

Shimadzu System GC Solutions Guide for the Hydrocarbon Processing Industry

Reliable, Advanced Performance to Help
You Stay Productive and Competitive



INTRODUCTION



Shimadzu provides proven System GC Solutions designed to meet the demands of your business and industry.

Our System GC Analyzers are built and tested to meet the specific analysis requirements of applicable industry standards.

Pre-installation

- Each System GC analyzer is factory pre-configured and pre-tested.
- Field installation and performance verification is completed by a Shimadzu factory-trained engineer or a certified partner engineer.

Post-installation

- Dedicated support by Shimadzu experts and partners will allow you to overcome your analytical challenges.

For six decades Shimadzu has been building gas chromatography products and remains committed to building the best GC products in the world. Throughout our long history, the customers' needs have always been central to all our design, manufacturing and testing processes.

As part of this continuing commitment, we developed System GC solutions for the hydrocarbon processing industry (HPI) to provide our customers with the most reliable analytical solutions available anywhere.

From characterization of raw crude and natural gas to monitoring production and quality of refined chemicals and alternative fuels, Shimadzu is committed to providing the most complete GC analysis portfolio. Shimadzu's HPI GC analyzers are built on a reputation of reliable, quality hardware and decades of technical expertise.

Our solutions range from a basic system modified with chemically deactivated material and customized columns to quantify trace contaminations in petrochemical systems to a complex multi-valve system for characterization of diverse components in a product.

The following pages provide an overview of Shimadzu's complete HPI GC analyzer solutions, which include:

- More than 100 factory-tested GC analyzers developed to comply with industry standards established by ASTM, GPA, ISO, UOP, etc.
- Customized GC analyzers configured and tested to your application's pre-determined specifications.
- Customized GC instruments and tools designed, delivered and supported by Shimadzu and its partners.

When you need pre-configured or customized analyzers, look to Shimadzu. We'll help you and your team reduce the time spent on application development and, as a result, improve your productivity.

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Nexis GC-2030

The Next Industry Standard

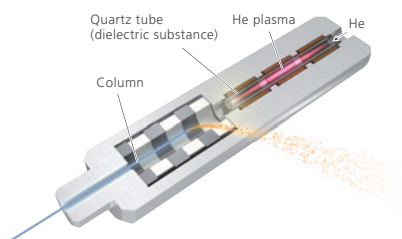
Nexis GC-2030, Shimadzu's premier gas chromatograph, offers a modern approach to a classic chromatographic technique. Designed with the user in mind, new innovative features, exceptional performance and high throughput capabilities will elevate your lab to the next level.



Features

High-Sensitivity Detectors Support a Wide Variety of Analyses

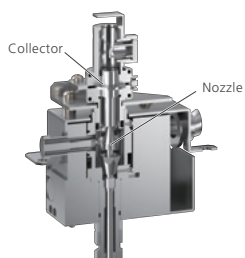
Barrier Discharge Ionization Detector (BID-2030)



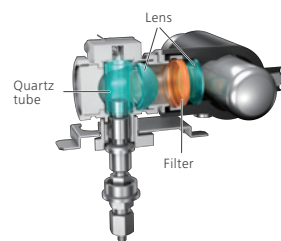
Sulfur Chemiluminescence Detector (SCD-2030)



Flame Ionization Detector (FID-2030)



Flame Photometric Detector (FPD-2030)



Intelligent Flow Controller with Exceptional Reproducibility

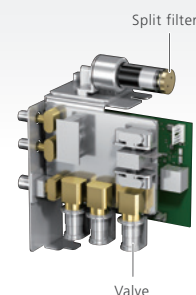
A new advanced flow controller (AFC) has been developed to include a CPU.

It supports carrier gas constant linear velocity control, constant flowrate control, constant pressure control, and various other control modes and achieves exceptionally high reproducibility for ultra-high-speed and ultra-high-precision control modes. Multi-step programs can be created for each control mode as well.

The split line filter can be replaced with hands. Internal contamination can be confirmed visually to ensure filters are replaced at the proper timing.

Results from Analyzing a Grob Test Mix
Standard Ten Consecutive Times

	Peak Area Value RSD%	Retention Time RSD%
Decane	0.29	0.005
1-Octanol	0.32	0.004
Undecane	0.28	0.004
2,6-dimethylaniline	0.29	0.003
n-Metyl Nonanoate	0.24	0.003
n-Metyl Decanoate	0.25	0.002
Dicyclohexylamine	0.23	0.003
n-Metyl Laurate	0.27	0.004



Flow Controller
(AFC-2030)

GC Systems Customized for Specific Needs

Gasoline analysis system

This system is able to measure specific substances in gasoline, such as oxygenates.

Natural gas analysis system

This system is able to analyze components in natural gas, such as shale gas.

Inorganic gas analysis system

This system is able to measure hydrogen and various other inorganic gases.

Hydrocarbon analysis system

This system is able to measure hydrocarbons that are generated, such as from catalyst reactions.

Refinery gas analysis system

This system is able to analyze components in gas from petroleum refineries.

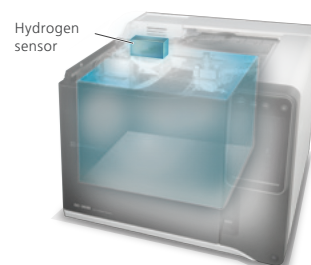
Public utility natural gas analysis system

This system is able to calculate calorific values from measurements of natural gas.

Faster Analysis with Hydrogen Carrier Gas

Hydrogen can be a safe and highly effective carrier gas. As a highly efficient carrier gas with a flat Van Deemter curve, it maintains its separation efficiency across a wide linear velocity range. This makes it both a good substitute for Helium and also a great choice for speeding up analysis times. We know safety is paramount, which is why the Nexis GC-2030 offers an optional built-in hydrogen sensor*. It not only maintains a safe standby mode for early detection of any potential leaks, but also shuts off hydrogen flow. The main unit also includes an automatic carrier gas leak check function, which is very helpful when using hydrogen as a carrier gas.

* Optional



Hydrogen Sensor Monitors Inside the GC Oven

Natural Gas

A close-up photograph of two gas burners on a stove, both of which are lit. The flames are a vibrant blue color, indicating a clean and efficient burn. The burners are set against a dark background, which makes the blue flames stand out prominently. The text 'Quick and Reliable Determination of Composition and Calorific Values' is overlaid on the right side of the image.

Quick and Reliable Determination of Composition and Calorific Values

Natural gas is widely used for town gas, electric generation, and as organic chemicals in feedstock.

Natural gas contains mainly methane and other light hydrocarbons but may also contain small amounts of carbon dioxide, oxygen, nitrogen, hydrogen sulfide, or helium as impurities.

For the trading of natural gas, calorific values and purity content are measured. In addition, some impurities, such as hydrogen sulfide, must be controlled before natural gas is used for producing chemicals.

Shimadzu natural gas analyzers measure permanent gases and light hydrocarbons from C1 to C5 with C6+ backflush; an extended model includes a function for measuring middle hydrocarbons up to C15. Our factory assembles and tests our GC analyzers for the chemical composition analysis of natural gas and liquid natural gas. Each system is equipped with software that outputs reports according to ISO BTU requirements.

