



**SIEMENS**

*Ingenuity for life*



Analytical Products and Solutions

## Contaminants in High-Purity Gases

Measuring Nitrogen at very low ppm  
concentrations

[usa.siemens.com/analyticalproducts](http://usa.siemens.com/analyticalproducts)

Whether you are trying to control air-separation processes or ensure proper gas-mixing concentrations, it can be challenging to measure trace contaminants simply and reliably. Specifically, detecting impurities of Nitrogen at very low parts-per-million (ppm) concentrations requires complex analytics.

But by configuring the Siemens online Process Gas Chromatograph MAXUM with a simple Backflush and Thermal Conductivity Detector (TCD), we have made it easy for you to measure Nitrogen concentrations down to sub parts per million levels. This is another example of Siemens Analytical Products and Solutions commitment to simplifying analytics, improving reliability and minimizing maintainability.

## Less than 1 ppm Nitrogen with TCD

Measuring traces of Nitrogen is challenging. Complex "discharge" detectors will do the job, but these devices are not simple, stable or easy to maintain.

Siemens has addressed the challenge of measuring traces of Nitrogen in Hydrogen by combining a simple backflush configuration with the Siemens Model 50 diaphragm valve and the Siemens standard thermistor TCD. Using standard analytical MAXUM parts combined with optimized flow and superior detector amplification and noise reduction enables our device to achieve a minimum detectability of about 0.2 ppmv. Because the analytics are diffusion tight, no inert gas purge is needed to prevent ambient nitrogen diffusion into the carrier gas. To ensure excellent minimum detectability, the ultra high purity carrier gas is further purified using an external palladium alloy getter filter that removes possible contaminants.

Power, valve control gas and a single carrier gas are packaged in a MAXUM airless oven. This simple analytical configuration ensures long-term repeatability and minimum maintenance.

<b>Analyzer</b>	MAXUM II Process Div.1, Group B7H2 GC
<b>Environment</b>	MAXUM: Cl.I, Div.1, B&H2, C, D Purifier: General Purpose
<b>Separation</b>	Micro packed 1/16"
<b>Analytic</b>	Backflush
<b>Valve</b>	Single 10 port diffusion tight Model 50 diaphragm valve for combined injection and backflush
<b>Detector</b>	Thermistor Thermal Conductivity Detector
<b>Carrier Gas</b>	Hydrogen UHP (99.995%) Purified to >99.9999% with external Getter purification; Consumption 3 scfd
<b>Cycle Time</b>	2 minutes
<b>Detectability</b>	~0.2 ppmv (2xSN)
<b>Repeatability</b>	+/- 0.22 ppmv at 0.6 ppmv over 4250 analysis cycle/6 days

Using superior hardware and advanced yet simple analytical solutions enables us to measure sub parts per million Nitrogen levels in Hydrogen and other trace components.

Continuous gas analyzers (CGA) or tunable diode lasers (TDL) also can be applied to instantly measure specific trace concentrations of CO, CO<sub>2</sub> and other gases,

Siemens delivers everything from analyzers to measurement equipment, sample systems and turnkey solution. If you want startup, commissioning and maintenance from a single source, talk to us!

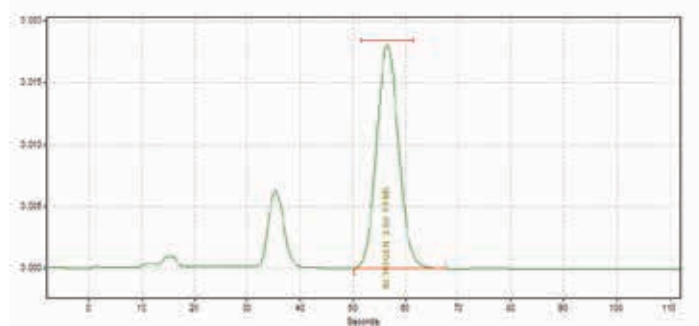


Fig. 1: 3.8 ppmv Nitrogen in Hydrogen

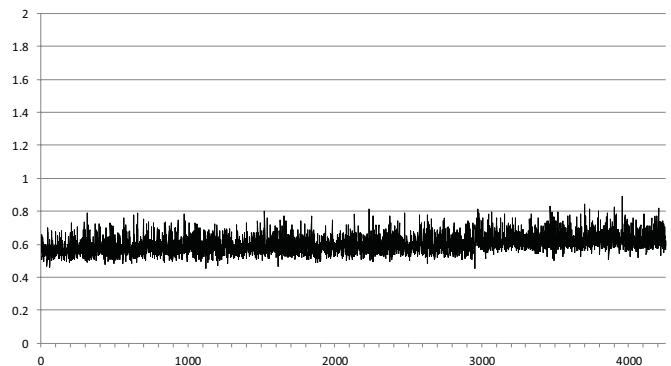


Fig. 2: Repeatability of +/- 0.22ppmv at 0.6 ppmv over a period of 6 days

### For more information, please contact:

Siemens Industry, Inc.  
5980 West Sam Houston Parkway North  
Suite 500  
Houston, TX 77041  
Phone: 713-939-7400  
Email: [ProcessAnalyticsSales.industry@siemens.com](mailto:ProcessAnalyticsSales.industry@siemens.com)  
[usa.siemens.com/analyticalproducts](http://usa.siemens.com/analyticalproducts)

Siemens Flyer  
August 2019

Published by  
Siemens Industry, Inc.

1-800-964-4114  
[info.us@siemens.com](mailto:info.us@siemens.com)

Process Automation  
Process Industries and Drives  
100 Technology Drive  
Alpharetta, GA 30005

Subject to change without prior notice  
Order No.: PIAFL-00059-0819  
Printed in USA  
All rights reserved  
© 2019 Siemens Industry, Inc.

The technical data presented in this document is based on an actual case or on as-designed parameters, and therefore should not be relied upon for any specific application and does not constitute a performance guarantee for any projects. Actual results are dependent on variable conditions. Accordingly, Siemens does not make representations, warranties, or assurances as to the accuracy, currency or completeness of the content contained herein. If requested, we will provide specific technical data or specifications with respect to any customer's particular applications. Our company is constantly involved in engineering and development. For that reason, we reserve the right to modify, at any time, the technology and product specifications contained herein.