

Aerogel Insulation Installs Faster, With Less Thickness on Sphere

Cryogel Z provides excellent
fire protection



CASE STUDY

DETAILS

Owner: Braskem
Engineer: Odebrecht
Basic Engineering: Procind

Contractor: Confab
Insulation Contractor: Isolenge

CHALLENGES

- Accommodate the complex geometry of a large sphere with pre-cut segments.
- Permit a rapid installation within an accelerated work schedule.

SOLUTIONS

- Five layers of **Cryogel® Z (10 mm)** and one layer of **Pyrogel® XT (10 mm)** were installed. The Pyrogel XT served as a final, sacrificial layer ensuring that underlying vapor barriers would not be penetrated or mechanically damaged.
- Cryogel Z segments were pre-cut from templates engineered by Sproule Manufacturing of Houston, allowing for total material waste of only 1.5%.
- Cryogel Z was secured to the sphere surface with 3M spray adhesive and weld pins prior to final banding.
- Painted, low-emissivity galvanized steel was installed over the insulation.

BENEFITS

- While additional mechanical works delayed the handover of the sphere to the insulation contractor, installation of the Cryogel Z was completed 20% more quickly than a polyurethane foam system. This allowed the insulation works to be completed in only 12 days – five days ahead of schedule – allowing the mechanical contractor to handover the completed sphere on schedule.
- Cryogel Z provides greatly improved fire protection of the sphere versus the previous polyurethane system. In testing to the UL 1709 standard, 50 mm of Cryogel Z, jacketed with stainless steel, can provide 90 minutes of fire protection – a significant improvement over polyurethane foam.
- The composite 60 mm of aerogel insulation replaces the traditionally specified 150 mm of polyurethane foam, while providing superior thermal performance that will not degrade over the course of time.
- Aerogel insulation provided a green solution well matched to Braskem's new biobased ethylene production.

Background

Braskem required additional storage capacity at its Eteno Verde plant in Triunfo (Porto Alegre), Rio Grande do Sul, Brazil. In May 2010, following delayed completion of the mechanical works on the construction of the new 18.36 m diameter sphere, it was turned over to Isolenge to install the insulation. The insulation system needed to provide both condensation control and a maximum heat flux of 11.6 W/m² while operating at -29°F (-34°C) in ambient temperatures and high temperatures in the region peaking at 104°F (40°C) with 80% Rh. A total aerogel insulation thickness of 60 mm replaced the originally specified 150mm of polyurethane foam.

Braskem embraced the Cryogel Z system as a faster, cleaner technology that allowed for a more rapid commissioning of the project and provided excellent performance under UL 1709 for fire protection. Cryogel's fire performance was a key factor in Braskem's decision to insulate the sphere with Cryogel rather than traditional polyurethane foam systems. Braskem and its engineering partner, Odebrecht, were completely satisfied with the Cryogel Z installation. Two additional spheres have been scheduled for construction and will include Cryogel Z for thermal insulation.

