

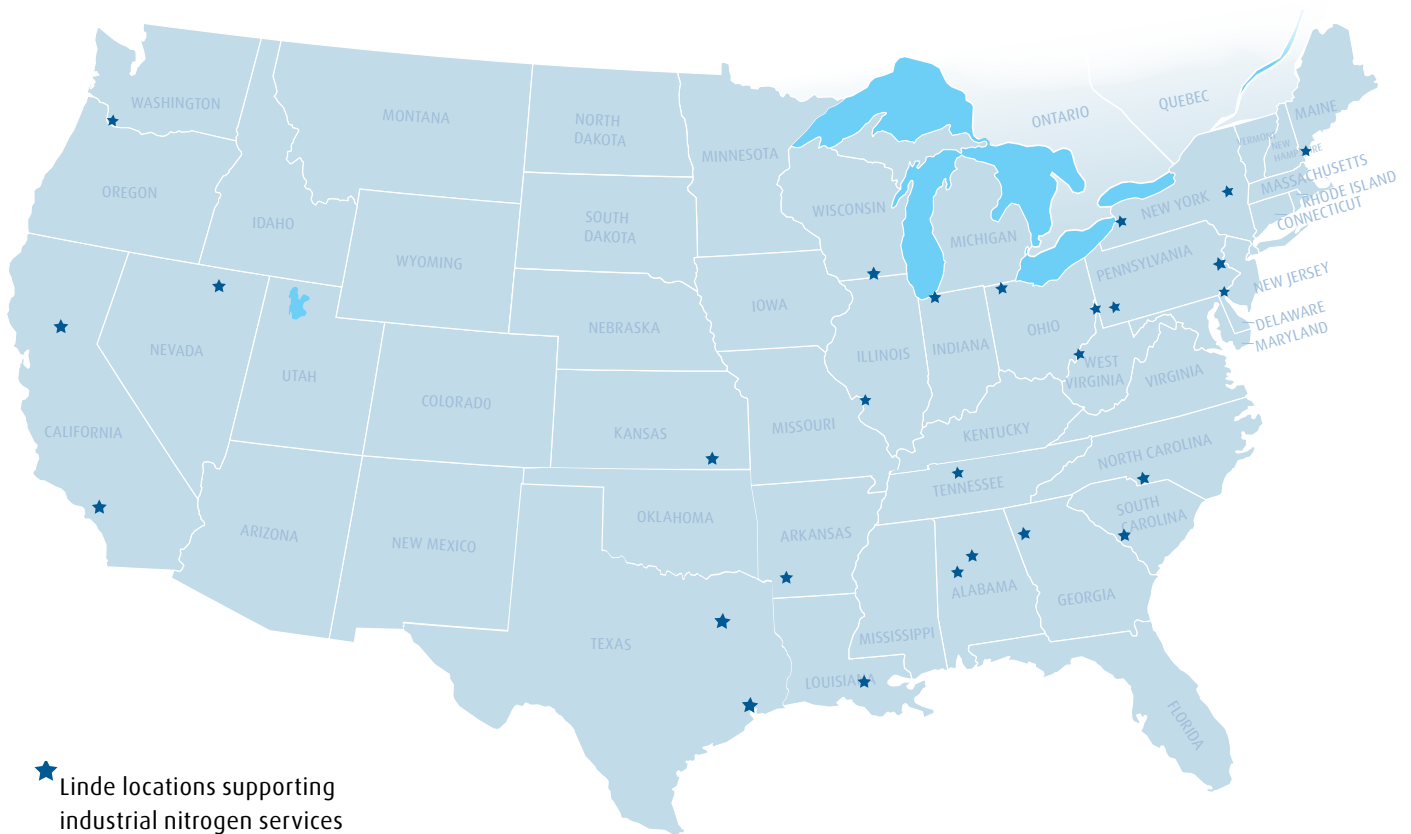
THE LINDE GROUP

*Linde*

# Pipeline, Plant Turnaround and MRO Nitrogen Services:

Safe, accurate, efficient and on budget.





Linde, a global leader in providing industrial gases and engineering for chemical plants, gas processing plants, and refineries, provides industry leading expertise in nitrogen pumping services for your pipeline and plant turnaround projects. We coordinate our industrial nitrogen services with your team to execute your project safely and effectively - driving up both efficiency and asset availability.

