certifications and approvals. Our rigorous quality control program is audited by independent parties such as FM, UL and ICC. ISO-C1/2.0 (2 lb/ft³ density) is generally the best-in-class polyiso product for refrigerant systems; yet ISO-C1/2.5 provides comparable performance and is often used because of its additional strength.

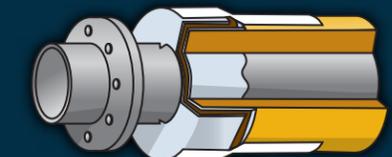
THIRD PARTY VERIFICATIONS:

END TO END ASSURANCE FROM FM, UL, AND ICC

BENEFITS AND FEATURES

Increased diligence must of course be exercised to optimize refrigeration insulation system performance while mitigating risks of future deterioration. Compared to cell-glass and XPS pipe billets, ISO-C1 has #1) lower initial capital cost, #2) higher energy savings due to better thermal conductivity, and #3) other physical properties that mitigate operational risks over the long term. Even ignoring ISO-C1's lower capital cost, over the 20-year life of an ammonia refrigeration insulation system, ISO-C1 could save \$40,000 per 100 linear feet of six inch pipe compared to XPS, and even more versus a cell-glass system.

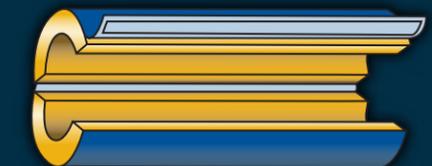
Yes, it can be argued that by simply adding greater thicknesses of XPS insulation the ISO advantage can be narrowed. Yet the appropriate question is why an end-user should pay more in capital cost to narrow the energy-savings gap with an insulant that is inherently less expensive and delivers better or comparable performance in all areas.



Vapor Stop with Vapor Barrier Sheetting and Mastic

DYPERM[®] WRAP

A zero-perm, 3-ply laminate vapor retarder constructed of a 1 mil aluminum foil with 0.5 mil polyester film on both sides. Recommended for low temperature piping including chill water to cryogenics. Dyplast recommends that DyPerm Wrap be factory-applied to the outer surface of the pipe insulation when possible, although it can be effectively field-applied as well.



Shop-applied Vapor Barrier with Self-seal Tape

DYPERM[®] TAPE

A zero-perm, 3-ply laminate vapor barrier tape made with 1 mil aluminum foil and a 0.5 mil polyester film on both sides. The tape is coated with a cold weather solvent acrylic pressure-sensitive adhesive system, combining superior quick stick at normal temperatures and superior performance below freezing.



Double Layer Expansion-Contraction Joint

PROCESS ENVIRONMENTS

The Process Environment encompasses the multiple variables that add complexity when configuring the optimal DyTherm Insulation System. Although several environmental variables can be modeled within the 3E-Plus software (www.pipesinsulation.org), a competent insulation engineer should be consulted.