Analysis of Chemical Plant and Refinery Gases

Turnkey configurations for gas chromatographic analysis, including instrumentation, methods, supplies and service.

Agilent Technologies
Innovating the HP Way

Agilent Technologies' analyzers for the hydrocarbon processing industry incorporate our extensive industry expertise in creating application-specific measurement solutions, based on standard or custom configurations of gas chromatographs, supplies, and methods, complemented by the specific knowledge of our channel partners.

Chemical plant and refinery gas analyzers are an integral part of any refinery or petrochemical plant lab. These analyzers provide valuable information regarding operations, unit optimization, and the release of finished products. These analyzers often carry the heaviest sample loads because of the critical information they produce.

Important benefits ensured by our systems include:

- Reliability
- Speed of analysis
- Resolution between components of interest
- System flexibility
- Guaranteed turnkey operation tailored to your particular needs

Agilent Technologies analyzers for chemical plant and refinery gases are based on the 6890 gas chromatograph, with standard or customized subsystems and software optimized for this application. We have broad expertise in these analyses, and extensive experience in valved gas chromatography, with standard and customized configurations. Our capability is complemented by the industry-specific experience of our partner, Wasson-ECE, Inc. All systems use Windows®-based software, with full data handling capabilities to facilitate communication within laboratory and plant-wide data systems.

Analysis Examples

This booklet contains some examples of specific analyzer configurations. Many more are possible, including the one that will fit your particular analytical needs.

Extended Refinery Gas

Application 383D

Reliability, ruggedness, and speed make this our most popular configuration. The system utilizes a single 6890 gas chromatograph with custom sub-systems to provide a comprehensive analysis in less than fifteen minutes. This advanced technology, coupled with Agilent's analytical guarantee, gives you the most complete refinery gas analysis available.

System Configuration

In the first subsystem the C_1-C_7 paraffins and olefins are detected along with a toluene and C_8+ backflush peak by an FID. This system utilizes the most recent advances in capillary column technology. These capillary columns provide an excellent separation of C_5 olefins which are difficult to analyze on standard PLOT columns. Capillary columns allow for a fast and reliable hydrocarbon analysis when coupled with Electronic Pressure Control (EPC).

A proprietary guard column increases system resistance to water, H_2S, and other sulfur components.

The second subsystem analyzes fixed gases and H_2S, using a TCD. The third subsystem also utilizes a TCD to analyze for hydrogen and helium using a nitrogen carrier gas. The two TCD signals are electronically summed to provide a single TCD output chromatogram. This complements the simultaneous FID chromatogram. Advancements in the ChemStation software yield a single, combined report.

The system's rugged design allows for years of reliable use in a production environment. Unlike other refinery gas systems, water in the samples will not adversely affect the quantitation.

LPG Option

This allows analysis of both gas and pressurized liquid samples.

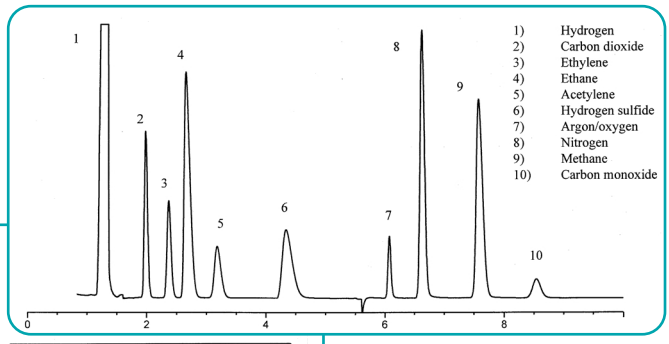
Fast and Flexible

By using EPC with the split/splitless inlet, you accelerate this analysis to provide a run time of less than 15 minutes while analyzing through benzene. The EPC option also allows more flexibility to choose between a fast analysis or a slightly longer analysis having greater resolution between peaks. The use of separate trains (sub-systems) allows one to run each train independent of the other two for easier operation and servicing.

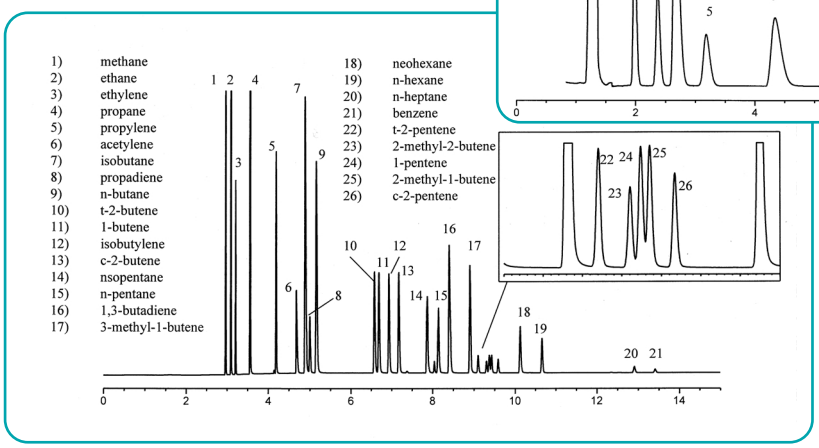
Hyperextended Refinery Gas Analyzer Application 383DH

