



Process &

Environmental
Analysis Solutions

WWW.MKSINST.COM

MultiGas™ 2032 Purity

REAL-TIME TRACE IMPURITY DETECTION

The MultiGas™ 2032 Purity Analyzer is an FTIR based analyzer capable of ppb contaminant detection in high purity bulk process gases. Bulk gas production quality has been improved with the MultiGas 2032 Purity Analyzer for such gases as NH_3 , NF_3 , and hydrogen.

The MultiGas 2032 Purity Analyzer is composed of a 2102 Process FTIR Spectrometer, high-optical-throughput sampling cell, and applications-specific analysis software. These integrated components, along with automated bake-out functionality, provide unmatched precision and accuracy for bulk gas contaminant monitoring.

Features & Benefits

- Real-time, on-line purity analysis of bulk process gas
- ppb level impurity detection in bulk process gases such as NF_3 , NH_3 and H_2
- Constructed for corrosive high purity gases
 - 316 SS welded sample lines and gas cell construction
 - Heated optical path eliminates moisture and atmospheric contaminants
 - Automated bake-out procedure
- High resolution analyzer deconvolves overlapping spectra
 - Enables speciation of impurities in the bulk gas
- Specialized zeroing and self-calibration software

Applications

Continuous monitoring of trace contaminants in high purity bulk gases in production environments, including:

- H_2O , CO , CO_2 , N_2O and CH_4 in NH_3
- H_2O , CO , CO_2 , N_2O and HF in NF_3
- H_2O , CO , CO_2 , HF , HCl , NH_3 , CH_2Cl_2 and CHCl_3 in H_2
- H_2O , CO , CO_2 , CH_4 , and NH_3 in N_2O



System Hardware

The 2102 Process FTIR Spectrometer is a compact process spectrometer capable of operating at spectral resolutions up to 0.5 cm^{-1} resolution.



2102 Process FTIR Spectrometer

This spectrometer is coupled to a patented low volume (200 mL) multi-pass gas cell with a 5.11 meter effective pathlength. The patented design of this cell incorporates aspheric, aberration-correcting mirrors which provide more than twice the optical throughput of a conventional multipass gas cell. For purity analysis, ambient temperature and pressure are monitored to ensure optimal sensitivity.

For compatibility with high purity applications, the gas cell body is constructed of nickel-plated 316 SS. The gas inlet and outlet connections are also 316 SS, and feature VCR® fittings. In addition, proprietary technology provides an ultra-low contamination seal for the gas cell mirrors and windows.



The 5.11 m pathlength, 200 mL volume, long path gas cell measures $8\frac{1}{2}'' \times 2'' \times 3\frac{1}{2}''$.

The analyzer also features automated bake-out functionality, which is unique to the MultiGas 2032 Purity. This automated bakeout sequence features single push button operation to dry the analyzer.

Specifications

Analyzer

Measurement Technique	FTIR Spectrometry
Gases and Vapors Measurable	Most molecules except for N_2 , H_2 , and O_2
Ranges	Full scale concentration setting between 10ppb and 100% full scale
FTIR	2102 Process FTIR
Spectral Resolution	$0.5 - 128\text{cm}^{-1}$
Scan Speed	2 scans/sec @ 0.5cm^{-1}
Scan Time	1-300 sec
Infrared Source	Silicon Carbide @ 1200°C
Reference Laser	Helium Neon (15798.2cm^{-1})
Detector	LN_2 -cooled MCT; TE-cooled MCT; Stirling-cooled MCT
Purge Pressure	20 psig (1.5 bar) max.
Spectrometer Purge Flow	4 L/min of purified ultra pure N_2
Optics Purge Flow	4 L/min of purified ultra pure N_2
Pressure Transducer	MKS Baratron® capacitance manometer
Purge Connection	$\frac{1}{4}''$ VCR®
Computer Requirements	Desktop or notebook Intel Pentium® PC under Microsoft® Windows® 95/98/NT/2000/Me and XGA display (1024 x 768)
Recommended Minimum	Intel Pentium III, 850 MHz, Microsoft Windows 2000, 256 MB Intel Pentium, 200 MHz, Microsoft Windows 95, 64 MB
Communications	National Instruments GPIB
Output	RS232/422/485, analog output
Dimensions	17.5"W x 12.5"H x 25.5"D
Installation	19" rack mount chassis
Power	120 or 240 VAC, 50/60 Hz, 6 amps
Weight	125 lbs. (57 kg)
Laser Safety	Class 1 laser product contains a Class 3R laser with continuous wave output at 633 nm



Specifications and Ordering Information

Sampling Parameters

Sample Temperature	Ambient to 60°C (calibration temperature dependant)
Sample Flow	0.2 – 10 L/min
Sample Pressure	0.01 – 8 atm (calibration pressure dependant)

Gas Cell

Construction	Welded 316 stainless steel
Fittings	¼" VCR®
Tubing	Heated ¼" stainless steel
Mirrors	Nickel plated aluminum substrate, with rugged gold coating
Windows	CaF ₂ , KBr, ZnSe (others available)

Detection Limits

Low-level detection limits for the 5.11 meter gas cell and a mercury-cadmium-telluride (MCT) detector at 0.5 cm⁻¹ resolution for typical gases in pure corrosives:

Name	Formula	Bulk Media	Typical Detection Limit with 20/20™ Cell and 2 minute Measurement
Water	H ₂ O	NH ₃ , NF ₃ , N ₂ O, PH ₃ , AsH ₃	20ppb
Carbon Dioxide	CO ₂	NH ₃ and NF ₃	5ppb
Carbon Monoxide	CO	NH ₃ and NF ₃	6ppb
Hydrofluoric Acid	HF	NF ₃	9ppb
Methane	CH ₄	NH ₃	15ppb
Nitrous Oxide	N ₂ O	NF ₃	3ppb

Ordering Information

Please contact your local MKS office for price and availability information.



MKS Instruments, Inc. Global Headquarters

2 Tech Drive, Suite 201
Andover, MA 01810
Tel: 978.645.5500
Tel: 800.227.8766 (in USA)
Web: www.mksinst.com

MKS Instruments, Inc. Process & Environmental Analysis Solutions

651 Lowell Street
Methuen, MA 01844
Tel: 978.645.5500