

# PITTSBURGH CORNING FOAMGLAS<sup>®</sup> INSULATION

Standing the Test of Time<sup>™</sup>

**Customer:**  
Procter & Gamble Company

**Location:**  
Cincinnati, Ohio

**Situation:**  
Food Processing—Tanks, Piping  
and Equipment



Designed to meet domestic and international demand for its breakthrough olestra product, P&G's \$200 million-plus production facility became fully operational in January 1998.

FOR 60 TANKS AND 135,000 LINEAL FEET OF PIPING:

## Noncombustibility Is a Key Ingredient at P&G's New Olean<sup>®</sup> Cooking Oil Plant

### Background

The Procter & Gamble Company (P&G), with headquarters in Cincinnati, is one of the world's most recognized companies. With annual sales reaching \$35.8 billion, P&G is one of the leading international producers and marketers of consumer products. Among its food and beverage brands: Pringles, Jif, Folgers and Millstone coffees and Crisco.

In 1996, P&G received approval from the U.S. Food and Drug Administration (FDA) to begin test marketing of snacks made with a new, calorie-free, fat-free cooking oil called olestra. This cooking oil had been developed by P&G over a 25-year span at a cost of more than \$200 million. Marketed under the brand name Olean<sup>®</sup> oil, the value of olestra is as a fat replacer—it contributes no fat or calories to the diet. P&G uses olestra in products

it makes, and also markets it to other food producers.

After receiving FDA approval to use olestra in producing snack chips and crackers, P&G successfully test marketed those products in several U.S. cities. Afterward, P&G broke ground on a new, \$200 million-plus production facility in Cincinnati to meet both U.S. and international demand.

### Process Control is a Critical Factor

The olestra national production facility is comprised of a series of tanks and vessels connected by a network of piping. Tank sizes vary, with the largest seven measuring 60 feet tall and 60 feet in diameter. About 80 percent of the piping system is equipped with either electric- or steam-heat tracers. Throughout the manufacturing process, system



*Olestra manufacturing is a highly flammable process. To reduce the threat of fire, P&G specified noncombustible, nonwicking FOAMGLAS<sup>®</sup> Super K<sup>™</sup> cellular glass insulation.*

temperatures vary from -150°F to 600°F, a challenging process control range for most industrial insulation materials.

“Process control is critical because of the large deviation in temperatures,” said Bob Potvin, P&G’s resident engineer, who has been involved in building P&G processing plants for 27 years. “If we couldn’t maintain the precise temperatures, the olestra would not move through the system properly, and the plant would shut down. That’s why a reliable insulation system is essential for this plant to run. FOAMGLAS® SUPER K™ insulation performs well within all of the plant’s temperature ranges.”

### **An Inherently Flammable Process**

In virtually any manufacturing operation, there is the potential for pipe leakage. At the P&G olestra plant, because of the flammability of the manufacturing process — and the sheer size of the facility — the selection of the insulation system took on added significance.

“The process of making olestra is inherently flammable,” explained Steven P. Newman, lead mechanical engineer for Fluor Daniel, the prime engineering procurement contractor. “Specifically, it’s the heating oil and methanol used in the manufacturing process that creates the flammable environment. Methanol has a very low flash point, and when you combine that with the temperatures at which the system runs — more than 600°F at some points — it creates a significant potential for fire.”

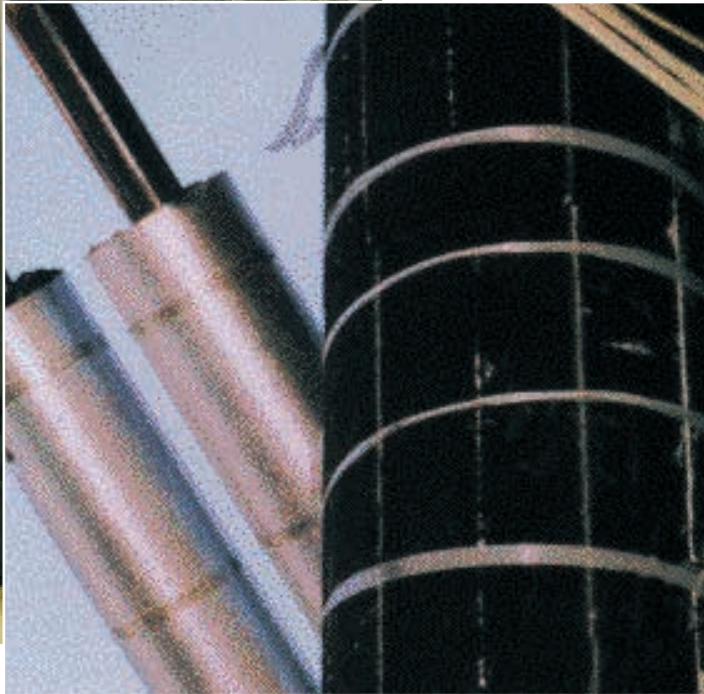
Since certain thermal insulation materials are inherently combustible and will contribute to the intensity of industrial fires, insulation is recognized by industry experts as playing a potentially active role in fire propagation. While some insulations are themselves noncombustible —such as fiberglass, calcium silicates and mineral wool — they can absorb or “wick” combustible liquids, and, consequently, contribute to the spread of a fire.

