FOCUSED ON **ANALYTICAL GAS SYSTEMS**

Bulletin LFAGS-L

Parker

ENGINEERING YOUR SUCCESS.

FOCUSED ON PURITY

Offering a wide range of advantages over the traditional cylinder gas supply, gas generators are increasingly becoming the popular choice in many laboratories.

In chemical sectors such as pharmaceuticals, polymer, environmental monitoring, CRO, and forensics, scientists rely upon specialized instruments for fast and accurate analysis of compound properties.

A consistent, safe supply of high-purity make-up, carrier, and fuel gases is essential to ensure precise results in separation techniques such as gas chromatography.

The challenge is to find a gas supply solution that meets the quality criteria while being easy to use, cost-efficient, and reliable.

"Parker on-site gas generation allows us to have a high-purity, safe, and consistent supply of gas."

Consistent, reliable purity

Gas purity varies significantly from cylinder to cylinder, and impurities can be introduced via the pipeline during changeover. In contrast, on-site generators supply consistently high-purity gas, preventing variations in quality, and ensuring ultra-sensitive analysis, every time.

Supported by proven, advanced technologies, you can trust Parker gas generators to deliver the reliability and consistency your work demands.

Expert gas generation solutions

With a history of expertise in gas generation, Parker is perfectly placed to support profitable operations in analytical science. Working with partners in laboratories across a range of sectors, our industry-leading solutions enable consistent accuracy through a constant, on-demand supply of nitrogen, hydrogen, and zero air for carrier, make-up and fuel gas.

FOCUSED ON PERFORMANCE

A safer choice

High-pressure cylinders are inherently linked to safety issues – from the chance of injury through manual handling to the risk of gas leaks, which can make the atmosphere potentially explosive or deficient in oxygen.

Gas generators from Parker are a safe alternative, thanks to leak detection technology with 'auto shut off' and integral alarms. They also operate at a fraction of the pressure and with low volumes of stored gas, further reducing the potential for harm.

These generators eliminate many of the inconveniences of dependence on outside vendors, such as uncontrollable price increases, dewar ice and condensation, contract negotiations, long term commitments, and tank rentals. With a Parker generator, you control your gas supply.

Cost-efficient with the lowest lifetime cost

In some cases, you can expect to have recouped the cost of your gas generator in less than one year. Energy efficient technologies keep running costs down, there are no hidden charges such as on-going delivery costs, cylinder rental or storage fees for spares and empty cylinders, and maintenance and part replacement costs are minimal.

Global support for your peace of mind

We know that business continuity is vital to your work. That's why we offer a comprehensive package of expert service, care, and maintenance across our complete analytical gas systems range, worldwide.

From installation, scheduled maintenance, and in very rare cases, emergency assistance, wherever you are, you can trust Parker to give you complete peace of mind.

Continuous supply, available on-demand

Parker gas generators are engineered to transform standard compressed air into nitrogen at safe, regulated pressures, on demand, without operator attention. Engineered for easy installation, operation, and long term performance, and permanently installed at the point of use, an on-site generator provides you with straightforward access to an unlimited supply of gas. Always at the correct pressure, flow, and temperature, Parker gas generators improve the stability of your instruments and the accuracy of your results.

FT-IR Purge Gas Generators

Model 74-5041NA

Spectra 15 & 30

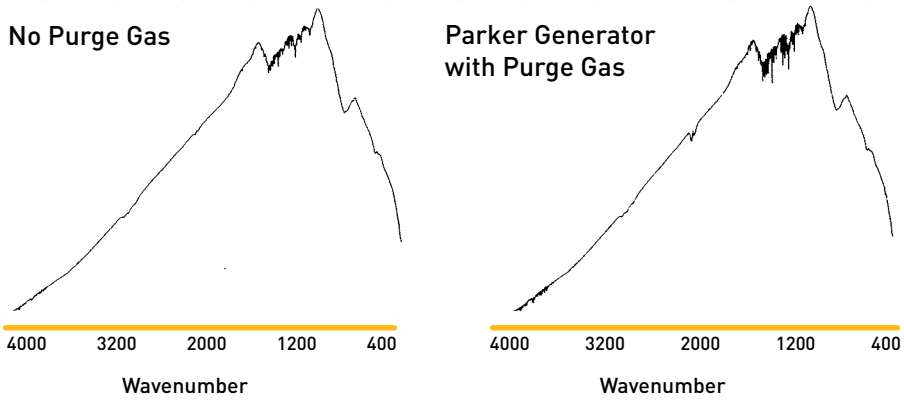
Parker FT-IR Purge Gas Generators are specifically designed for use with FT-IR Spectrometers to provide a purified purge gas and air bearing gas from compressed air. The generators supply carbon dioxide -free air at less than -100°F (-73°C) dew point with no suspended impurities larger than 0.01 µm.

