



**Introduction to Pyrogel® & Cryogel®
High-Performance Aerogel Insulation**

Project Profiles in:
**Process Improvement
Corrosion Defense
Speed of Application**

Pyrogel®

Cryogel®

USER BENEFIT

Faster Application

Ground Level Insulation



Alkylation Contactor on US Refinery

Cryogel® Z installed in 60% of the time that was originally allocated to cellular glass.

The ground level contactors were pre-insulated for a faster and safer project completion.

The faster install resulted in reduced maintenance cost and earlier return to service.



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Faster Application

Reduced Maintenance Expense



**Maleic Anhydride Reactor at a
Mid-West Chemical Plant**

Pyrogel® installed faster, resulting in reduced maintenance cost and an earlier availability for the reactor to be returned to service.

The tough and lightweight format of Pyrogel meant the reactor could be insulated at ground level, in the horizontal position, and then lifted into place.

This faster application resulted in a direct savings of \$80,000.



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Process Stability

Live Installation



Asian LNG Gasification Facility

Cryogel® Z was selected to remediate and replace damaged PIR pipe insulation at an LNG facility. The failed PIR resulted in excessive condensation and ice formation. Cryogel Z excelled in on-site trials and was adopted into the site specification.

Cryogel's unique properties at cryogenic temperatures enable an effective live install on LNG pipework. The facility maintenance team elected to replace PIR entirely on some lines while only replacing the outer layers on others.

The facility remained operational throughout the maintenance events.



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Constructability

Unit Pre-Insulated to Save Time



Stilll extracted from BP Corporate Video - 2017

Vacuum Distillation Unit at European Refinery

Pyrogel® XTE was selected for pre-insulation of a 63m vacuum distillation unit.

30mm and 40mm of Pyrogel XTE applied at Asian construction site prior to sea transport to a European refinery.

The efficient and versatile format of Pyrogel XTE enables rapid insulation of large diameter vessels. Unrivalled toughness and durability ensures that the protective insulation layer is sustained during transport, staging and unit installation.



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Faster Application

8-Day Turnaround Critical Path



Demethanizer Tower at Mid-West Refinery

Cryogel® installed faster on a tower during a turnaround, resulting in a reduced maintenance cost and earlier return to service.

Due to the hydrophobic nature of Cryogel, the tower was essentially weatherproofed before jacketing was applied.

Cryogel Z supports superior labor productivity and faster turnarounds.



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Process Stability

Lower Steam Generation Costs



Off-site Steamline Insulation Replaced at South American Petrochemical Complex

Persistently wet insulation resulted in aggressive corrosion under insulation (CUI) on a high-pressure steam line. Massive heat loss during rain events led to steam sheds and process shutdowns.

Pyrogel® XTE was selected to replace water absorbent mineral wool and calcium silicate insulation. Pyrogel XTE keeps the steam line dry and operating efficiently, supporting downstream process stability, supporting downstream process efficiency and energy savings in even the most challenging environment.

Approximately \$1,300,000 in annual energy savings was achieved through the avoidance of degraded insulation.



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Reusable

Reduced Maintenance Cost &
Earlier Return to Service



C3 Splitter Turnaround at a Texas Refinery

Cryogel® was removed from the 340 foot tall splitter, and then reinstalled when the turnaround was completed. This reuse aided in reduced maintenance expense and an earlier return to service.

Removed Cryogel was stored on scaffold during turnaround.

Cryogel was 40% lighter than previously used insulation.

Re-use of Cryogel eliminated time and expense of re-insulation.



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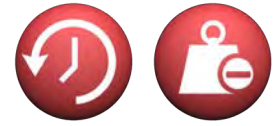
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Faster Application

Reduced Capital Expense



Depropanizer Feed Settler at Canadian Hydrocarbon Processing Facility

The lighter weight of Pyrogel® XTF and its faster installation resulted in a reduced capital cost and earlier return to service.

Pyrogel XTF helped to reduce construction time by months as the existing pad could be retained.

\$500,000 of direct savings by eliminating the need for pad and achieving faster application.



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Pyrogel®

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Faster Application

Superior Constructability



US LNG Liquefaction Terminal

Cryogel® Z's unique properties at deep cryogenic temperatures mean that complex contraction joints are eliminated in LNG systems.

The unique and intuitive installation technique of Cryogel, combined with its versatile format, enables task simplification for rapid and effective completion of the insulation phase.

Cryogel Z is mechanically and thermally durable, sustaining cryogenic protection during the construction, commissioning and operational phase of the project.



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Process Stability

Focus on Plant Operation, Not Weather



FCCU Overhead Line on Gulf Coast Refinery

Repeated failure of the existing rigid insulation system led the system to “self-remove.” Subsequently, cold spots on an FCCU overhead line appeared.

Faced with ongoing unfavorable process conditions, the site selected Pyrogel® to restore the thermal insulation layer and sustain optimum operating conditions.

Pyrogel resists the main enemies of thermal insulation—heat, water, and mechanical abuse—to protect processes and assets for longer.



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Faster Application

Earlier Handover of Unit



NAPHTHA Cracker - Cold Section at Asian Petrochemical Facility

Cryogel® Z was selected to reinsulate a fractionator unit during a turnaround due to faster application rates compared to rigid insulation.

