

Composite Repairs Live Butane Line

PIPE DETAIL

28-inch (711-mm) Carbon Steel line carrying Butane

Design Pressure 12.26 barg (178 psi)

Design temperature 145°C (293°F)

Operating temperature 81°C (178°F)

SUMMARY

- A 28-inch (711-mm) carbon steel line carrying butane had sustained significant corrosion
- Thermo-Wrap™ Inspectable was used to repair the dents
- 3 ClockSpring|NRI technicians completed the installation in 32 hours
- No hot work was required
- No negative environmental impact
- No need to completely shut down refinery operations

ClockSpring|NRI Europe Ltd. had a team of technicians already working on site at a refinery when a routine inspection revealed external atmospheric corrosion on a 711-mm (28-inch) carbon steel line carrying butane. A length of 1.6 m (5 ft) of line was severely corroded, resulting in extensive wall thinning. The line was designed for 12.26 bar (178 psi) pressure and 145°C (293°F) and was operating at 81°C (178°F).



A routine inspection revealed external atmospheric corrosion on a 711-mm (28-inch) carbon steel line carrying butane.

The traditional solution for repairing the line was to use a clamp, but the extent of the damage meant the repair would require a clamp weighing nearly two metric tons.

The ClockSpring|NRI engineering team evaluated the details of the line damage and designed a composite solution. The thin-walled state of the line meant surface preparation would not be possible on the corroded area. This led to the decision to use Thermo-Wrap™ Inspectable, which is particularly well suited for repairing high-temperature and process piping.

Thermo-Wrap Inspectable is a custom-engineered repair system that uses a fiberglass, composite-reinforced coating and non-crimped, glass fiber architecture, specially formulated to work with digital radiography inspection equipment. Thermo-Wrap Inspectable is appropriate for corroded or damaged piping with harsh chemical services and elevated temperatures. It requires no cutting or welding, which simplifies installation.



Technicians carefully grit blast the line as close as possible to the defect without creating further damage or causing production loss on the damaged line.

Engineers determined that the repair would require large quantities of Thermo-Wrap Inspectable and immediately began preparing the shipment from a local office. The composite was shipped to the site the same day, and work commenced immediately.



Technicians installed a 40-layer system of Thermo-Wrap Inspectable over 3.1 m (10.2 ft) of the damaged line.

The main installation challenge was to apply a large number of layers in a congested area on to a pipeline running at 81°C (178°F). A team of 3 ClockSpring|NRI technicians grit blasted the line as close to the damaged section as possible and repaired the damaged area with Thermo Fill epoxy to restore the geometry of the line. The team then applied a 40-layer system of Thermo-Wrap Inspectable installed in four stages. The entire repair was completed in 32 hours without halting production.

Working with trusted partners allowed the refinery to repair the damaged line quickly without shutting down the line or losing production and provided assurance that the installation could be executed without the risk of a live leak.



The completed installation restored a length of 3.1 m (10.2 ft) 711-mm of corroded (28-inch) carbon steel line to safe service.



ClockSpring|NRI technicians applied UV stable epoxy coating to add further protection to repair.