Natural Gas Analyzer

Nexis GC-2030NGA1 with Hydrogen / Nexis GC-2030NGA2 without Hydrogen

Analyzer Description

System Configuration:

- 3 valves / 6 packed columns / 2 TCDs

Sample Information:

- Natural gas or similar gaseous mixture

Compounds Analyzed:

- C1 to C5 (Methane, Ethane, Propane, i-Butane, n-Butane, i-Pentane, n-Pentane)
- C6+ as Backflush
- He, H₂, O₂, N₂, H₂S, CO, CO₂

Typical Concentration Range:

- 0.01 % mol for all components except for H₂S and CH₄, 0.20 % mol for H₂S and 20 % mol for CH₄

Reference Methods:

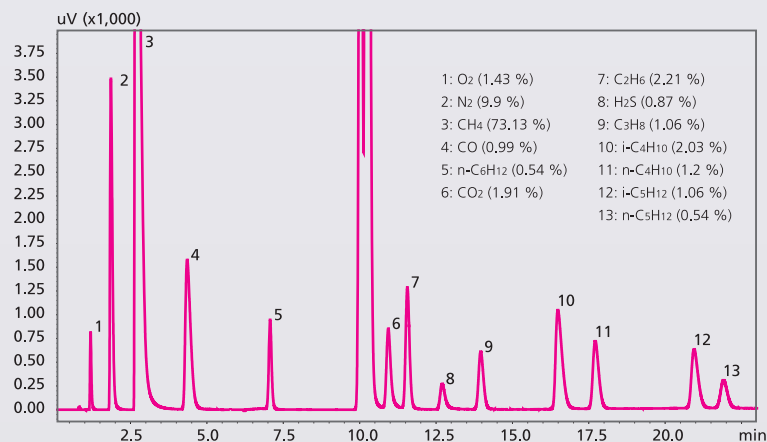
- ASTM D-1945, D-3588 and GPA2261

Features

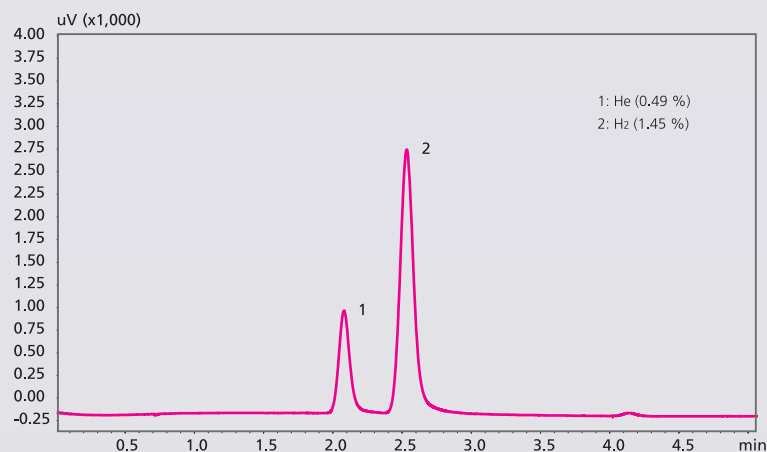
- Dual TCD channels
- Dedicated channel for Hydrogen and Helium analysis
- Rugged packed columns
- 25 minute analysis time
- BTU and Specific Gravity Calorific Calculation software provided as per ASTM D-3588

Typical Chromatogram

TCD-1



TCD-2



Fast Natural Gas Analyzer

Nexis GC-2030FNGA1 with Hydrogen / Nexis GC-2030FNGA2 without Hydrogen

Analyzer Description

System Configuration:

- 4 valves / 8 columns (packed and capillary) / 2 TCDs / FID

Sample Information:

- Natural gas or similar gaseous mixture

Compounds Analyzed:

- C1 to C5 (Methane, Ethane, Propane, i-Butane, n-Butane, i-Pentane, n-Pentane)
- C6+ as Backflush
- He, H₂, O₂, N₂, H₂S, CO, CO₂

Typical Concentration Range:

- 0.01% mol for permanent gases and C2 hydrocarbon on TCD, 10 ppm for C3 to C6+ hydrocarbons on FID except for H₂S and CH₄, 0.10% mol for H₂S and 20% mol for CH₄

Reference Methods:

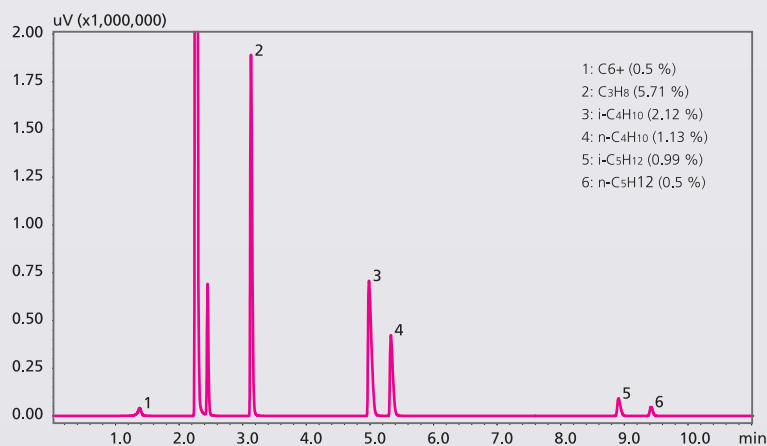
- ASTM D-1945, D-3588 and GPA2261

Features

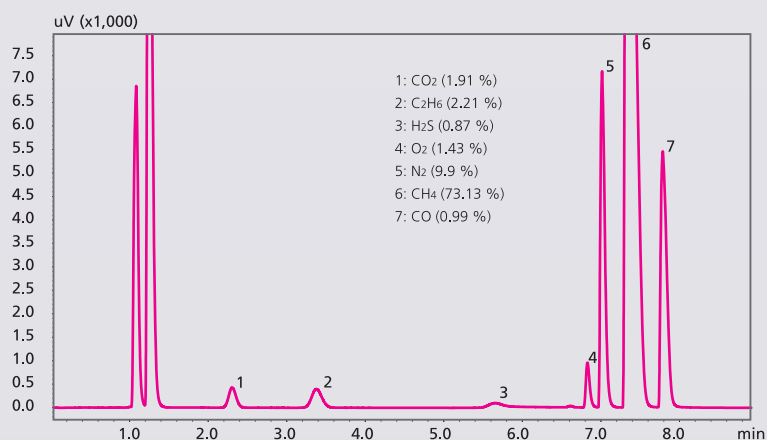
- Dual TCD channels
- Dedicated channel for Hydrogen and Helium analysis
- FID channel for C3 to C6+ hydrocarbons
- Rugged packed and capillary columns
- 10 minute analysis time
- BTU calorific calculation software provided

Typical Chromatogram

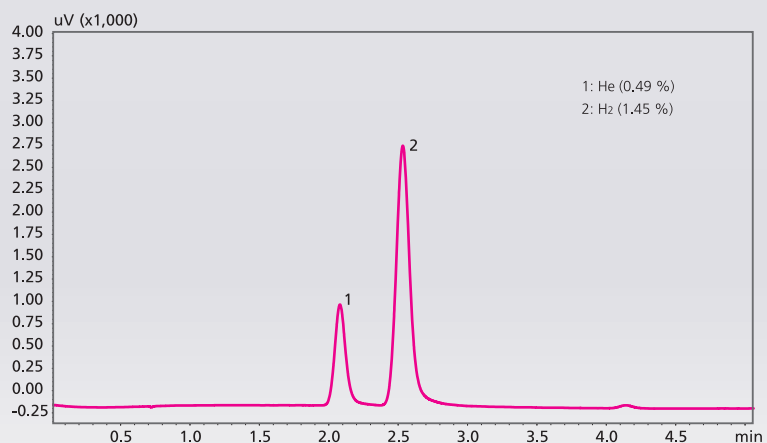
FID



TCD-1



TCD-2



Extended Natural Gas Analyzer (Single Oven)