#### Our services for Pipeline and Plant Turnaround Services include:

- Purging
- Pipeline Drying (nitrogen can achieve -80 dew point for projects where moisture removal is critical)
- Blanketing
- Pigging & Pipeline Cleaning
- Pressure Testing (pneumatic and hydrostatic) & Charting Services
- Leak Testing and Helium Leak Detection
- Plant Commissioning
- Accelerated Cool-Downs
- Reactor Hot Stripping
- Accelerated Drying



## How it works

### One call does it all!

From the moment you contact us, Linde will tailor our approach to your unique operational and environmental requirements.

For every job, our onsite team brings a wealth of pressure pumping experience with the greatest focus on safe project execution. Linde will coordinate and oversee all of the work, including:

- Site and job safety assessments
- Delivery & storage of nitrogen and / or water
- Hydrostatic & Pneumatic testing (including water removal & line drying to dew point specifications)
- Safe execution of project based upon your specifications
- Coordination with other service companies and your designated team
- Delivery of all equipment, material and subcontracts to get the job completed safely, accurately and on time
- Flameless nitrogen vaporization pumping equipment designed for LEL environments

Linde provides the water and/or nitrogen, high-pressure pumping and vaporizing equipment, and storage vessels according to your unique operational and environmental specifications prior to putting the plant into operation.



## Our expertise

Linde has been an active member of the energy industry since the 1950s, partnering with oil and gas producers, midstream operators, refineries and chemical plants. Our site operators are experts in the safe handling and operation of gases, hydrocarbons, high- pressure pumping, vaporization and storage equipment. All project employees have the necessary operator qualifications (OQ), knowledge and understanding required to ensure the safest and highest quality service. This experience, backed up by Linde's position as the world's leading industrial gas solutions provider, will ensure we get the job done right.

## Safety

At Linde, safety, health, quality and care for the environment are the foundation of our business. In practice, our number one priority is creating a safe, secure jobsite through in-depth knowledge of the project scope, conducting site survey risk assessments and job site safety analysis. This ensures a healthy environment for our colleagues, customers, business partners and neighbors. Our dedication to safety does not stop there. Safety is engineered into the equipment, procedures and operational practices and a professional HAZOP review is conducted before the equipment is released for operations. Not only are we helping customers increase productivity and improve economics, but Linde is also setting new safety standards in the industry with use of these tools and equipment. The result: safely executed projects delivered on time and within budget.

All piping used on the jobsite is schedule 1502 (15,000 psi rated) and will have Kevlar Gangline™ restraints on each connection. All Linde employees on the job site will wear air monitors to ensure a safe working atmosphere.

