Nitrogen Pipeline Services: Where and When You Need It

From gas supply to integrity management to cleaning – along with service design and modeling – Linde Services Inc. has the experience and track record you can rely on to support your new pipeline construction and ongoing maintenance needs.

Expertise You Can Count On

Linde offers production, delivery, and pumping of nitrogen – and can deliver a continuous supply of high-purity nitrogen to you via a dedicated fleet of mobile pumping units.

Dry, inert nitrogen is a versatile industrial tool, and Linde's precisely controlled mobile nitrogen pumping services (NPS) puts nitrogen to work in a wide range of applications using a variety of mobile nitrogen equipment.

We match the type of equipment to each application for optimum economy and performance. Linde can deliver nitrogen to you based on any combination of the following conditions

- → Flow rates to 860,000 scfh (single unit)
- → Pressures to 10,000 psi
- → Temperatures from -320° to 600°F
- → Volumes: unlimited

Linde equipment mobility provides nitrogen where you need it, whether that is on site or in locations where nitrogen is typically unavailable, such as pipeline right-of-ways and remote valve stations and terminals.

At-A-Glance: Linde Applications

Drying and Purging prevents product contamination, corrosion, and risk of explosions by removing air and residual moisture. Blanketing protects interior pipeline walls from corrosion during extended out-of-service periods; ideal for removing water after hydro-testing and protecting moisture-sensitive products.

Pipeline Displacement is a one-step displacement, drying, and inerting process. Linde can support multi-leg displacements over hundreds of miles.

Tool Propellant is used for pigging with pressurized nitrogen gas as the propellant. Inline inspection tools can also be pushed through pipelines.

Pneumatic Pressure Testing of equipment is undertaken by safely using air or nitrogen.

Cleaning Service That Cuts Downtime

The *SANDJET*™ service is Linde's in-place economical pipeline cleaning method that cleans to a white-metal blasted finish while drying and inerting. The *SANDJET* service uses dry, inert nitrogen gas to propel cleaning particles through the line at high velocity to quickly remove corrosion, scale and heavy deposits. The service is also effective for removing contaminants prior to abandonment. The best part: the entire service takes only a few hours.

Complete Engineering Modeling

Linde is your one-stop technical resource – providing detailed engineering estimates for your pipeline displacement needs. By assessing pipeline diameter, requested pig speed, and elevation data, Linde can provide hour-by-hour injection flow rate and pressure requirements. See sample report below:

We monitor the inlet and outlet pressure for safety

Time Hours	Milepost miles	Elevation feet	N_2 Flow scfh	N_2 Used mscf	Inlet Pressure psig	Outlet Pressure psig	Pig Speed mph	Discharge Rate bbl/hr
Pre-start	0:00	4857	0	0	526	410	0.0	0
0:00	0:00	4857	599355	0	1300	220	1.6	1193
0:30	0:81	4883	604964	301	1300	217	1.6	1204
1:00	1:63	4908	610643	605	1300	214	1.6	1216
1:30	2:46	4934	616384	912	1300	210	1.7	1227
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52:30	99:47	4417	741935	36903	1300	220	2.0	1477
53:00	100:47	4375	741933	37273	1291	211	2.0	1477
53:30	101:47	4333	0	37378	1278	193	2.0	1477
54:00	102:47	4301	0	37378	1265	180	2.0	1477
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.	.	.	.	.	.	.	.	.
117:30	229:47	5180	0	37378	563	527	2.0	1477
118:00	230:47	5163	0	37378	560	524	2.0	1477
118:22	231:22	5181	0	37378	558	533	2.0	1477
Stopped	231:22	5181	0	37378	558	558	0.0	1477

Design nitrogen flow and pressure at mile posts for a safe (below MOP) and efficient displacement

Integrity Management That Keeps You Online

Pressure and Leak Testing: With *SeeperTrace*® recognized by customers as a sensitive and reliable test method for long distance pipelines, a leak as small as one gallon per day can be detected without service interruption or excavation. In fact, by adding a tracer to nitrogen, water, or process fluid, any leak can be found quickly and located accurately. Repairs and testing can be completed without costly delays, and can even be done while the pipeline is in service.

Helium Leak Detection: *HeliTec*® Linde's helium leak detection service, quickly locates leaks in buried pipelines by using a helium tracer in a gas (usually with nitrogen as a carrier gas) along with a sensitive helium detector. By removing the process fluid from the line and pressurizing it with the test gas, the helium detector can sense the presence of helium in the air above the line. A problem detected quickly is a problem solved with a reduced impact on productivity.

Linde Services, Inc. has the innovative applications and expertise to help you optimize your operations and reduce downtime with extensive service offerings for refineries, chemical plants, terminals and pipelines. Our offerings include:

- → Purging and Inerting
- → Accelerated Cooldown
- → Inert Entry Support
- → Hot Nitrogen
- → Backup Hydrogen Supply
- → *SANDJET* Cleaning
- → Product Displacement
- → Tool Propellant
- → Drying and Purging
- → Blanketing
- → Pneumatic Pressure Testing
- → *Tracer Tight* Leak Location
- → *SeeperTrace* Leak Location
- → *HeliTec* Leak Detection
- → Specialty Services
- → Temporary Gas Supply
- → Dry Ice Blasting

To learn more about Linde's nitrogen pipeline services, visit us at **www.lindeus.com/industrialservices** or call us at **1.844.44LINDE**.

Linde
10 Riverview Drive
Danbury, CT 06810
Phone 1.844.44LINDE (1.844.445.4633), Fax 1.800.772.9985; 716.879.2040
www.linde.com