

GC Custom Solutions

GC AND GC/MS SOLUTIONS FOR REACTION MONITORING



Varian is the analytical instrument vendor that provides custom solutions for complex separations, data manipulation and reporting.

The Varian standard analyzers address many application areas in oil and gas industry research.

Our single vendor approach uses the latest hardware, software and column technologies available, providing you with the best possible return on your investment.

Varian Solutions

Whether you are involved in fuel cell development, hydrocarbon gas research or one of the myriad of chemical research processes, being able to measure the range of organic components is at the core of your ability to get your job done confidently day after day. Varian recognizes this, and we have made a commitment to customers in this research field to provide the broadest array of state-of-the-art analytical chromatography products possible to meet or exceed your needs, be they simple or highly complex.

Application Areas include:

- ▶ Catalyst research and screening
- ▶ Fuel cell development
- ▶ Gas to liquid monitoring
- ▶ Biomass conversion
- ▶ Synthetic natural gas

Building for the Future

- ▶ Varian can provide solutions for the analysis of a single component to a complex mixture of gases and liquids.
- ▶ Universal, selective or information rich detection is available to help the analyst provide the answers at the research, pilot plant or finished product stage.
- ▶ As your requirements change for the future so can the instrumentation, with additional channels and capabilities.
- ▶ In summary, Varian works closely with its customers to provide the most comprehensive GC analysis solutions to best meet their GC/GC-MS needs, by offering a complete selection of high performance gas chromatographs and highest quality capillary GC columns.

NOTICE: Varian, Inc. was acquired by Agilent Technologies in May 2010. This document is provided as a courtesy but is no longer kept current and thus will contain historical references to Varian. For more information, go to www.agilent.com/chem.

GC Custom Solutions

CP-4900 Micro GC

This system employs the latest micro-machine technology to obtain outstanding analytical performance and high speed analysis.



Perfect for the rapid analysis of gaseous streams it can be configured with up to four independent channels

Channels include:

- ▶ MS for the analysis of $H_2/O_2/N_2/CH_4$ and CO
- ▶ PPQ for $N_2/CH_4/N_2O$ and C_2 hydrocarbons
- ▶ CP-Sil 5 for Hydrocarbons C_2-C_{10}
- ▶ Alumina PLOT™ for detailed hydrocarbons C_1-C_6

Options:

- ▶ Backflush to protect the columns and reduce cycle times
- ▶ Gassifier for the controlled injection of high pressure samples
- ▶ Genie Filter for moisture removal
- ▶ Carry Case for field sampling and analysis

Detectors:

- ▶ Micro Thermal Conductivity Detector (TCD)
- ▶ DMD for target compound analysis of sulphur gases down to 0.5 ppm

Analysis in seconds rather than minutes

450-GC Gas Chromatograph

The ideal choice for research environments where you are never quite sure what you may be asked to do tomorrow, and as a result, need a high degree of flexibility.



The GC can be conveniently configured for one, two or three channel operation and has a wide array of inlets, detectors and automated sample introduction devices from which to choose.

Available inlets:

- ▶ Isothermal split/splitless
- ▶ Programmable temperature vaporizing capillary (PTV)
- ▶ On-column packed, megabore
- ▶ Flash vaporizing megabore packed injector
- ▶ Gas sampling valves
- ▶ Liquid sampling valves

Available detectors:

- ▶ Universal
 - Flame Ionization (FID) : hydrocarbon response
 - Thermal Conductivity (TCD) : universal response
 - Pulsed Discharge Helium Ionization (PDHID) : ultra sensitive universal response
- ▶ Selective
 - Pulsed Flame Photometric (PFPD) : for S, N, P and up to 28 other elements
 - Electron Capture (ECD) : halogen specific
 - Thermionic Specific (TSD) : N and P specific
 - Photoionization (PID) : Aromatics and unsaturated hydrocarbons
 - Mass Spectrometer (MS) : Information rich detection

GC Custom Solutions

Varian: The Leader in Customized Applications

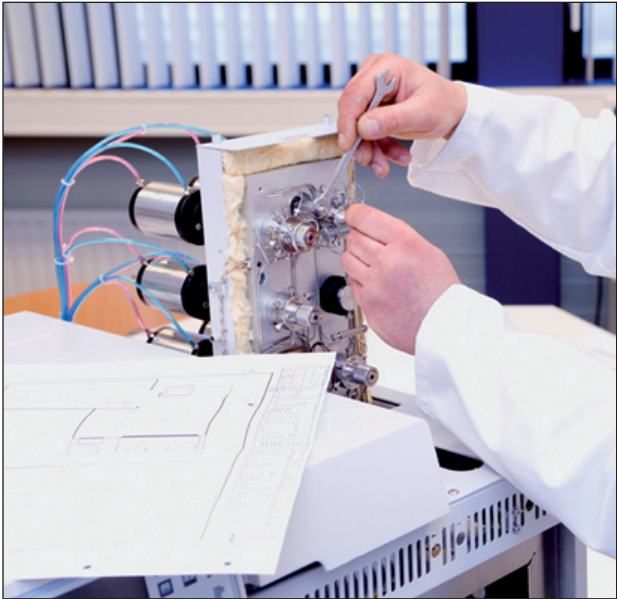
Our single vendor approach uses the latest hardware, software, and column technologies available, providing you with the best possible return on your investment.