Nexis GC-2030ENGA1

Analyzer Description

System Configuration:

- 4 valves / 7 columns (packed and capillary) / 2 TCDs / FID

Sample Information:

- Natural gas or similar gaseous mixture

Compounds Analyzed:

- C1 to C14 hydrocarbons
He, H₂, O₂, N₂, H₂S, CO, CO₂

Typical Concentration Range:

- 0.01 % mol for permanent gases and C2 hydrocarbon on TCD, 10 ppm for C3 to C13 hydrocarbons on FID except for H₂S and CH₄, 0.10 % mol for H₂S and 20 % mol for methane

Reference Methods:

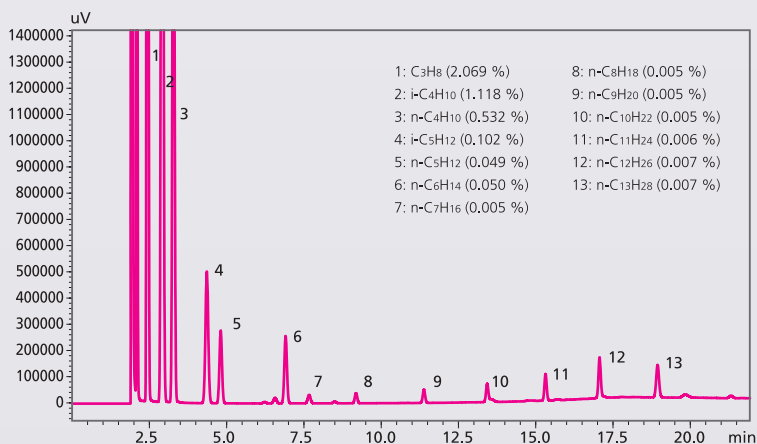
- ASTM D-1945, D-3588 and GPA2286

Features

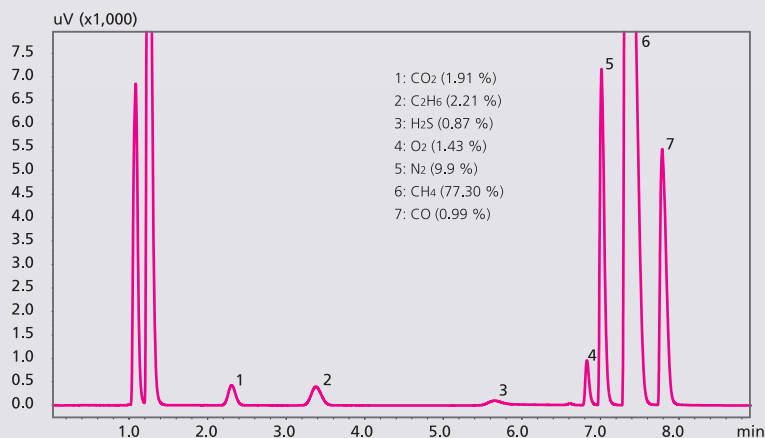
- Dual TCD channels
- Dedicated channel for Hydrogen and Helium analysis
- FID channel for C3 to C13 hydrocarbons
- Rugged packed and capillary columns
- 30 minute analysis time
- BTU Calorific and Specific Gravity Calculation Software provided as per ASTM D-3588

Typical Chromatogram

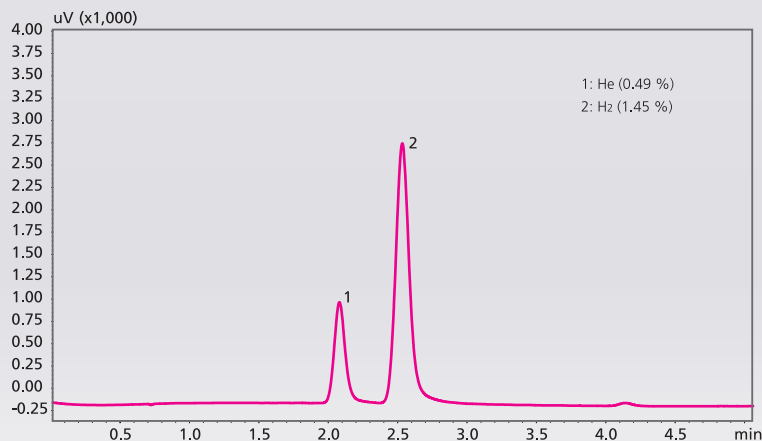
FID



TCD-1



TCD-2



Extended Natural Gas Analyzer (Dual Oven)

Nexis GC-2030ENGA2

Analyzer Description

System Configuration:

- 4 valves / 7 columns (packed and capillary) / 2 TCDs / FID
- Dual Oven

Sample Information:

- Natural gas or similar gaseous mixture

Compounds Analyzed:

- C1 to C14 hydrocarbons
- He, H₂, O₂, N₂, H₂S, CO, CO₂

Typical Concentration Range:

- 0.01 % mol for permanent gases and C2 hydrocarbon on TCD, 10 ppm for C3 to C14 hydrocarbons on FID except for H₂S and CH₄, 0.10 % mol for H₂S and 20 % mol for CH₄

Reference Methods:

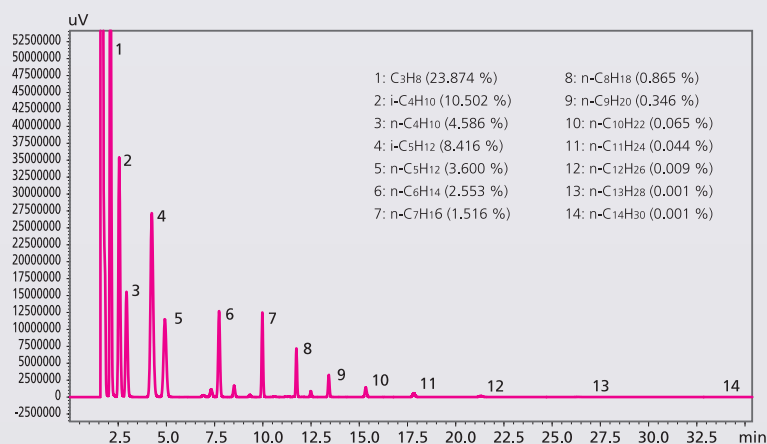
- ASTM D-1945, D-3588 and GPA2286

Features

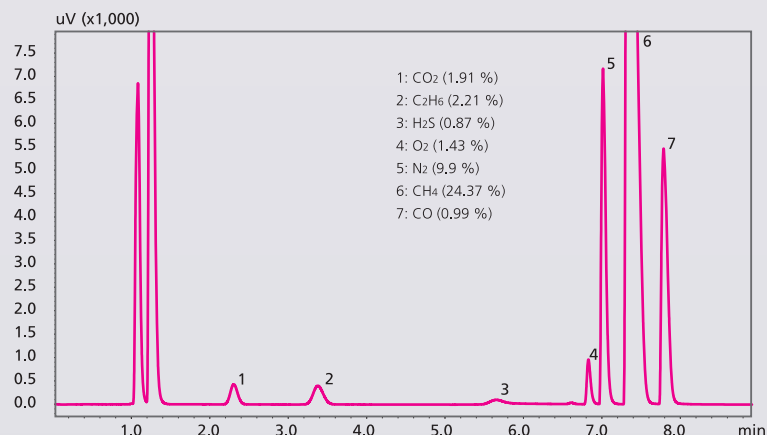
- Dual TCD channels
- Dedicated channel for Hydrogen and Helium analysis
- FID channel for C3 to C14 hydrocarbons in 2nd GC oven
- Rugged packed and capillary columns

