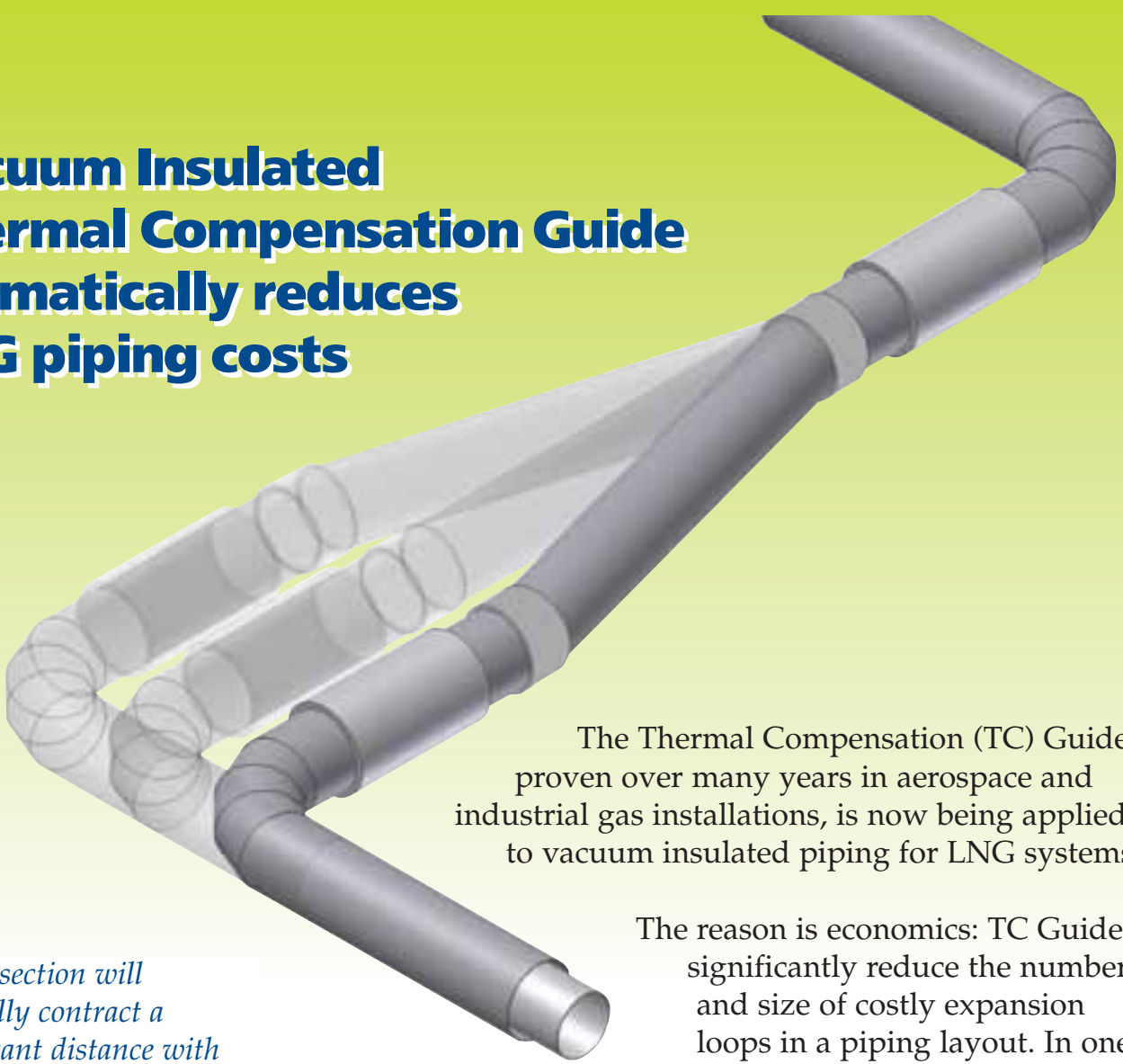


Vacuum Insulated Thermal Compensation Guide dramatically reduces LNG piping costs



A pipe section will thermally contract a significant distance with the change from ambient to cryogenic temperatures. A TC Guide spool absorbs this movement, performing the same function as an expansion loop and greatly increasing the distance between any loops that may still be required.

The Thermal Compensation (TC) Guide, proven over many years in aerospace and industrial gas installations, is now being applied to vacuum insulated piping for LNG systems.

The reason is economics: TC Guides significantly reduce the number and size of costly expansion loops in a piping layout. In one 4.5 km LNG system, the use of TC Guide spools **eliminated 12 expansion loops, 92 elbows and 850m of 30" pipe.**

TC Guide spools also cut on-site construction costs:

- Lower field labor costs
- Less need for support construction
- Lower pipe transportation costs



A 42" diameter TC Guide spool designed for hydrogen service

Vacuum insulated TC Guide spools have long been specified by NASA and the aerospace industry to compensate for thermal movement and vibration in liquid hydrogen and oxygen piping in launch pads and engine test stands.



Long Term Advantages of Vacuum Insulated Thermal Compensation Guides:

- Reduced construction time
- Lower piping system pressure drop and boil-off gas
- Reduced maintenance costs
- Designed for 5,000 cycle life
- TC Guide spools can also be used with mechanically insulated piping.
- Designed for double containment

Offered by the Linde/PHPK Alliance, your new, experienced source for large diameter vacuum insulated LNG piping.

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