- Increases FT-IR sample and maximizes up-time
- Safe - operates at low pressure
- Cost effective - payback typically less than one year
- Compact - free up valuable laboratory floor space
- Improves signal-to-noise ratio even on non-purge applications

The units are designed to operate continuously 24/7. Each system offers cleaner background spectra in a shorter period of time and more accurate analysis by improving the signal-to-noise ratio. The generators are also ideally suited for use with CO_2 Analyzers in addition to supplying other laboratory instruments. Each generator is quiet, reliable, and easy to install - simply attach the inlet air and outlet purge lines, plug the power cord into a wall outlet, and enjoy trouble-free operation. The model 74-5041NA Self Contained FT-IR Purge Gas Generator includes a state-of-the-art compressor.

Comparative Spectral Analysis in Purging an FT-IR Sample Chamber

This spectra comparison illustrates that a Parker FT-IR Purge Gas Generator allows an FT-IR to be purged at a much higher flow rate than is practical with nitrogen. The sample chamber purging of CO_2 and water by the Parker unit is faster than the sample compartment purged with nitrogen.



Gas Generator Selection Chart

Flow Capacity	Model
Up to 17 lpm	Spectra 15
Up to 34 lpm	Spectra 30
Up to 102 lpm	75-62NA
Up to 28 lpm	74-5041NA[1]

1. With internal compressor.

A Parker FT-IR Purge Gas Generator and Self-Contained Lab Gas Generator were used in conjunction with the Society for Applied Spectroscopy Fourier Transform Infrared Spectrometry Workshop at the University of Georgia (organized by Dr. James A. de Haseth and Dr. Peter R. Griffiths). The Self- Contained Lab Gas Generator provided excellent purge for six spectrometers. The organizers were so pleased with the performance of the Parker systems, they have requested that Parker Hannifin Corporation participate in future workshops.

- Dr. James A. de Haseth and Dr. Peter R. Griffiths

Parker also offers Gas Generators for these Applications

Products for LC-MS & Evaporation

- High purity nitrogen for LCMS instruments and solvent evaporation
- Tri-gas units available for instruments that require nitrogen, dry air, and zero grade air
- Produce a continuous supply of high purity nitrogen from an existing compressed air supply
- Integrated compressor systems eliminate the need for house air
- Systems available to support one or dozens of instruments

Products for Spectroscopy

- Remove water and CO_2 from compressed air
- Protect expensive optics from damage from water vapor
- Increase Signal to Noise Ratio and maximize instrument sensitivity
- Ultra dry air for NMR injecting, spinning, and ejecting samples

Products for Ultra Dry Air

- Gas generators for dilution and calibration of Emissions Analyzers
- Exceed instrument manufacturer specifications
- Nitrogen and specialty blend gasses available

Products for Chromatography

- Hydrogen, Zero Air, and UHP Nitrogen Generators for gas chromatography
- Combination systems available to provide multiple gasses from one unit
- Highest purities available from any supplier

Analytical Gas Supplies

- Installation kits, compressors, purifiers, flow-meters, regulators, and all the materials needed to equip your lab
- High quality components, designed specifically for use with Parker gas generators, to deliver high purity gas to your instruments

Products for TOC Analysis

- Generate gasses for all combustion, UV persulfate, and wet oxidation techniques
- Ensures consistent, reliable, instrument operation and reduces instrument service and maintenance costs