Standard systems are available to meet the requirements of most analytical methods covered by ASTM, GPA, ISO, DIN and UOP.

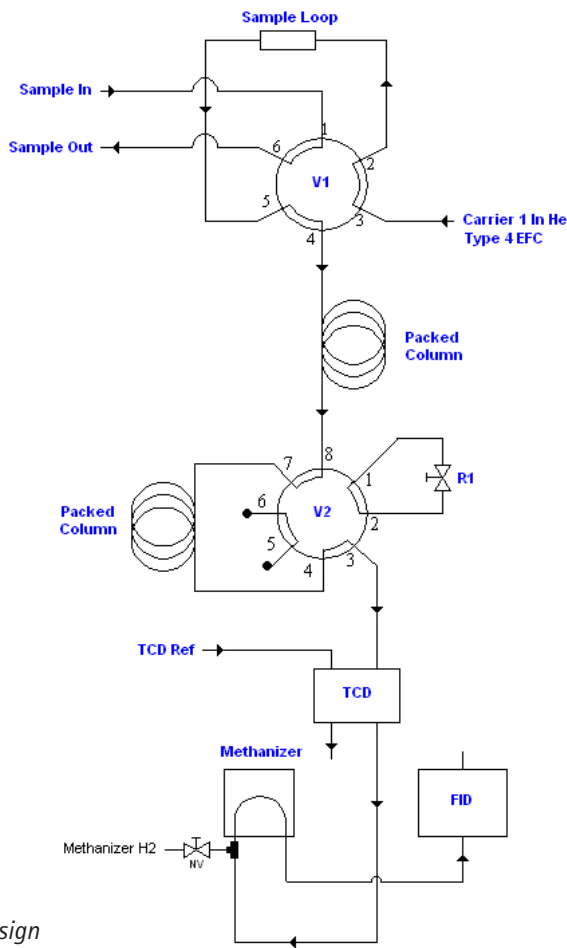
However, if your need is more complex, our team of chemists, mechanical and software engineers will design systems and demonstrate separations to meet your specific requirements.

Example channels include:

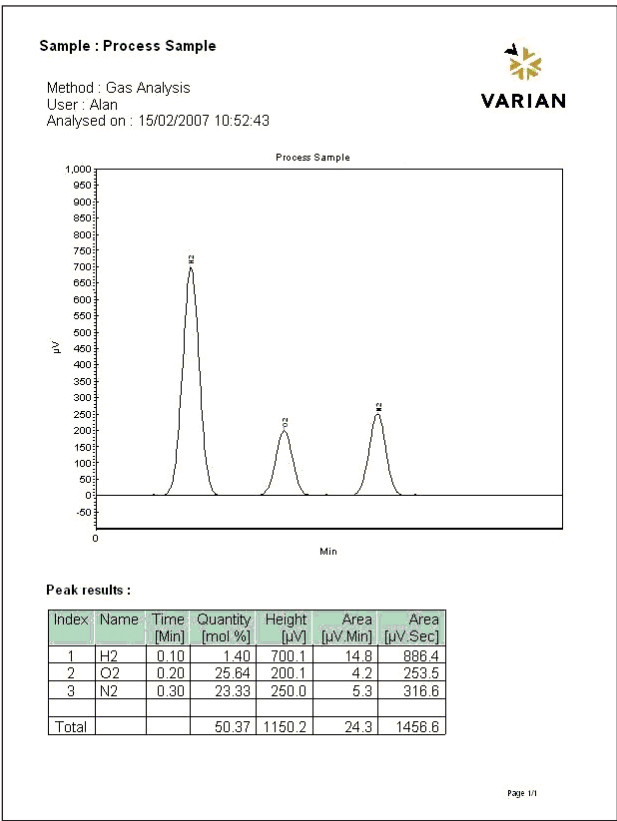
- ▶ Permanent Gases : $H_2/O_2/N_2/CO$ and CO_2
- ▶ Light Hydrocarbons : C_1-C_6
- ▶ Sulphur Gases
- ▶ Oxygenates
- ▶ Syn Gas
- ▶ Natural Gas



Build



Design



Results

GC Custom Solutions

GC/MS – Information Rich Detection

For the analysis of unknowns or experimental confirmation, adding the MS Detector to the configuration adds a third dimension of information.



The versatile bench top GC/MS provides the highest level of flexibility and performance to supply the ultimate in analytical solutions. Established technology combined with the latest advances in MS ensures adaptability for the modern laboratory.

Add the versatility of the 450-GC and you have the ultimate research tool.

Fully Automated Accessories:

- ▶ QuickSwitch valve technology for multi-method, multi-detector experiments
- ▶ Stream selection valves for multi-stream monitoring
- ▶ Headspace sampling for volatiles

Enhanced Performance:

- ▶ MSⁿ – for improved sensitivity, matrix elimination and the ultimate in confirmation
- ▶ Chromatoprobe – for solid sample introduction
- ▶ Liquid reagent CI – easy to use, no hardware changeover from EI to CI
- ▶ Low maintenance technology – no source or lenses to contaminate or clean for increased throughput and productivity



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SI-0709/B/9.08 Printed in the UK