



Introducing a new team to supply the best in Vacuum Insulated Piping for LNG

Linde BOC Process Plants and PHPK Technologies have joined forces to design and manufacture large diameter vacuum insulated piping for the global LNG market. With Linde's vast experience in cryogenic equipment manufacturing and PHPK's expertise in the design and production of complex vacuum insulated piping systems, this new partnership will provide the most reliable and cost-effective transfer and distribution systems available to the LNG industry.



THE LINDE GROUP

Linde BOC Process Plants (LBPP)

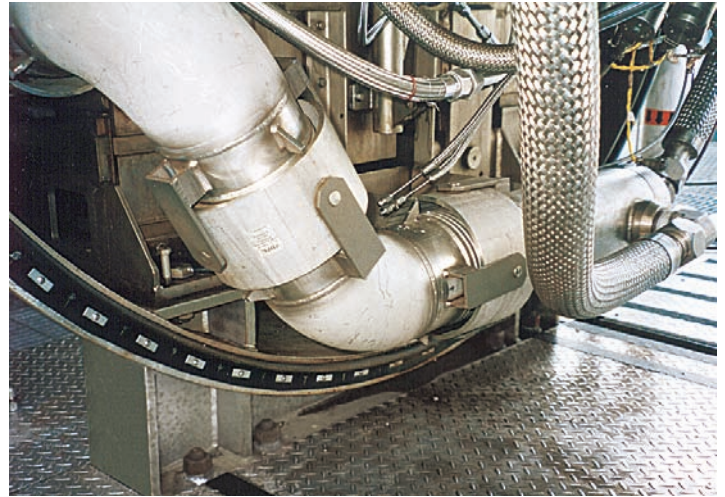
LBPP's fabricating capabilities include cryogenic air separation plants, helium and hydrogen liquefaction units, natural gas processing equipment, and other large scale projects. Located on 24 acres at the Port of Catoosa, Linde's U.S. based manufacturing facility allows for easy barge access to major U.S. sea ports. This modern 161,000 sq. ft. facility features an ISO-9001 certified quality system, state-of-the-art manufacturing equipment, and an experienced, highly trained workforce in its custom and high-volume production areas.



PHPK Technologies

Engineering complex vacuum insulated piping (VIP) systems since 1992, PHPK has some of the most experienced cryogenics engineers in the industry. PHPK has designed and manufactured LH₂, LHe, LN₂ and LOX VIP for NASA launch and testing facilities, U.S. Navy aircraft carriers, Boeing and Lockheed Martin launch complexes and LNG facilities. VIP has been produced in sizes up to 24" diameter and pressures up to 10,000 psig. PHPK engineers utilize sophisticated Finite Element Analysis techniques to verify and qualify its complex system and component designs.





(Above) PHPK has proven expertise in complex cryogenic piping systems, such as in this shuttle engine test stand.

(Left) This LNG liquefaction plant is typical of Linde's design, construction and installation capabilities.

What we offer

The Linde/PHPK team will provide its customers with fast delivery of superior quality vacuum insulated piping for LNG receiving terminals, liquefaction plants or peak shaving facilities at an affordable price.

Piping is available in a wide variety of sizes, pressures ranges and materials. Our standard design utilizes shop fabricated and evacuated vacuum insulated spool sections in lengths of 80 ft. and more to meet customer requirements. System design incorporates either internal expansion joints for underground or sub-sea installations, or external expansion connections with hinge joints to reduce or eliminate expansion loops.

Our vacuum insulation system features laminated radiation shielding and a low conductive spacer material that allows less than 10 percent of the steady-state heat gain of mechanical insulation materials. In addition,

cool-down losses of the vacuum insulated piping are greatly reduced due to the absence of conventional insulating materials.

Linde/PHPK's LNG piping will help customer save through:

- Reduced installation costs
- Lower maintenance costs
- Reduction of boil-off gas
- Longer piping runs with fewer joints
- Increased support spacing

In addition, double-wall vacuum insulated piping can act as containment piping, which allows for simpler plant layout requirements.

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