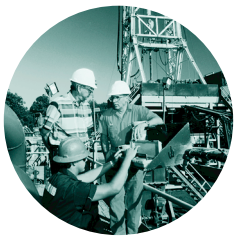
- All the features of 383D Refinery gas analyzer
- Allows for an additional user-specified column to the FID
- Maximum column temperature for the user-specified column is 225 °C
- Can be configured to inject gas, LPG, or ambient liquid samples

TCD Channel



FID Channel





Fast Refinery Gas

Application 583D

Speed of analysis, combined with reliability and ease-of-use make this a great addition to your laboratory. Built on the 6890 gas chromatograph and its advanced capabilities, we have created an analyzer specifically configured to meet this need for fast refinery and chemical plant gas analysis.

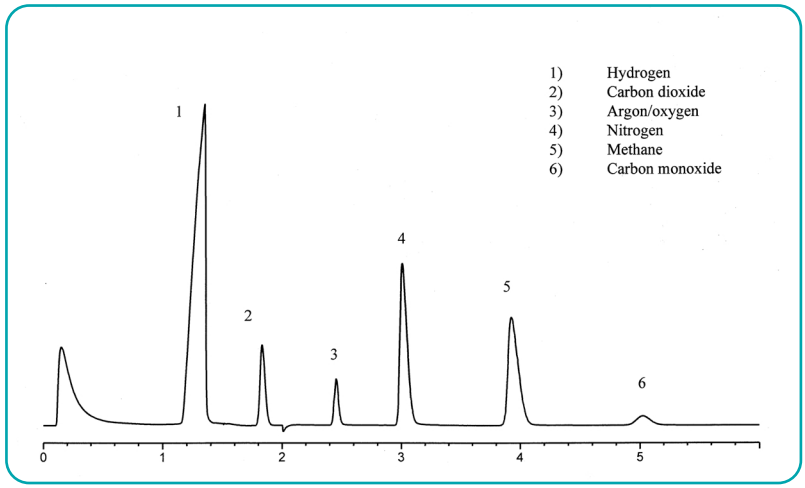
System Configuration

Utilizing the proven technology found in the plant and refinery gas application 383D, this fast refinery gas system performs a simplified analysis to provide high sample throughput with proven column and hardware technology. This analyzer performs a fast analysis—less than six minutes through n-C_6 and features dual TCDs and an FID. Hydrogen carrier gas is used on the FID subsystem to shorten analysis time.

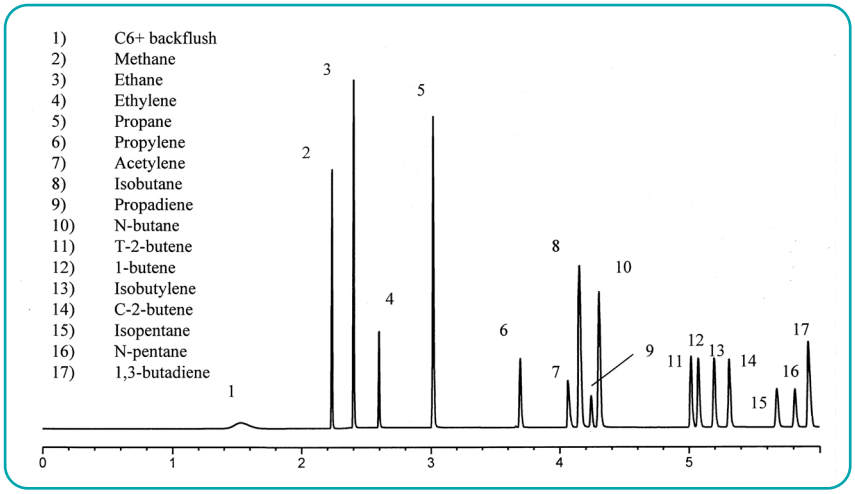
LPG Option

This allows analysis of both gas and pressurized liquid samples.

TCD Channel



FID Channel

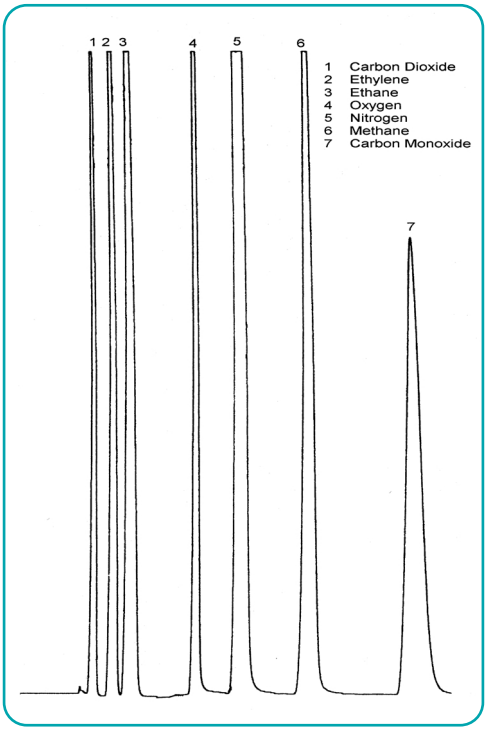


Fixed Gases

Application 131-00

This application analyzes fixed gases completely in under 12 minutes. Adding H_2S analysis brings the total time to 15 minutes. The system is protected from water and sulfur contamination.

