

# NitroGEN™



“Let us handle your heavy lifting.”



# About Flowco Production Solutions

- Premier provider of USA-made Gas Lift, Plunger Lift, and NitroGEN™ Generation Services
- Founded, owned and directed by pioneers of the artificial lift industry
- Best service team in the business
- Sales and service locations in all the major oil and gas plays
- In-house design, engineering and manufacturing capabilities
- Experienced and responsive field support staff



# Introduction

- NitroGEN™ offers unrivaled fluid recovery rates to start, or resume well production faster and more economically
- Mobile units quickly and conveniently dispatched directly to well site
- Safer and more economical alternative for unloading and cleaning out wells



# NitroGEN™ Generation System



**1**

*Low pressure air compressor pulls atmospheric air to the membrane separator*

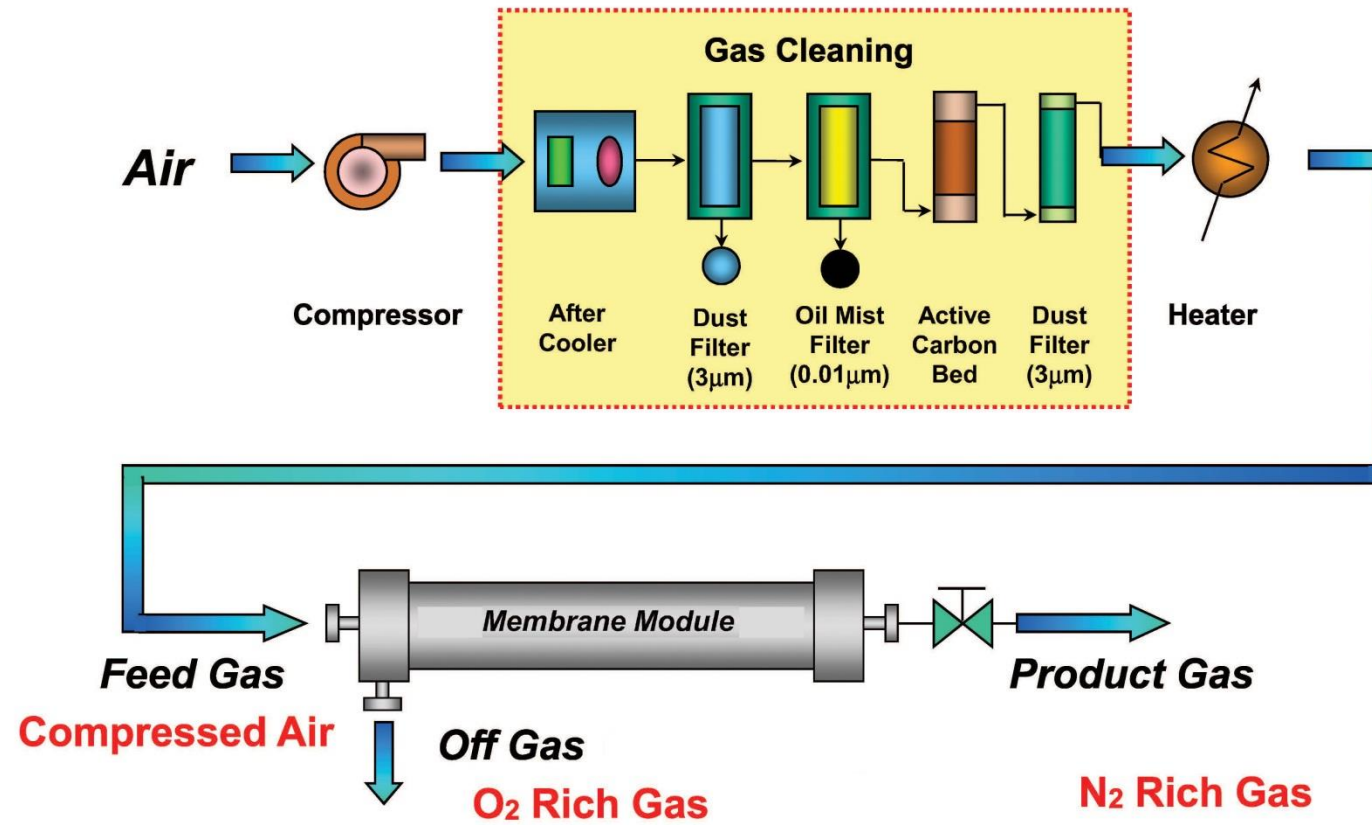
**2**

*Membranes separate air into rich, inert nitrogen gas at >95% purity and oxygen waste*

