Alaska Pipeline Insulation

Crude oil moving through the 800-mile Trans-Alaska Pipeline must be kept at a relatively high temperature—about 180 degrees Fahrenheit—to maintain the fluidity of the oil. In Arctic weather, that demands highly effective insulation. General Electric Co.'s Space Division, Valley Forge, Pennsylvania, provided it with a spinoff product called Therm-O-Trol. Shown being installed on the pipeline, Therm-O-Trol is a metal-bonded polyurethane foam especially formulated for Arctic insulation.

A second GE spinoff product, Therm-O-Case, solved a related problem involved in bringing hot crude oil from 2,000-foot-deep wells to the surface without transferring oil heat to the surrounding permafrost soil; heat transfer could melt the frozen terrain and cause dislocations that might destroy expensive well casings. Therm-O-Case is a double-walled oil well casing with multi-layered insulation which provides an effective barrier to heat transfer. Therm-O-Trol and Therm-O-Case are members of a family of insulating products which stemmed from technology developed by GE Space Division in heat transfer/thermal control work on Gemini, Apollo and other NASA programs.

Aid to Solar Collector Development

Below, an engineer is testing a sample coating to determine its "emissivity," meaning the degree to which it emits radiant energy. The instrument he is using, called the McDonald Emissometer, is useful to companies engaged in development of solar energy collectors. Originally developed by NASA, the system is manufactured for the commercial market by International Technology Corporation, Satellite Beach, Florida.

Solar heating and cooling systems employ coatings to increase efficiency. Designers want a coating which absorbs solar heat to the maximum extent possible with minimal emittance of infrared radiation, which occurs when the collector plate gets hot. The coating is important because too much coating causes energy loss by emittance, too little reduces the collector's ability to absorb heat.

NASA's Lewis Research Center, which conducts solar energy research, saw a need for a simple means of testing coating samples for emittance. Such equipment is available to research laboratories, but it is complex and expensive. To provide an equally accurate but relatively low-cost system for wide use by manufacturers of solar equipment, Lewis undertook development of the emittance measuring device in conjunction with Willey Corporation, Melbourne, Florida and the Institute of Optics, University of Rochester, New York.

In use, the emissometer is placed above a heated sample and the radiation from the sample is focused on a detector within the instrument. Rising temperature, determined by heat sensing equipment, indicates the degree of emittance, which is measured and displayed on a meter. The emissometer permits easy testing of various experimental coatings and also helps determine how the coatings will react to increases in temperature or time in use, information important to development of efficient solar collectors.