Cryogel Z's superior thermal and CUI defense features support superior asset protection and improved process stability.

Faster application on a NAPHTHA cracker cold side unit enabled earlier completion of the insulation phase of the turnaround.



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Faster Application

Support Earlier Unit Restarts



**Coastal Petrochemical Facility
in South Asia**

Pyrogel® & Cryogel® were selected to re-insulate a South Asian petrochemical complex. High levels of rainfall and a coastal exposed site led to devastating CUI, requiring a total strip, treat and re-insulation program.

Pyrogel & Cryogel's versatile format supported faster application rates, enabling the facility to restart units earlier.

By keeping their assets drier for longer, the facility will benefit from improved process stability and reduced operating costs, in addition to reducing the risk of CUI.



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Process Efficiency

6-Month Payback On Drum Super-Insulation



Delayed Coker Unit at Mid-West Refinery

Coker Drums super-insulated with Pyrogel® support better coke bed formation and increased liquid yield.

Incumbent mineral wool insulation degraded and “self-removed”, resulting in sub-optimal feed and drum temperatures.

Pyrogel resists the combined impacts of heat, water and vibration to support sustained protection of feed lines, drum and overhead lines.

Using Pyrogel for Delayed Coker Unit insulation results in safer operations, reduced stress, corrosion, and optimum temperature support for increased profitability.



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Process Stability

Focus on Plant Operation, Not Weather



High Pressure Steam Line at Gulf Coast Refinery

Persistently wet calcium silicate insulation suppressed steam quality, leading to supply pressure dips during rain storms. The pressure dips were so severe that the facility maintained a weather watch to manage steam sheds and process shutdowns.

Because of its superior performance in challenging environments, Pyrogel® was selected to remediate the steam line. By keeping the assets dry, the site team can focus on unit operation and profitability instead of the weather.

The facility recovered millions of dollars of margins that were previously lost.



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Faster Application

Completed on Time



Unit Upgrade During Turnaround on Brazilian Refinery

Additional tower unit pre-insulated with Pyrogel® to reduce time off-steam.

No alterations of existing support rings, nozzles, or manholes.

The use of Pyrogel was expanded to the desalting unit.

Turnaround phase completed on time.



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Faster Application
Unrivalled Labor Productivity



Isomerization Tower at a US Refinery

Pyrogel® XTE was selected to insulate a 120 foot (37m) isomerization tower based on superior CUI defense and process stability capabilities.

The tower was insulated at a remote insulation facility. Despite the tower's late arrival to that facility, the unit was insulated, jacketed and transported to the refinery on time.

Pyrogel's lightweight, efficient and versatile format facilitated an accelerated insulation phase, resulting in completing the job in a fraction of the time allocated for rigid insulation.

The insulating crew also reported minimal scrap rates and improved workshop logistics.



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Process Stability
Reduced Regeneration Time



Regeneration System at a Gulf Coast Petrochemical Plant

The discovery of CUI originating from persistently wet insulation led to the complete removal of the thermal protection on a regeneration unit. Subsequent increases in operating costs led the site to search for a viable alternative.

Removable covers fabricated using Pyrogel® XTE were selected. The thin, lightweight covers can be removed for inspection within 5 minutes.

Pyrogel increased regeneration temperature by 50°F, minimized potential for stalled regenerations while boosting CUI defense. Payback is expected in less than one year and was adopted as a best-practice in the organization.



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Faster Application

Versatile & Efficient Format



**Remote South American
Copper Mine**

Pyrogel® XTE was selected for freeze protection of critical fire fighting water lines at a remote copper mine.

Pyrogel's ultra efficient and versatile roll format could be air-freighted to the remote site for a fraction of the cost of rigid insulation. Faster installation rates reduced downtime and led to earlier restart of operations.

Freight and install savings are in excess of \$10,000.



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Faster Application
Sustained Thermal Protection



Aluminium Refinery in Australia

Pyrogel® XTE was selected for heat conservation service in an aluminium refinery using the tube digestion process. An aggressive environment and process conditions led to accelerated CUI under the incumbent mineral wool, despite the 300°C process.

Pyrogel's sustained thermal protection in a challenging environment supports better process control, reduced energy costs and maintenance interventions.

Site management can now focus on operational performance without fear of process instability during rain events.



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Process Stability

Labor Savings & Improved Performance



Coker Yield Line at Gulf Coast Refinery

70 mm of Pyrogel® HPS was selected to insulate the 36-inch yield line on a Gulf Coast Delayed Coker Unit, displacing 6 inches of calcium silicate.

Pyrogel HPS installed faster, leading to savings of approximately \$25,000 in labor. The unit was made available faster, supporting an earlier restart.

Pyrogel HPS is engineered to maintain design temperatures feed lines, drum, and overhead lines increasing potential for improved liquid yield, reducing operating costs and boosting asset protection.



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Our renowned global technical services team is available to diagnose and prescribe a sustainable Pyrogel or Cryogel solution. Get in touch today to discuss a range of services offered including...

- Lunch and Learns
- Thermographic Inspections
- Problem Diagnosis
- Trial Installations
- Contractor Training
- Specifications

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