Typical Chromatogram

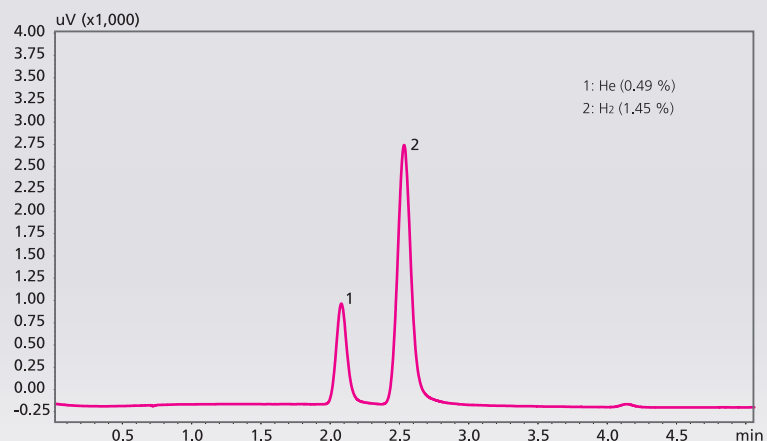
FID



TCD-1



TCD-2



Natural Gas Analyzer (ISO6974-3)

Nexis GC-2030ISO6974-3

Analyzer Description

System Configuration:

- 2 valves / 3 columns (packed) / 2 TCDs / FID

Sample Information:

- Natural gas or similar gaseous mixture

Compounds Analyzed:

- C1 to C8 hydrocarbons
- He, H₂, O₂, N₂, CO₂

Typical Concentration Range:

- 0.1 % mol for permanent gases (O₂, N₂, CO₂) on TCD, 1 ppm for C4 to C8 hydrocarbons on FID except for C3, H₂ / He and CH₄, 0.001 % mol for C3, 0.01 % for H₂ / He and 50 % mol for CH₄

Reference Methods:

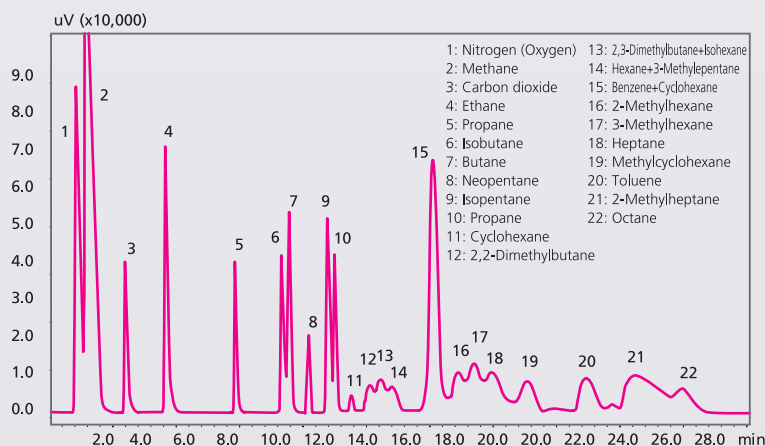
- ISO6974-3, ISO6976

Features

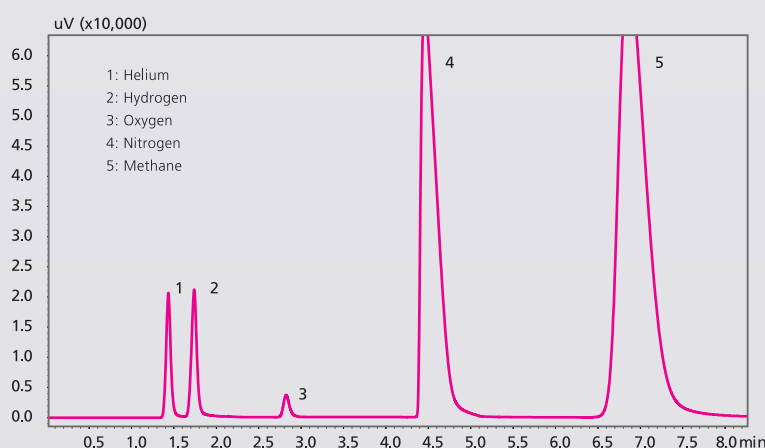
- Dual TCD channels
- Dedicated channel for Hydrogen and Helium analysis
- FID channel for C4 to C8 hydrocarbons
- Rugged packed columns
- 20 minute analysis time
- ISO Calorific and Specific Gravity Calculation Software provided as per ISO6976.

Typical Chromatogram

TCD-1



TCD-2



Natural Gas Analyzer (ISO6974-4)

Nexis GC-2030ISO6974-4

Analyzer Description

System Configuration:

- 1 valve / 2 columns (packed) / TCD

Sample Information:

- Natural gas or similar gaseous mixture

Compounds Analyzed:

- C1 to C6+ hydrocarbons
- N₂, CO₂

Typical Concentration Range:

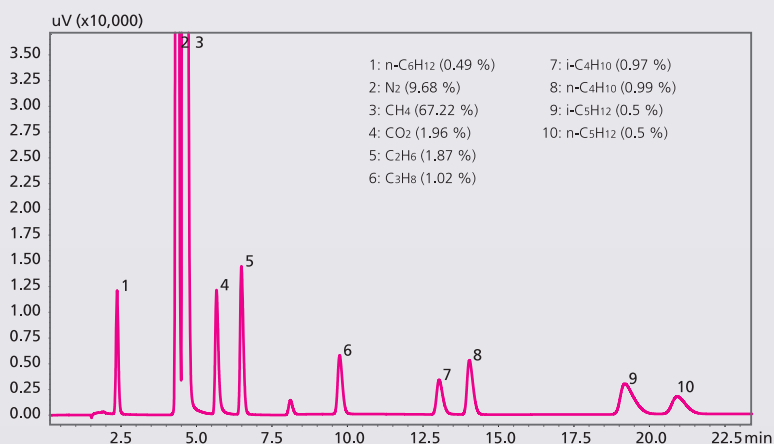
- 0.001 % mol for permanent gases on TCD, except for CH₄, 75 % mol for CH₄

Reference Methods:

- ISO6974-4, ISO6976

Typical Chromatogram

TCD-1



Features

- Single TCD channel
- Rugged packed columns
- 22 minute analysis time
- ISO Calorific and Specific Gravity Calculation Software provided as per ISO6976.