**3**

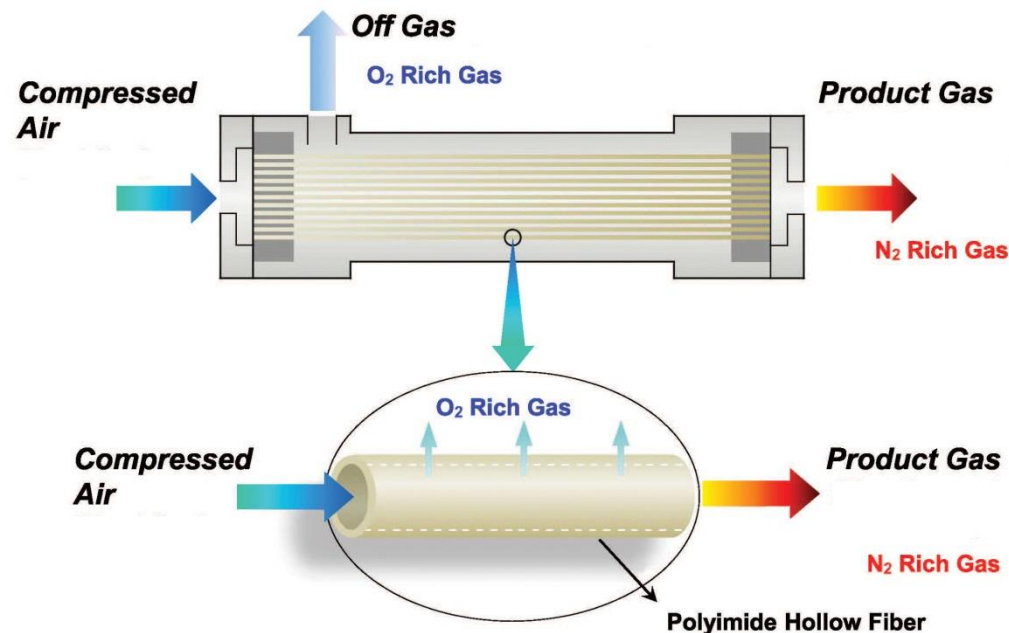
*High pressure booster compressor discharges nitrogen gas volumes all the way up to 600 scfm at 5,000 psi*

# NitroGEN™ Generation Process



# Membrane Technology

- Membrane technology is used to separate nitrogen from the air
- Each membrane consists of bundles of hollow fibers packed into tubes
- Oxygen and water vapor flow out the sides of the fibers leaving the Nitrogen to exit at exact purity required



# NitroGEN™ Capabilities

- Units discharge nitrogen gas at volumes up to 600 scfm at 5,000 psi
  - NitroGEN™ units are some of the highest pressure machines in the market
- Other direct N2 competitors
- Versatile unloading methods
  - Down annulus, flow tubing
  - Down tubing, flow annulus
  - Multiple units used together for higher injection rates/volumes
  - Unload multiple wells at same time
  - Inject on Multiple wells simultaneously



# Indirect Competitors & Limitations

- Liquid or Cryogenic Nitrogen
  - Safety
  - Product Supply Source
- Foam Air Units
  - Pressure Limitation
  - Explosive
  - Corrosive
- Swab Units
  - Volume Limitation
  - Tools in Tubing



# NitroGEN™ Capacity Rates

- Pumping N2 down the annulus and flow up the tubing  
Maximum Tubing Capacity Rates

Tubing Size	Blpd	Blph
2.375"	2,400	100
2.875"	3,000	125

- Pumping N2 down the tubing and flow up the annulus
  - Maximum Annulus Capacity Rate = 200+ Blph

# Oil Field Applications

- Well Jetting and Unloading
- De-watering
- Reservoir Pressure Maintenance
- Pipeline Purging
- Supply gas for Flowco™ Gas lift system
- Well Clean out
- Pipeline Pressure Testing
- New Well Completion Activity
- New Well Drill Outs
- Well Testing
- 24/7 Supervision and daily reporting

# Additional Applications

- Pipeline pigging & purging
- Pipeline drying & testing
- Inerting for line or valve repair
- Vessel blanketing
- Offshore applications & caisson repair
- Platform commissioning & repair
- Coal mine fire services



# NitroGEN™ Advantages

- Method that is quicker to deploy than:
  - Coiled tubing, foam/capstring, submersible pump and pumping units
- Quick implementation – up and running in 30 minutes
- 24/7 operation
- Two-man supervision
- Twice daily performance reports
- Minor Flowback services



# Advantages (continued)

- Noncorrosive, not explosive and environmentally safe
- Safer, more affordable alternative to liquid/cryogenic nitrogen
- Quicker and more efficient than swabbing
- Shorten spud to sales time
- Guaranteed nitrogen purity of > 95%



# Conclusion

- Nitrogen gas is a safe, affordable alternative for unloading and cleaning out wells
- Offers unrivaled fluid recovery rates to start, or resume well production faster and more economically than ever before
- NitroGEN™ is convenient, versatile and reliable

