



Minimize Down Time for Refinery Turnarounds



Linde has the services and expertise you need to help minimize downtime and reduce risks during turnarounds and routine maintenance throughout your facility. Our wide range of mobile nitrogen pumping applications include accelerated cooling, purging, inerting, hot stripping, accelerated drying, inert entry support, pipeline cleaning, furnace tube decoking and more.

As the largest supplier of nitrogen in North America, you can count on us to be there where and when you need us. Nitrogen is often used in refineries because of its cost-effectiveness, availability, and nonhazardous effects. Combined with our precisely controlled mobile pumping equipment, Linde can put nitrogen to work in a wide range of applications. We match the type of equipment used to each application for optimal economics, performance, and safety. Linde can deliver nitrogen product to you via a manned mobile pumping unit based on any combination of the following conditions:

- Flow rates to 23,786 m³/h (840,000 scfh) per unit
- Pressures to 68,950 kPa (10,000 psi)
- -195° to 315°C (-320° to 600°F)
- Volumes: unlimited

Linde can also support certain applications with tube trailer and trailer-mounted vaporizer fleets depending on pressure, flow, and safety considerations. Linde's operators are trained in refinery service applications. We ensure compliance for OSHA, drug testing and safety council training in addition to your site-specific safety training.

At-A-Glance: Linde Applications

Purging and Inerting. During unit shutdowns, Linde uses nitrogen to safely purge potentially explosive hydrocarbon and air mixtures from vessels, transfer lines and equipment, leaving an inert atmosphere for shutdown and start up activities.

Accelerated Cooldown. Whether it is a straight forward Once-Through cooldown or liquid nitrogen injection using Linde's NICOOL™ Service, we can help you reduce cooldown time from days to just hours. In the NICOOL Service the cooling capacity of liquid nitrogen lowers the temperature of the recycle gas stream, resulting in more efficient cooling and lower nitrogen consumption.



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Inert Entry Support. Linde is one of the industry leaders in safety and reliability for your inert entry support operations that require an independent nitrogen supply with our TMVU-100 vaporizing unit. The non-mechanical TMVU-100 is able to provide constant flow of nitrogen without the potential of unexpected supply disruption that may occur with other mechanical equipment arrangements.

Hot Nitrogen. Our pumping units can perform jobs beyond the scope of plant nitrogen systems. We can provide high flow, high pressure and high temperatures to cut downtime dramatically. The result is accelerated vessel drying and effective hydrocarbon stripping for catalyst regeneration and activation.

Drying. To help prevent product contamination, corrosion, and risk of explosions, Linde can pump nitrogen through systems and pipelines prior to startup. This allows removal of air and residual moisture within the systems.

SANDJET® Furnace Tube Decoking. We can help remove coke and inorganic scale deposits using nonabrasive cleaning material propelled by dry, inert nitrogen gas. In our SANDJET system, cleaning particles travel through the furnace tubes at high velocity and dislodge coke deposits. This process can be faster than traditional pigging or steam air methods and there is no moisture left in the tubes.

SANDJET Pipeline Cleaning. The SANDJET service is ideal for preparing piping for a service that requires a high degree of cleanliness or dryness. A pipeline segment is rapidly cleaned, dried and left with an inert atmosphere in one step saving both time and money.

Hydrogen. When reformers are taken off-line or as other spot hydrogen needs arise, Linde has the hydrogen supply capability you need. We can provide 99.99% pure hydrogen via our portable liquid hydrogen vaporizer at pressure up to 900 kpa (130 psig) and flows up to 4800 m³/h (170,000 scfh). We can also provide smaller amounts of hydrogen via tube trailers at pressures up to 6895 kpa (1,000 psig).

Engineering Modeling. To provide you with an estimate of your turnaround needs, Linde will assist in providing a detailed engineering evaluation. With a few key pieces of information, Linde can model reactor cooldowns, heat-ups, vessel purging, vessel drying, SANDJET furnace tube decoking, and any additional pipeline nitrogen needs you may have.

Contact Linde Today:

To contact Linde and learn more about our services, please visit us at www.lindecana.ca/services, email us at LSCI@linde.com, call in western Canada **866.443.3491** or call in eastern Canada **888.332.4066**.

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