BID Ultra-Fast Natural Gas Analyzer

Nexis GC-2030 BIDUFNGA

Analyzer Description

System Configuration:

- 3 valves / 6 columns (packed and capillary) / BID / FID

Sample Information:

- Natural gas or similar gaseous mixture

Compounds Analyzed:

- C1 to C6+ hydrocarbons
- H₂, O₂, N₂, CO, CO₂, C₂H₆, C₂H₄, C₂H₂, H₂S

Typical Concentration Range:

- 0.001 % mol for permanent gases and C2 hydrocarbons on BID, except for CH₄ and H₂S, 20 % mol for CH₄ and 0.01 % for H₂S

Reference Methods:

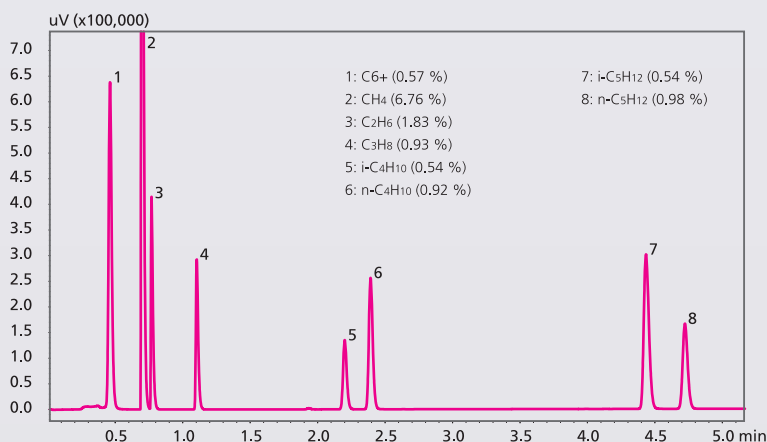
- ASTM D-1945, D-3588, GPA-2261

Features

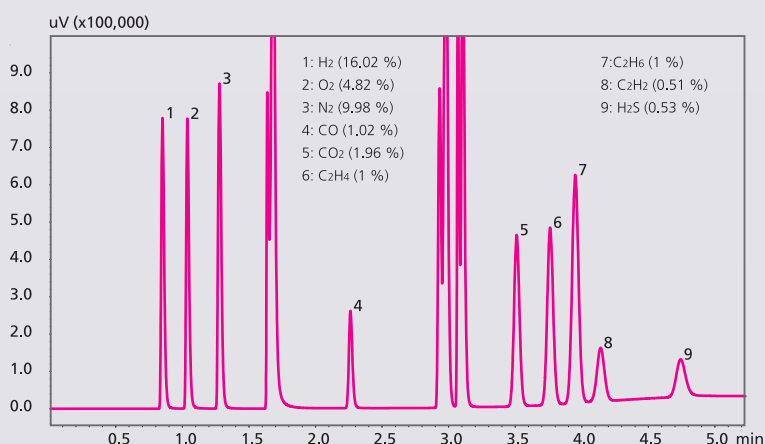
- Single BID channel
- FID for C1 to C6+ hydrocarbons
- Rugged packed and capillary columns
- 5 minute analysis time
- BTU Calorific and Specific Gravity Calculation Software provided as per D-3588

Typical Chromatogram

FID



BID



Refinery Gas



Advanced, Complete Work Solutions without Workflow Disruption

Refineries distillate crude oil into different fractions, and then produce fuels and feedstock for downstream chemical processes, such as gasoline, naphtha, fuels, heavy oils, and lubricants.

After the distillation and cracking process, refinery gases vary widely depending on the processing stage.

Refinery gases contain permanent gases such as oxygen, nitrogen, carbon dioxide and saturated and unsaturated hydrocarbons from C1 to C5.

Refinery gas composition analysis is very complex and high-speed analysis is required to provide quick feedback to processing control.

Shimadzu refinery gas analyzers measure permanent gases and light hydrocarbons from C1 to C5 with C6+ backflush; high-speed analyzers can give results within six minutes. Each analyzer is factory assembled and tested to ensure optimum performance for the chemical composition analysis of refinery gas.

Refinery Gas Analyzer

Nexis GC-2030FRGA1 with Hydrogen / Nexis GC-2030FRGA2 without Hydrogen

Analyzer Description

System Configuration:

- 4 valves / 8 columns (packed and capillary) / 2 TCDs / FID

Sample Information:

- Refined gas or similar gaseous mixture

Compounds Analyzed:

- C1 to C6+ hydrocarbons
- He, H₂, O₂, N₂, CO, CO₂, C₂H₆, C₂H₄, C₂H₂, H₂S

Typical Concentration Range:

- 0.01 % mol for permanent gases and C2 hydrocarbons on TCD, except for H₂S, 0.1 % for H₂S
- 0.001 % for C1 to C6+ hydrocarbons

Reference Methods:

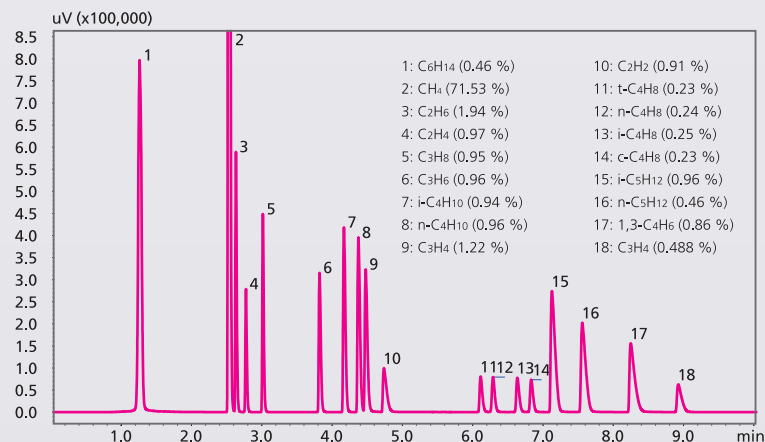
- ASTM D-1945, D-1946, D-3588, GPA-2261

Features

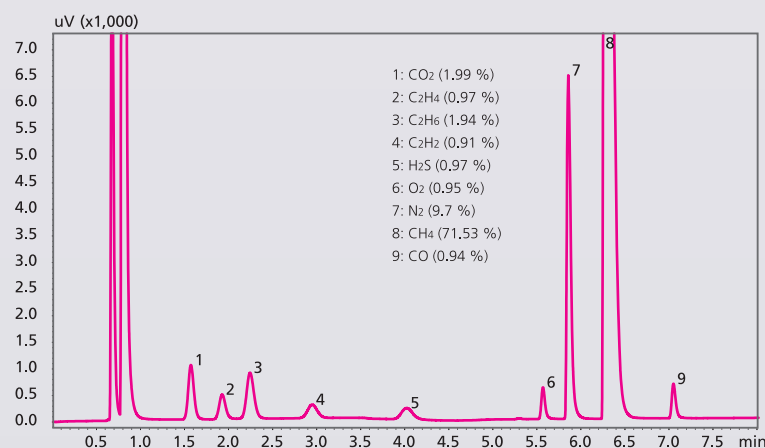
- Dual TCD channels
- Dedicated channel for Hydrogen and Helium
- FID for C1 to C6+ hydrocarbons
- Rugged packed and capillary columns
- 10 minute analysis time
- BTU Calorific and Specific Gravity Calculation Software provided as per D-3588

Typical Chromatogram

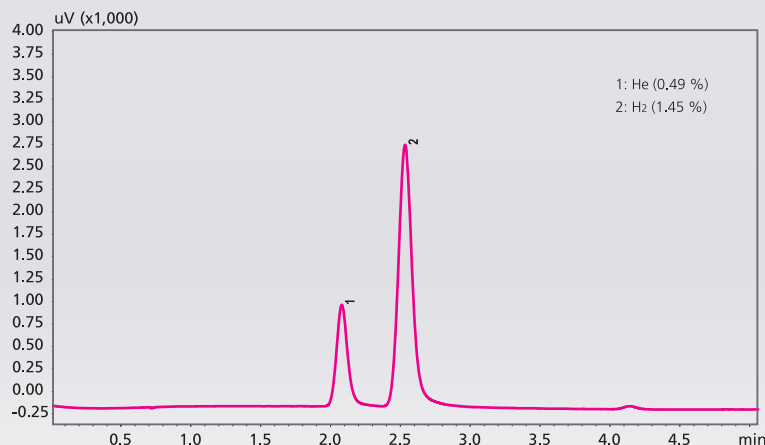
FID



TCD-1



TCD-2



High Speed Refinery Gas Analyzer

Nexis GC-2030HSRGA1 with Hydrogen / Nexis GC-2030HSRGA2 without Hydrogen

Analyzer Description

System Configuration:

- 4 valves / 8 columns (packed and capillary) / 2 TCDs / FID

Sample Information:

- Refined gas or similar gaseous mixture

Compounds Analyzed:

- C1 to C6+ hydrocarbons
- He, H₂, O₂, N₂, CO, CO₂, C₂H₆, C₂H₄, C₂H₂, H₂S

Typical Concentration Range:

- 0.01% mol for permanent gases and C2 hydrocarbons on TCD, except for H₂S, 0.1% for H₂S
- 0.01% for C1 to C6+ hydrocarbons

Reference Methods:

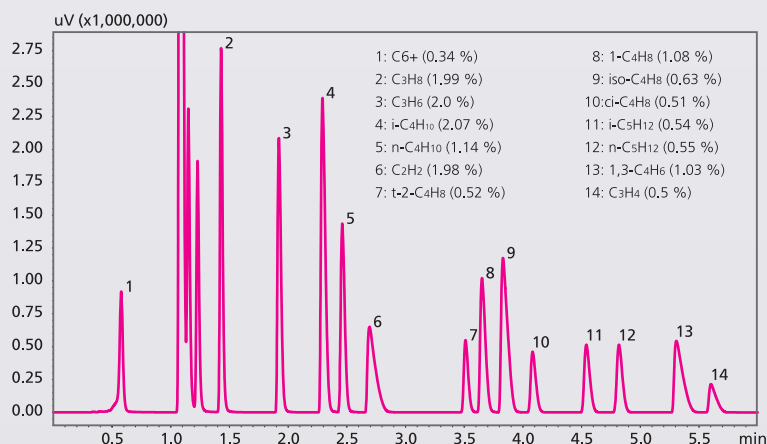
- ASTM D-1946, D-1945, D-3588, GPA-2261

Features

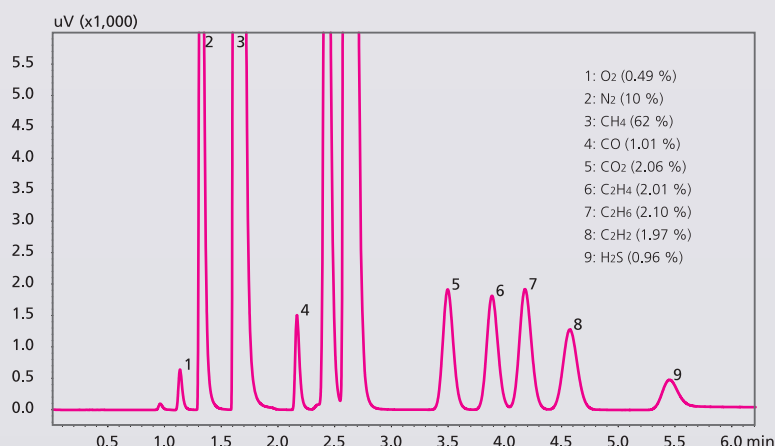
- Dual TCD channels
- Dedicated channel for Hydrogen and Helium
- FID for C1 to C6+ hydrocarbons
- Rugged packed and capillary columns
- 6 minute analysis time
- BTU Calorific and Specific Gravity Calculation Software provided as per D-3588

Typical Chromatogram

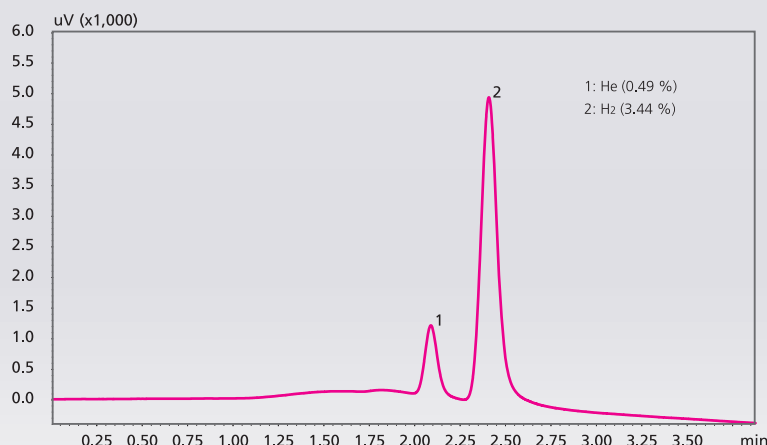
FID



TCD-1



TCD-2



Extended Refinery Gas Analyzer

Nexis GC-2030ERGA1 with Hydrogen / Nexis GC-2030ERGA2 without Hydrogen

Analyzer Description

System Configuration:

- 4 valves / 9 columns (packed and capillary) / 2 TCDs / 2 FIDs
- Dual Ovens

Sample Information:

- Refined gas or similar gaseous mixture

Compounds Analyzed:

- C1 to C14 hydrocarbons
- He, H₂, O₂, N₂, CO, CO₂, C₂H₆, C₂H₄, C₂H₂, H₂S

Typical Concentration Range:

- 0.01 % mol for permanent gases and C2 hydrocarbons on TCD, except for H₂S, 0.1 % for H₂S
- 0.001 % for C3 to C13 hydrocarbons

Reference Methods:

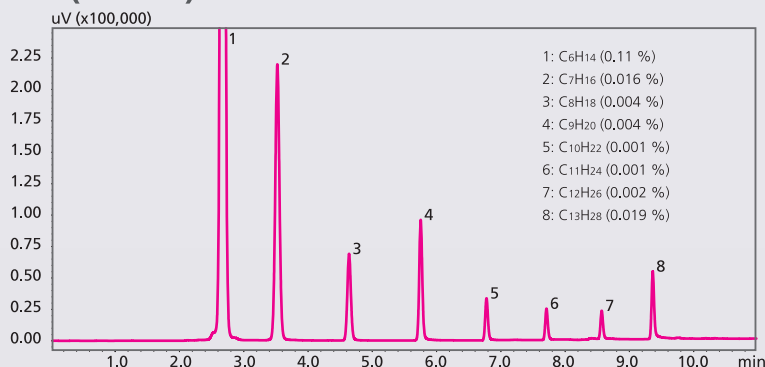
- ASTM D-1946, D-1945, D-3588, GPA-2286

Features

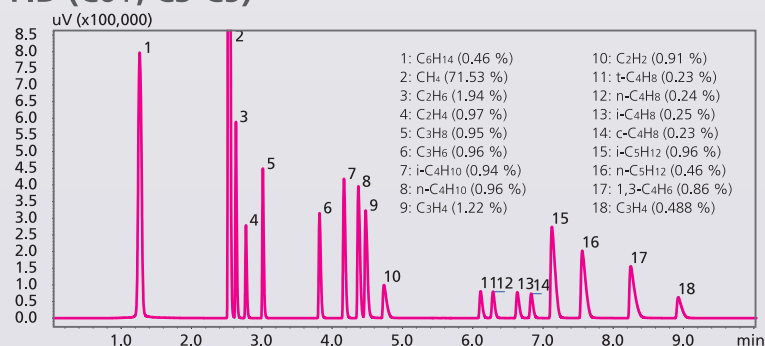
- Dual TCD channels
- FID for C3 to C6+ hydrocarbons
- 2nd FID in second oven for C6 to C14 hydrocarbons
- Rugged packed and capillary columns
- 10 minute analysis time
- BTU Calorific and Specific Gravity Calculation