“The concern going in was two-fold,” Newman said. “Either leaks could occur directly onto the insulation and immediately ignite (by high temperatures or open flame). Or, the insulation could become saturated, and as the process moves from an ambient temperature to 600°F, the insulation could ignite spontaneously.”

*FOAMGLAS® Super K™ insulation was installed to the sidewalls of more than 60 tanks and vessels, the largest seven of which stand 60 feet tall and measure 60 feet in diameter.*



*FOAMGLAS® Super K™ insulation was secured to tanks and vessels with stainless steel strapping, then covered with corrugated aluminum jacketing. In all, more than 250,000 board feet of insulation was used in the tank phase.*



Pipe sizes range from 1/2-inch- to 36-inches in diameter, with most being in the 4- to 6-inch range. FOAMGLAS® Super K™ insulation was prefabricated in 2-foot, half-round sections and field applied, in thickness ranging from 2- to 3-inches, secured with stainless steel strapping and covered with corrugated aluminum jacketing.



About 80 percent of the plant's piping system is equipped with either electric- or steam-heat tracers. Throughout the manufacturing process, system temperatures vary from -150° to 600°F.

## ***A Nonflammable, Non-Wicking Insulation is Required***

To reduce the threat of fire, P&G specified noncombustible, nonabsorbent FOAMGLAS® Super K™ cellular glass insulation for all tanks and piping. Because it is 100 percent glass, without binders or fillers, it cannot burn, even when in contact with the most intense flames. Since FOAMGLAS® Super K™ insulation is impermeable and non-wicking, it cannot absorb or transport combustible liquids.

Mike Fitzsimmons, project manager for Petrochem Insulation, Inc., the insulation installer, said, "In an environment such as the olestra plant, where there's a potential for leakage of flammable material, it's critical to have an insulation that not only does not absorb liquids, but does not transfer them through wicking. If olestra ever leaked, there could be the potential for major problems.

"Procter & Gamble considered a number of insulation materials, but chose FOAMGLAS® Super K™ insulation because it's nonabsorbent and non-wicking," Fitzsimmons continued.

"FOAMGLAS® Super K™ insulation helps to reduce the chances that a fire could occur and spread."

## ***The Tank Phase***

Insulating the tanks and piping system began following successful systems testing.

According to Newman, "Because FOAMGLAS® Super K™ insulation performs equally well throughout the temperature range that the olestra plant operates, it was used on all of the tanks and pipes."

FOAMGLAS® Super K™ insulation was installed to the sidewalls of the 60 tanks and vessels. Thicknesses ranged from 3 inches to 4 inches, depending on the size and operating temperatures of the vessels. The insulation was secured with stainless steel strapping, then covered with corrugated aluminum jacketing. In all, more than 250,000 board feet of insulation was used in the tank phase.

## ***The Piping Phase***

For the piping system, approximately 135,000 lineal feet of FOAMGLAS® Super K™ insulation was installed. Pipe sizes range from 1/2-inch to 36-inches in diameter, with most being in the 4- to 6-inch range. The FOAMGLAS® Super K™ insulation was prefabricated in 2-foot, half-round sections and field applied, in thicknesses ranging from 2 to 3 inches. The half rounds were butted together and secured with stainless steel strapping, then covered with aluminum jacketing.

For cold processing pipelines requiring a vapor barrier, the insulation was sealed along the butt joints and longitudinal seams, a mastic was applied, and the lines were covered with aluminum jacketing. For use below -70° F, the insulation was applied in multiple layers with all seams staggered. Some cold system piping (32-inch-diameter) received a built-up insulation thickness of between 5 and 6 inches.

“Another reason FOAMGLAS® Super K™ insulation was specified was because of its high load-bearing strength,” said Newman. “Many of the pipes rest on half-pipe saddles that were designed to be used as support bases. The FOAMGLAS® Super K™ insulation was capable of supporting those heavy loads without deformity.”

For easier access, most of the flanges, pumps, heat exchangers, in-line control instruments and control valves and other equipment—more than 400 pieces in all—were covered with hard insulation boxes constructed of aluminum and FOAMGLAS Super K™ insulation. “The boxes that we constructed made for some really odd configurations,” said Newman. “While formability was not a reason why we specified FOAMGLAS® Super K™ insulation, we were pleased with how easy it is to sculpt.”

After a little more than a year’s construction, the world’s first olestra plant became operational—just in time for national TV commercials touting olestra. “It’s the largest FOAMGLAS® insulation job that I’ve ever been associated with in my 20 years of experience,” said Fitzsimmons. “But Procter & Gamble clearly didn’t cut any corners; they wanted to do everything the right way. Depending on maintenance and repair, the FOAMGLAS® Super K™ insulation should last upwards of 30 years or more.”



*For cold processing equipment requiring a vapor barrier, a mastic was applied to FOAMGLAS® Super K™ insulation and the lines were covered with aluminum jacketing.*



*FOAMGLAS® Super K™ insulation was field fabricated for odd shapes such as vessel heads (as shown). For easier access, flanges, pumps, controls and other odd shapes were covered with hard insulation boxes constructed of aluminum and FOAMGLAS® Super K™ insulation.*

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