Recommended Gas Generators for Analytical Instruments

Instrument	Gas Requirements	Gas Purity Requirements	Flow Rates	Generator Recommendation/Model
Atomic Absorption (AA) with Flame	Air for Oxidant Gas	Clean, dry	1-7 SCFM	**AA Gas Purifier** Model 73-100
Atomic Thermal Desorber	Zero Air Hydrogen for FID Fuel	Clean, dry, hydrocarbon-free Clean, dry, high purity	Up to 1600 ml/ min.	**Zero Air or TOC Gas Generator** HPZA-3500 or TOC-1250
Atmospheric Pressure Ionization (API-MS)	Air for nebulizer gas, nitrogen for curtain, sheath, and shield gas	Clean, dry, hydrocarbon-free 99% or higher (Nitrogen or Zero Air)	20-67 lpm	**Nitrogen Generator** N2-14, N2-22, N2-35, N2-45, N2-80, N2-135, N2-200, Nitroflowlab, Nitroflow60, NitroflowTG1, NitroflowTG2, 76-98-N100, 76-98-N200, 76080
Autosamplers for Various Instruments	Air for pneumatic controls, nitrogen for sample injector	Clean, dry Ultra high purity	<1 SCFM <550 cc/min	**Membrane Air Dryer** 64-02 **UHP Nitrogen Generator** UHPN2-1100
CO_2 Analyzers	Calibration Air	CO_2 free	0.5-1.0 SLPM	**FT-IR Purge Gas Generator** Spectra15, Spectra30
Continuous Emissions Monitoring (CEM)	Calibration Air Dilution Air	Dry, CO_2, SO_2, NO_x, Hydrocarbon-free	10-15 SLPM	**CEM Zero Air Generator** 75-45-M744
Emissions Analyzers	Zero Air	Hydrocarbon-free	2-15 SLPM	**Zero Air Generator** HPZA-18000
Fourier Transform Infrared Spectrometer (FT-IR)	Air for sample compartment, optics, and/or air-bearing	Clean, dry, CO2-free	0.5-3 SCFM	**FT-IR Purge Gas Generator** Spectra15, Spectra30 **Lab Gas Generator** 74-5041NA
Gas Chromatograph (GC) GC-FID	Zero air as flame support air Hydrogen as flame fuel gas Hydrogen as capillary carrier gas Nitrogen as packed carrier gas Nitrogen as make up gas	Clean, hydrocarbon-free Ultra high purity Ultra high purity Ultra high purity, zero grade Ultra high purity, zero grade	150-600 cc/min. 30-40 cc/min. Varies Varies <100 cc/min	**Zero Air Generator** HPZA-3500 **Hydrogen Generator** H2PEM-260 **Hydrogen Generator** H2PD-300 **UHP Nitrogen Generator** UHPN2-1100 **UHP Nitrogen Generator** UHPN2-1100
GC-FPD	Zero Air as Flame Support Air Hydrogen as Flame Fuel Gas Hydrogen as Capillary Carrier Gas Nitrogen as Packed Carrier Gas	Clean, hydrocarbon-free Ultra high purity Ultra high purity Ultra high purity	<200 cc/min 50-70 cc/min Varies Varies	**Zero Air Generator** HPZA-3500 **Hydrogen Generator** H2PEM-260 **Hydrogen Generator** H2-1200 **UHP Nitrogen Generator** UHPN2-1100
GC-NPD	Zero Air to Rubidium/Thermonic Bead Hydrogen as Detector Support Gas Hydrogen as Capillary Carrier Gas Nitrogen as Packed Carrier Gas	Dry, clean, hydrocarbon-free Ultra high purity Ultra high purity Ultra high purity	<200 cc/min <10 cc/min Varies Varies	**Zero Air Generator** HPZA-3500 **Hydrogen Generator** H2PEM-100 **Hydrogen Generator (Palladium)** H2PD-300 **UHP Nitrogen Generator** UHPN2-1100

Instrument	Gas Requirements	Gas Purity Requirements	Flow Rates	Generator Recommendation/Model
GC-TCD	Hydrogen as carrier & reference gas	Ultra high purity	Varies	**Hydrogen generator** H2PD-300
LC-MS	Nitrogen as a curtain gas	LC-MS Grade	3-30 lmp	**Nitrogen generator** N2-14, NitroFlowLab, NitroFlow60, N2-35
ICP Spectrometer	Nitrogen as Optic/Camera Purge	Ultra high Purity	<1-5 lmp	**Nitrogen generator** 76-98NA
Nuclear Magnetic Resonance (NMR)	Air for lifting, spinning	Clean, dry	<10 SCFM	**Air dryer** UDA-300NA **Lab gas generator** 74-5041NA
Ozone generator	Supply air	Clean, dry	.3-20 SCFM	**Air dryer** 64-01, 64-02, 64-10, UDA-300NA
Protein analyzer	Dry air, nitrogen	Clean, dry	Up to 5 SCFM	**Nitrogen generator** N2-14, N2-22, NitroFlowLab, N2-35
Solvent evaporators (sample concentrators)	Nitrogen	Clean, dry nitrogen	2-15 SLPM	**Zero Air Generator** Nitrovap-1LV, Nitrovap-2LV
Stack gas sampler	Dilution air	Clean, dry	<1.0 SCFM	**CEM zero air generator** (75-45-M744)
Total oxygen demand (TOD)	Nitrogen as a carrier gas	Ultra high purity	300 cc/min	**Nitrogen Generator** UHPN2-1100
Thermal gravametric analyzer (TGA)	Nitrogen as furnace purge	Clean, dry, inert	<100 cc/min	**Zero Air Generator** HPZA-3500 **Hydrogen Generator** H2PEM-260 **Hydrogen Generator** H2PEMPD-1300-100 **UHP Nitrogen Generator** UHPN2-1100
Differential scanning calorimeter (DSC)	Air for air shield	Clean, dry	<100 cc/min	**Dry Air Generator** 64-01, UDA-300
Total hydration analyzer (THA)	Zero Air for FID Hydrogen as flame fuel gas	Clear, hydrocarbon free Ultra high purity	50-500 cc/min 5-50 cc/min	**Zero Air Generator** 75-82S, 75-83NA **Hydrogen Generator** H2PEM-100
Total organic carbon analyzer (TOC)	Dry air or nitrogen for carrier gas Combusion gas	Clean, dry, hydrocarbon-free, CO_2 Free, Ultra high purity	100-500 SLPM 50-700 cc/min	**TOC gas generator** TOC-625, TOC-1250 **UHP Nitrogen Generator** UHPN2-1100

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