Cryogel™ Z
Proven for LNG Service
Project Profiles

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A composite insulation system of polyisocyanurate covered with 50 mm of cellular glass was originally specified for the gasification section of this facility. Due to time constraints in the construction schedule, 20 mm of Cryogel Z was used in place of the cellular glass. The Cryogel Z / PIR composite offered equivalent protection against heat gain, moisture, and fire, and greater durability against mechanical damage. Most importantly, the Cryogel Z flexible blankets installed 80% faster than the cellular glass and eliminated expansion/contraction joints.
LNG Loading Arms
Mejillones, Northern Chile

Loading arms are usually uninsulated due to the severe stresses of cycling between ambient and LNG (-160°C) temperatures. This can result in heavy ice formations during operation, and dangerous ice falls during the subsequent warm up. The Mejillones LNG loading arms were insulated with Cryogel Z because it is impervious to cryogenic cycling, light enough to not affect the structural dynamics, and thin enough to avoid interference with the swing mechanism.
LNG Unloading and Vapor Return Lines
Everett, Massachusetts, USA

LNG loading/unloading lines in this facility commonly used rigid polyisocyanurate insulation or cellular glass. Since this facility does not continuously maintain the piping at cryogenic temperatures, the constant thermal cycling poses severe stresses on the insulation. To combat the wear-and-tear on the pipe insulation, a trial with Cryogel Z was performed in October 2007. In addition to the decreased thickness, the contractor found substantial improvements in application time. The system has been through more than 100 deep thermal cycles to date, with outstanding results.
Adriatic LNG is an offshore LNG receiving terminal located just south of Venice, Italy. Rigid insulation material was specified for the piping, but due to construction timing issues, Cryogel Z was used to insulate the cryogenic valves and flanges. Cryogel Z was chosen due to its extremely thin profile, ease of construction and logistics, and fast application time.
This uninsulated bellows coupling at the base of an LNG tank was accumulating ice balls and impairing the movement of the stainless steel corrugations. The relative motion inherent to bellows necessitated the use of Cryogel Z because it always remains flexible, even at cryogenic temperatures.
LNG Field Joints
Freeport, Texas, USA

The Freeport LNG terminal uses vacuum piping for the LNG transfer lines, and the field joints required an insulation that could be easily applied and have a very thin profile. Cyrogel flexible insulation blankets offered the best solution for this application.
Cryogel Z has the lowest k-value of any cryogenic insulation material in the world, reducing thicknesses by 50% - 75%. Cryogel Z’s flexible blanket form, with a factory-applied vapor barrier, is both faster to install and more durable once in service, resulting in lower-cost, higher-performing designs.

Applications for Cryogel Z include sub-ambient piping and equipment, cryogenic storage and transport, industrial gases, and LNG import/export pipelines and process areas.

Cryogel Z Insulation System Advantages

- Thinness creates more space in and around pipe racks and equipment.
- Thinness can decrease the overall size of a production facility, resulting in major material reductions and cost savings.
- Thinness results in volume and freight savings, decreased accessory materials, minimal site storage, and simplified logistics.
- Unique flexible form and wrap application makes installation faster, easier, and less costly. Rigid insulation systems require numerous segments that must be effectively sealed.
- Will not break during shipment.
- Competitive with other insulation systems on an installed basis due to decreased material requirements, logistics improvements, reduced installation time, and shorter construction schedules.

Service Temperature Range

-460°F (-270°C) to 195°F (90°C)

Thermal Performance

Cryogel Z has the lowest thermal conductivity of any material used for cryogenic service. It is therefore much thinner compared to other cold insulation materials. In most cases, condensation control thickness is sufficient to meet the desired heat gain limitations. Cryogel Z’s minimal thickness results in a smaller surface area and reduced heat gain compared to other insulation materials. This heat gain “safety factor” maximizes system performance by improving process control, reducing boiloff and saving energy. Also, Cryogel Z does not have blowing agents that diffuse out over time, so its thermal performance remains constant.

Moisture and Vapor Resistance

Permeability to water and water vapor are critical to any insulation system operating at cryogenic temperatures. Cryogel Z uses a factory-applied mylar vapor barrier to achieve a zero-perm system.

Structural Integrity

Cryogel Z is well-suited for sub-ambient and cryogenic applications. Under these severe conditions, its structure experiences no thermal shock and remains totally flexible. This is unlike rigid, cellular insulation materials, which experience contraction, thermal shock, extreme stresses, damaged structure, freeze-thaw crack propagation, and degraded insulation performance under the same conditions.

Dimensional Stability

Cryogel Z insulation has a coefficient of thermal expansion similar to that of stainless steel, so there is minimal movement of the insulation system. Its low contraction rate and flexible wrap application eliminate the need for costly and labor-intensive expansion and contraction joints required by traditional rigid insulation systems.

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