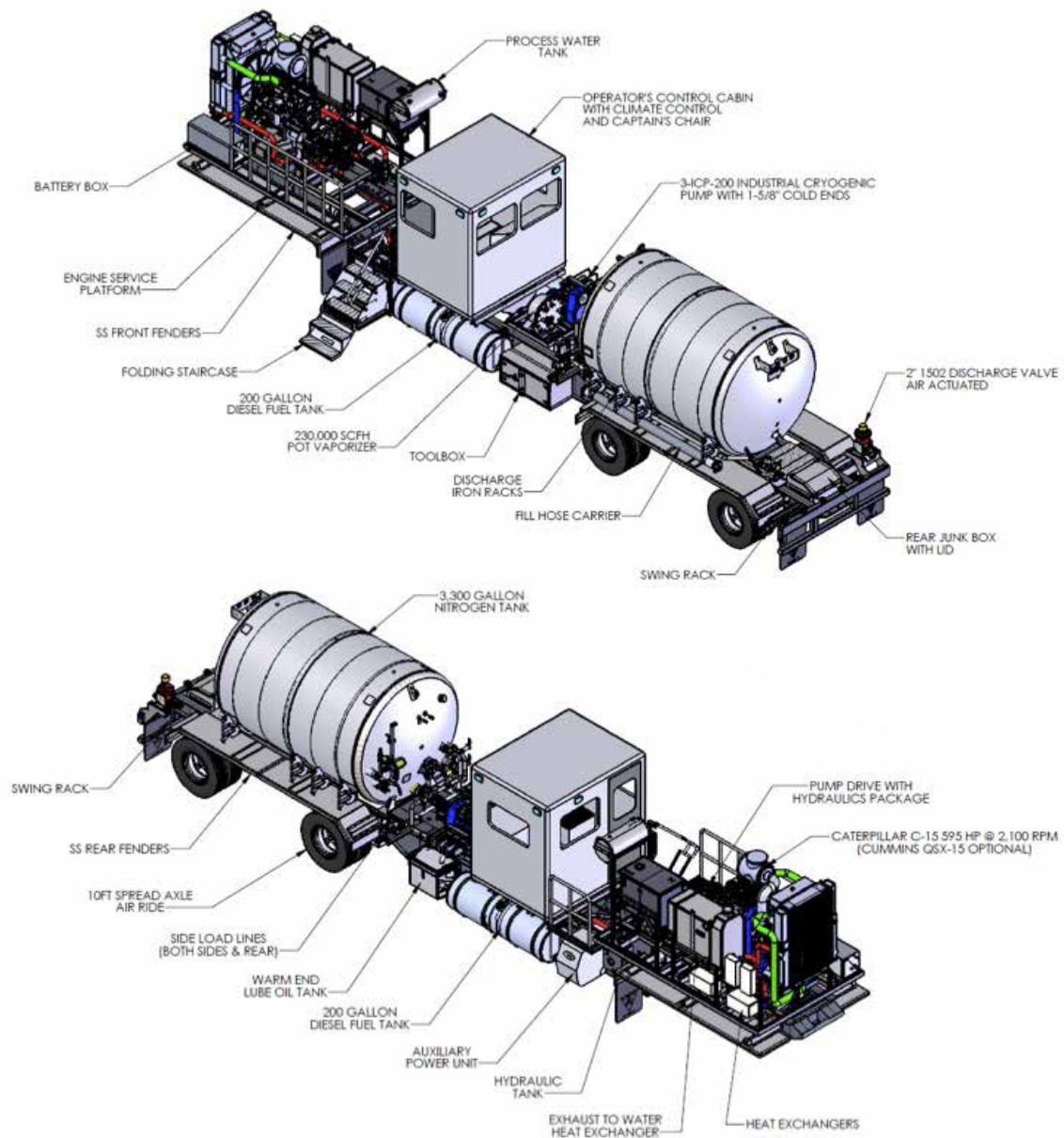
# Pressure Pumping Capabilities

Linde owns an expanding fleet of pumping and storage equipment, which has been designed, engineered and constructed to meet the rigors of industrial plant requirements and off-road pipeline operators.

## High Rate Heat Recovery Unit (HRU) Flameless

This equipment utilizes the exhaust supplied from the engine to provide the heat needed to vaporize the nitrogen. There is no open flame with this pumping unit, ensuring a safe working environment where a lower explosive limit (LEL) may exist.