System Configuration
The system uses a sampling valve and a switching valve, packed columns, and a TCD for the analysis of carbon dioxide, ethylene, ethane, acetylene, oxygen, nitrogen, methane, and carbon monoxide. The lower detection limit is 200 ppm, except for CO, which is 500 ppm, and those components eluting on the tail of a major component.



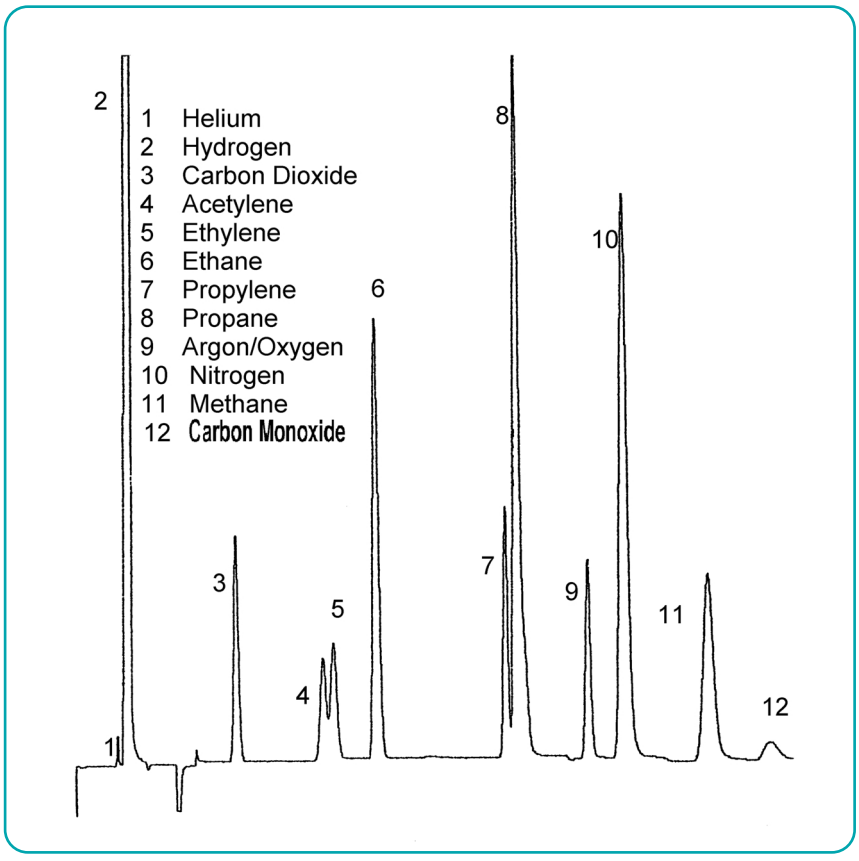
Flue Gas

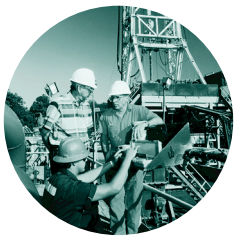
Application 160-00

Allowing detection of hydrogen and helium in the sample, this analyzer is designed for the rapid, comprehensive analysis of fixed gases. An isothermal auxiliary oven allows high flexibility and capability. Analysis time is 15 minutes. Systems can be configured for hydrogen sulfide analysis.

System Configuration
Two subsystems operating simultaneously provide a fast, yet complete analysis. The first subsystem uses a gas sampling and switching valve, packed columns, and a TCD for the analysis of helium, carbon dioxide, acetylene, ethylene, propylene, propane, argon/oxygen composite, nitrogen, methane, and carbon monoxide. The lower detection limit is 200 ppm, except for CO, which is 500 ppm, and those components eluting on the tail of a major peak.

The second subsystem uses a separate gas sampling and switching valve, packed columns, nitrogen carrier, and a second TCD to detect hydrogen. The lower detection limit is 100 ppm.





Industry-Specific Answers
Take advantage of the industry expertise that's available to you from Agilent Technologies and our partners. We can provide the answer to your chemical analysis requirements.

Ask Agilent Technologies
Let's talk about your analysis requirements for chemical plant and refinery gases. Contact your Agilent representative or authorized distributor. Or for more information, visit www.agilent.com/chem. Help us help you analyze your world.

A Solution Partnership
Agilent Technologies' channel partners complement our expertise in the hydrocarbon processing industry. Wasson-ECE is an Agilent Technologies Premier Solution Provider, a partnership that helps provide you with the most comprehensive analyzer solutions. Wasson's expertise in producing innovative solutions to support the hydrocarbon processing industry will greatly complement Agilent Technologies' products and knowledge.

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