



Case Study

LNG #30

Large Bore Vacuum Insulated Pipe (VIP) System for LNG Bunkering Facility



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Highlights:

- LNG facility, opening in 2021, is located in Tacoma WA, includes liquefier and state-of-the-art marine bunkering operations
- Large bore vacuum jacketed piping used to provide the efficient transfer of LNG.
- Designed for zero venting and full secondary containment which advances the design and safety for large vacuum insulated piping

Location— Port Tacoma, Washington, USA

Scope of Project:

- 17.24 bar/250 PSIG, 25.4cm/10" ID VIP for majority of the run
- From liquefier storage tank to marine use point—800 ft
- Project included engineering design, thermal stress analysis, and fabrication



Application:

Liquefied Natural Gas (LNG) is growing as the marine fuel solution for lowering emissions in the ocean-shipping sector and driving development of bunkering facilities globally. The Port of Tacoma's location will be an efficient port of call for LNG fueled ships that sail the US West Coast. Scheduled to commission Q2 2021, the facility will also provide backup storage supply for the local natural gas utility.

Project Background:

The liquefaction facility is located across a roadway and three rail road tracks from the marine loading pier. Chart was challenged to provide custom engineered piping that would be installed in a below grade casing. The VIP system would basically be inaccessible to normal servicing or repairs and required zero venting operations.

System Configuration:

Double wall piping with both inner and outer pipe made of stainless steel. Using SS materials on outer pipe serves as the secondary safety containment for the 243.884 meters/800 ft run. Taking in consideration the challenges of installing the pipe in the purpose built casing, the robust designed spools measure in lengths up to 21.35 meters/70ft for fewest run connections. Engineered and manufactured with vapor return lines.

Significant Accomplishments:

Full system approach to meet transfer requirements for fueling LNG powered ships with a flow rate of 600m³/hr (2,600 gal/min)

Zero loss emissions design eliminates venting methane to atmosphere during operations as well as during extended intervals between use

Manufactured with internal bellows – eliminated need for expansion loops

