Airgas Nitrogen Services
an Air Liquide company

Nitrogen Pumping

Safety, expertise, reliability and service

- Avoid stoppage with 24/7 service and product availability
- Get peace of mind with unmatched safety record and experienced crew
- Save on fuel cost, reduce emissions, and eliminate fire watch with heat recovery units
- Improve safety with leading-edge equipment and shut-down systems
- Reduce transport unloading time charges with temporary on-site liquid storage tanks

Upstream, Midstream, LNG and Downstream

As the need for reliable and efficient nitrogen services rises and with increasing productivity demands of pipelines, refineries, LNG, and natural gas processing facilities, more and more businesses rely on Airgas Nitrogen Services to meet demands.

Airgas, an Air Liquide company, has 1,400 locations strategically positioned throughout the U.S. and a large pumping fleet to help service your planned, unplanned and liquid supply projects – uninterrupted from start to finish.

Nitrogen Supply

Vessel purging considerations

- Volume of the tank
- Product in the vessel
- Existing pressure in the vessel
- Pressure rating of the vessel
- Type of service (i.e. lower to a specific dew point)
- Vessel and pipeline connections

Pipeline services considerations

- Outside diameter of pipeline
- Pipeline length
- Pipeline wall thickness
- Existing pressure in the pipeline
- Type of service (i.e. pressure test, purge, push pig)
- Product, if any, in the pipeline
- Significant drops in the pipeline (i.e. riser to riser)
- Pipeline connection

LNG considerations

- Pressure test internal pipeline
- Cool down and sweep dock line
- Flare changeout and maintenance
- Purging trains for TAR
- Dry out of condensates
- LEL O_2-free start up
- Mechanical Integrity Testing (MIT)

Downstream services considerations

- Type of service (i.e. reactor cool down, hot strip, inert support, vessel blanketing)
- Flow of nitrogen per minute or hour
- Pressure desired
- Temperature requirements
- Duration of job (i.e. 24/7)
- Product phase (i.e. liquid or gas)
- Estimate volume of nitrogen

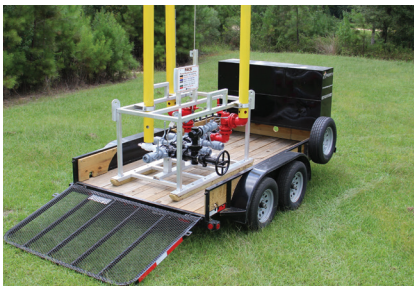
Nitrogen Pumping Equipment

High-rate hot gas units

- 660,000–880,000 SCFH @ 10,000 psi
- Hot gas -320°F to 500°F
- Safety shut downs for psi and hi-low temp capabilities
- Reeled network cables for external monitoring

Heat recovery units

- 180,000 SCFH pump unit @ 10,000 psi
- 3,000 gallon liquid N_2 tank
- Safe and efficient recovery vaporization systems
- Electronic over-pressure shutdown system



Pressure relief skid

- 15,000 psi manifold
- Cage frame protects all inlets and outlets
- Chart recorder
- Redundant pressure relief that relieves full flow of pumper for rapid shutdown

Dual-pump units

- 360,000 SCFH @ 10,000 psi
- 3,000 gallon liquid N_2 tank
- Safe and efficient recovery vaporization systems
- Electronic over-pressure shutdown system
- Capable of simultaneous rates and pressures pumping operations
- Two independent pumping systems

Bobtails

- 11,000 SCFH diesel-fired, 3,000 SCFH non-fired @ 10,000 psi
- -320° to 500°F
- Allen-Bradley PLC with full feedback control for pressure, temperature and flow
- Fully automatic transmission/control
- All bobtail configurations = 39' long

Mobile Heat Trailer

- Accepts N_2 flow with boost pump trailer or industrial gas pump unit
- Temp output range: -322°F to 800°F
- 10,000 psi max configuration
- Output range*: 2500 SCFM @ 800°F with LIN use

* Max temperature output is based on volume and temperature pumped into the trailer. +2500 SCFM requires Airgas consultation.