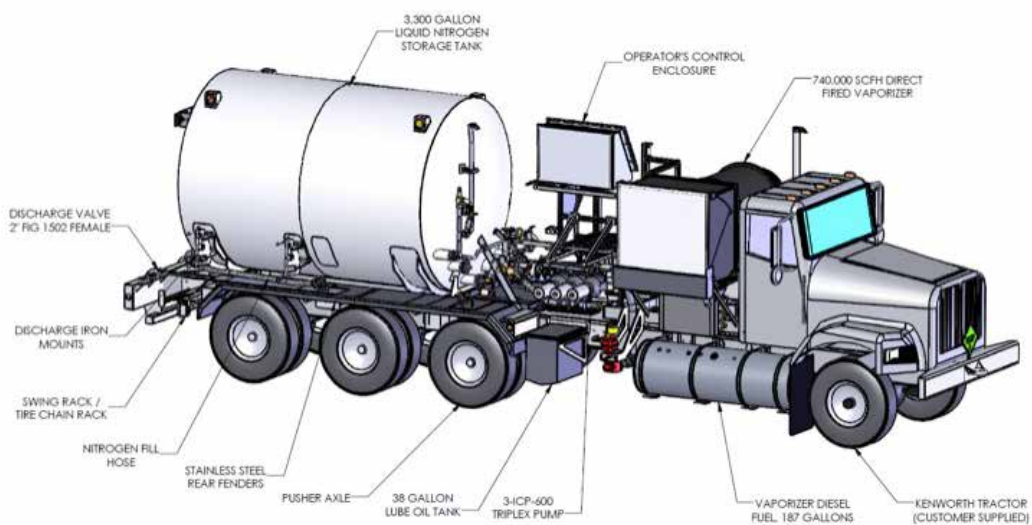
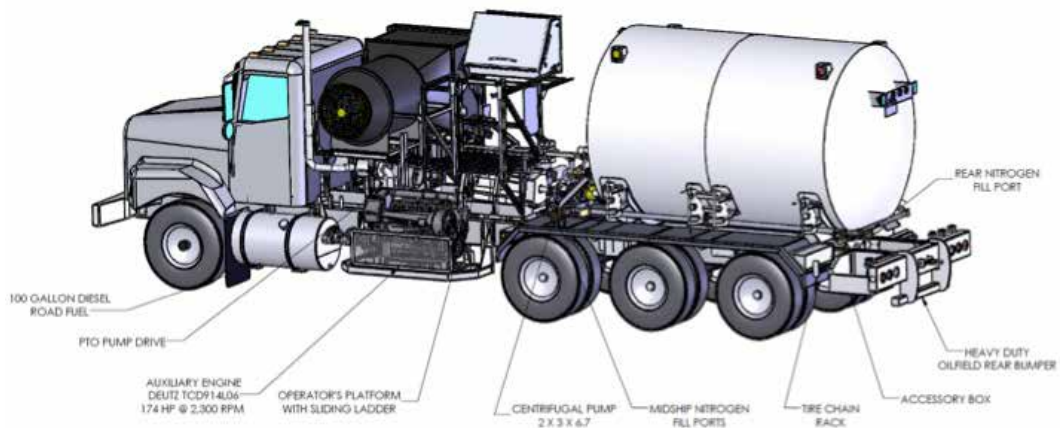
|                     |  |
|---------------------|--|
| Pressures           | Designed for Max 10,000 psig with electronic over pressure shutdown        |
| Flow rates          | 230,000 SCFH   |
| Temperatures        | Maximum 200° F (flow rates adjusted); low temperature protection to -10° F |
| N2 Storage Capacity | 3,000 gallon liquid nitrogen storage capacity on each pumping unit         |



## High Rate Open Flame Unit

The High Rate Open Flame Unit is the industry leader in efficiency and performance. The ultra efficient vaporization system ensures maximum heating of the nitrogen using minimum horsepower.

|                     |  |
|---------------------|--|
| Pressures           | Designed for Max 8,900 psig with electronic over pressure shutdown         |
| Flow rates          | 720,000 SCFH   |
| Temperatures        | Maximum 600° F (flow rates adjusted); low temperature protection to -10° F |
| N2 Storage Capacity | 3,000 gallon liquid nitrogen storage capacity on each pumping unit         |



# Forward Storage Capabilities

Linde's Nitrogen Portable Storage Vessels (NPSV) provides 16,700 gallons of nitrogen (N<sub>2</sub>) storage capacity to improve supply chain and optimize inventory management. This cost effective option allows Linde to minimize on-site traffic, project disruption and costly delays. With less commotion and moving pieces this solution also mitigates the risk and potential for injury.



## Queen Portable Storage Unit

This equipment offers 16,700 gallons of portable liquid nitrogen storage capacity.

|                          |                         |
|--------------------------|-------------------------|
| Nominal capacity         | 16,654 U.S. gallons     |
| Service temperatures     | -320° F                 |
| Maximum working pressure | 60 psig                 |
| Length (nom)             | 52 feet 9 inches        |
| Width                    | 102 inches              |
| Height                   | 13 feet 3 inches        |
| Estimated weight         | 37,700 lbs. ±3%         |
| Evaporation rate         | 0.55% in 24 hours (lin) |
| Pumping Capacity         | 550 gpm                 |



# Getting ahead through innovation.

With its innovative solutions, Linde is playing a pioneering role in the global market. As a technology leader, it is our task to constantly raise the bar. Driven by our tradition of entrepreneurship, we are working steadily on developing new high-quality products and innovative processes.

Linde offers more. We create added value, clearly discernible competitive advantages and greater profitability. Each solution is tailored specifically to meet our customers' requirements – offering standardized as well as customized solutions. This applies to all industries and all companies regardless of their size.

If you want to keep pace with tomorrow's competition, you need a leader in industry technology by your side for which top quality, process optimization, and enhanced productivity are part of daily business. Linde will not only be there for you ... but with you. After all, working together to solve problems forms the core of commercial success.

Linde – ideas become solutions.