Skid-pump units

- 60,000–90,000 SCFH @ 10,000 psi
- 2,000 gallon liquid N_2 tank
- Heat recovery units
- Mobile space constrain solution

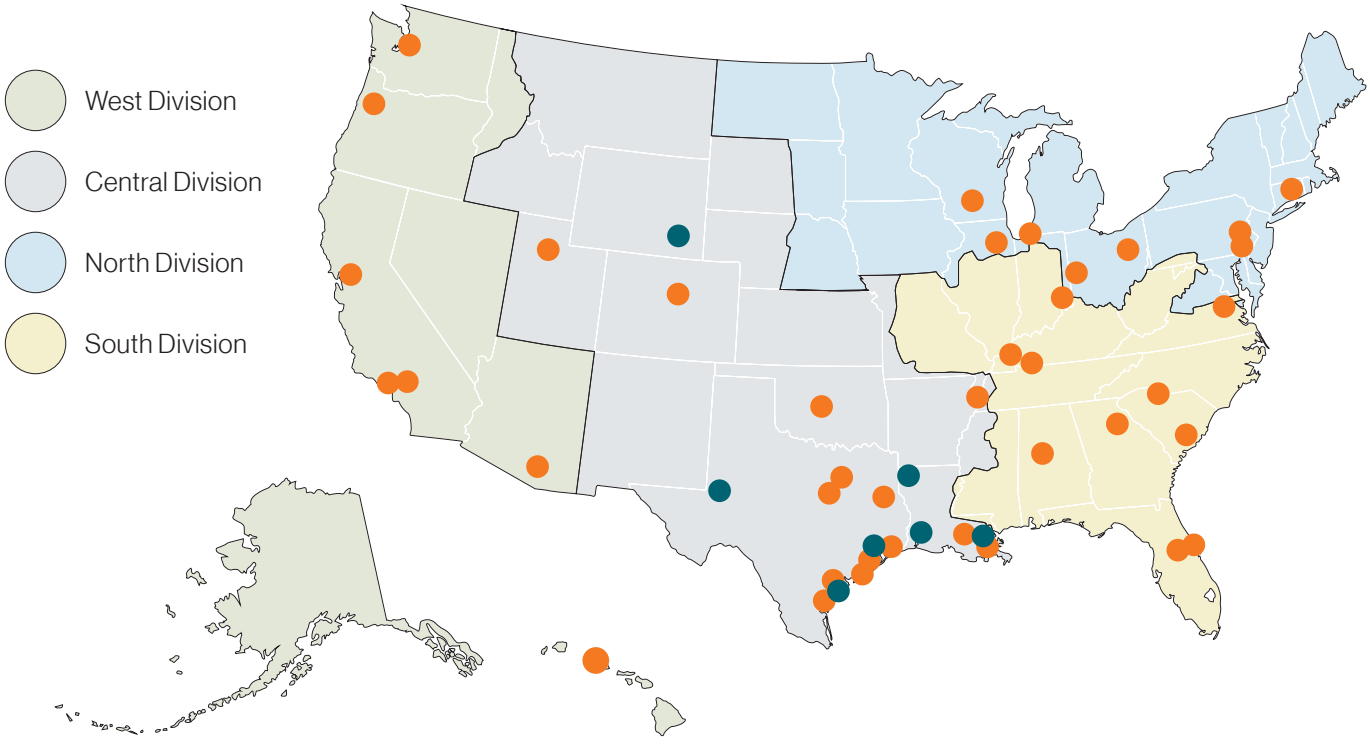
Transport, Queen & King

- 500,000 SCF transport liquid N_2
- 1,250,000 SCF queen liquid N_2
- 2,250,000 SCF king liquid N_2

Nitrogen Pumping

Service locations

With a robust and efficient supply chain, Airgas Nitrogen Services provides a constant and consistent supply of quality nitrogen right to your site, whenever you need it.



- Equipment Distribution Yards for Airgas Nitrogen Services
- Air Separation Units (ASUs)

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