Typical Chromatogram

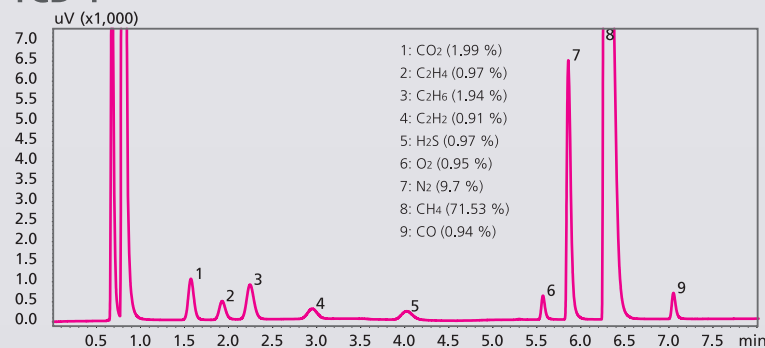
FID (C6-C13)



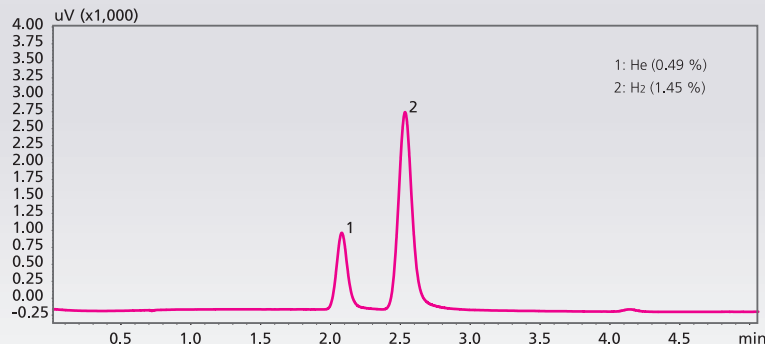
FID (C6+, C3-C5)



TCD-1



TCD-2



Complete Extended Refinery Gas Analyzer

Nexis GC-2030CERGA1

Analyzer Description

System Configuration:

- 5 valves / 9 columns (packed and capillary) / 2 TCDs / 2 FIDs
- Dual GC Ovens

Sample Information:

- Refined gas or similar gaseous mixture

Compounds Analyzed:

- C3 to C14 hydrocarbons
- He, H₂, O₂, N₂, CO, CO₂, C₂H₆, C₂H₄, C₂H₂, H₂S

Typical Concentration Range:

- 0.01 % mol for permanent gases and C2 hydrocarbons on TCD, except for H₂S, 0.1 % for H₂S
- 0.001 % for C3 to C14 hydrocarbons

Reference Methods:

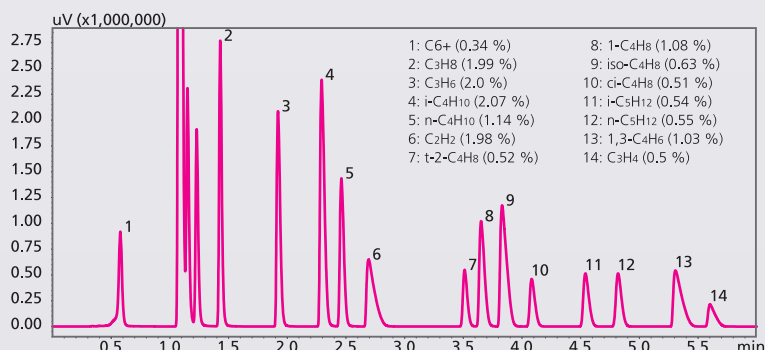
- ASTM D-1946, D-1945, D-3588, GPA-2286

Features

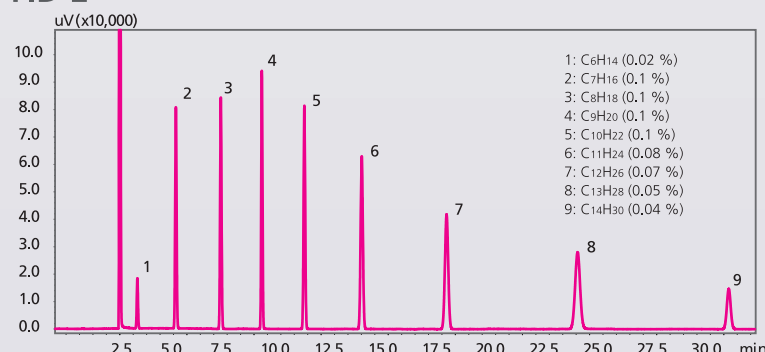
- Multi sample-type injectors - Vaporizer/ Liquid sampling valve/ Gas sample injection
- Dual TCD channels
- Dedicated channel for Hydrogen and Helium
- FID for C3 to C6+ hydrocarbons
- 2nd FID for C6 to C14 hydrocarbons in 2nd GC oven
- Rugged packed and capillary columns
- Dedicated software for switching analytical flow and sample injection method

Typical Chromatogram

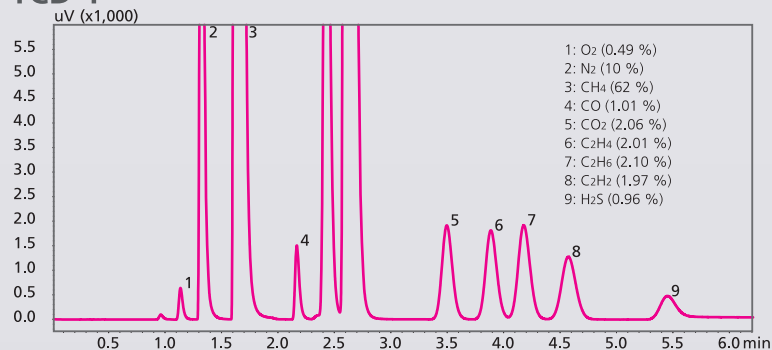
FID-1



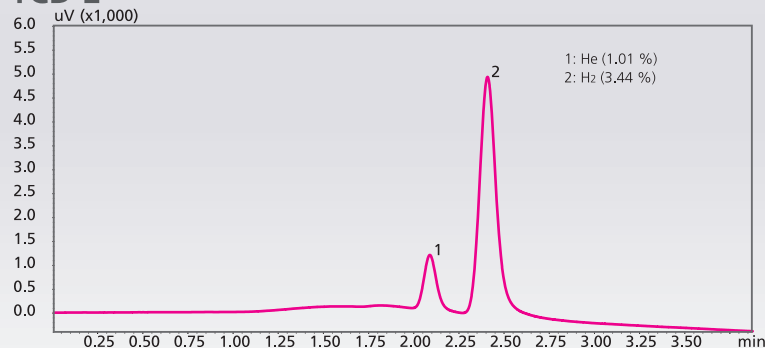
FID-2



TCD-1



TCD-2



BID Ultra-Fast Refinery Gas Analyzer

Nexis GC-2030 BIDUFRGA

Analyzer Description

System Configuration:

- 3 valves / 6 columns (packed and capillary) / BID / FID

Sample Information:

- Refined gas or similar gaseous mixture

Compounds Analyzed:

- C1 to C6+ hydrocarbons
- H₂, O₂, N₂, CO, CO₂, C₂H₆, C₂H₄, C₂H₂, H₂S

Typical Concentration Range:

- 0.001 % mol for permanent gases and C2 hydrocarbons on TCD, except for H₂S, 0.1 % mol for H₂S
- 0.001 % for C1 to C6+ hydrocarbons

Reference Methods:

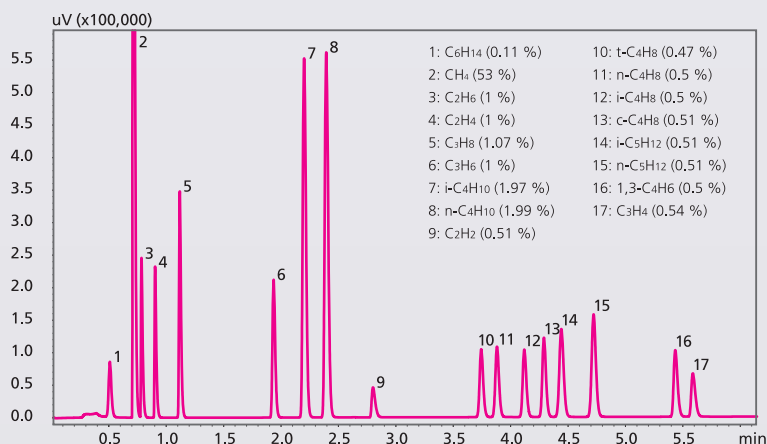
- ASTM D-1946, D-1945, D-3588, GPA-2261

Features

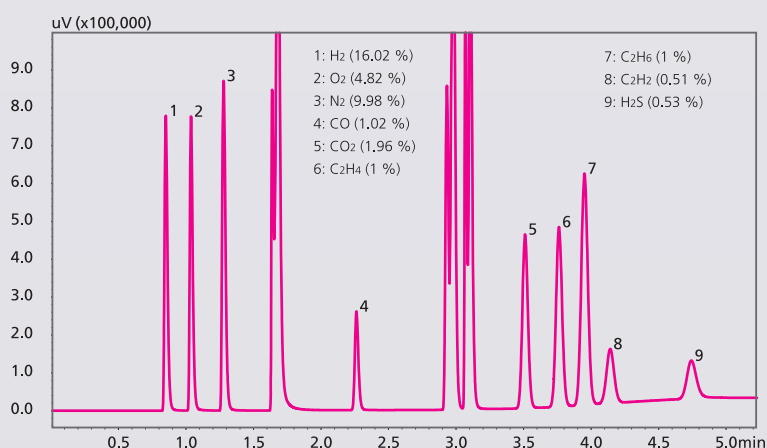
- 1 BID channel
- FID for C1 to C6+ hydrocarbons
- Rugged packed and capillary columns
- 6 minute analysis time
- BTU Calorific and Specific Gravity Calculation Software provided as per D-3588

Typical Chromatogram

FID



BID



BID Extended Refinery Gas Analyzer (Single Oven)

Nexis GC-2030 BIDERGA-S

Analyzer Description

System Configuration:

- 4 valves / 7 columns (packed and capillary) / BID / 2 FIDs

Sample Information:

- Refined gas or similar gaseous mixture

Compounds Analyzed:

- C1 to C6+ hydrocarbons
- C6 to C14 hydrocarbons
- H₂, O₂, N₂, CO, CO₂, C₂H₆, C₂H₄, C₂H₂, H₂S

Typical Concentration Range:

- 0.001 % mol for permanent gases and C2 hydrocarbons on TCD, except for H₂S, 0.01 % mol for H₂S
- 0.001 % for C1 to C6+ hydrocarbons
- 0.001 % for C6 to C13 hydrocarbons

Reference Methods:

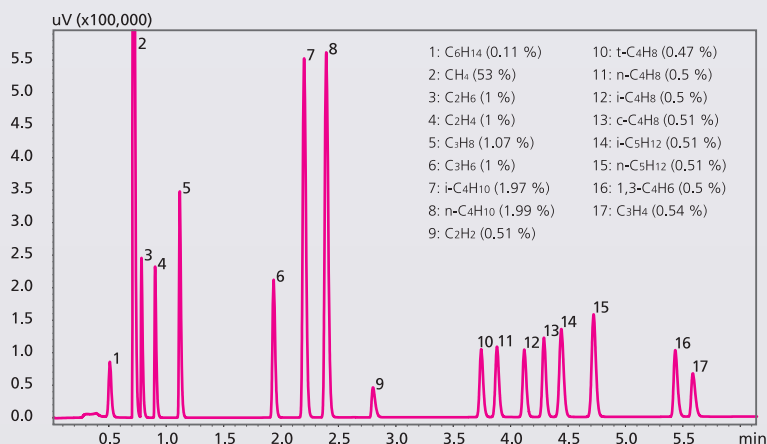
- ASTM D-1946, D-1945, D-3588, GPA-2286

Features

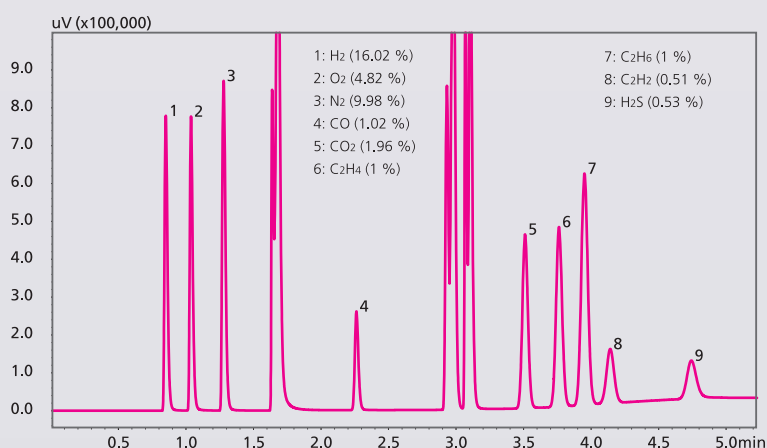
- 1 BID channel
- FID for C1 to C6+ hydrocarbons
- 2nd FID for C6 to C13 hydrocarbons
- Rugged packed and capillary columns
- 10 minute analysis time

Typical Chromatogram

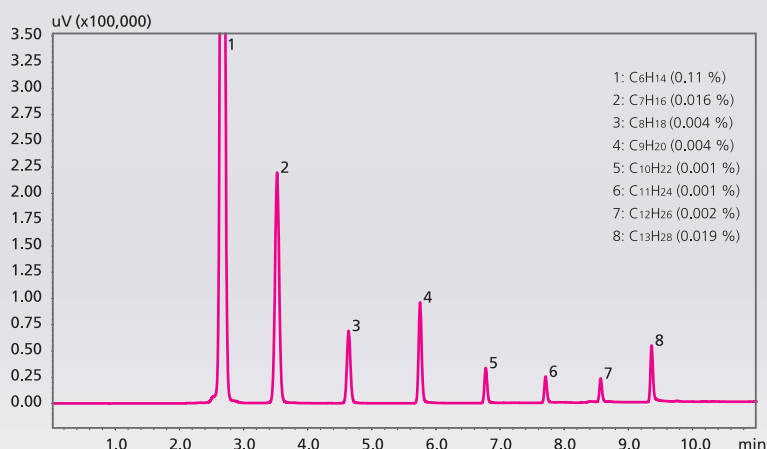
FID-1



BID



FID-2



BID Extended Refinery Gas Analyzer (Dual Oven)

Nexis GC-2030 BIDERGA-D

Analyzer Description

System Configuration:

- 4 valves / 7 columns (packed and capillary) / BID / 2 FIDs

Sample Information:

- Refined gas or similar gaseous mixture

Compounds Analyzed:

- C1 to C6+ hydrocarbons
- C6 to C14 hydrocarbons
- H₂, O₂, N₂, CO, CO₂, C₂H₆, C₂H₄, C₂H₂, H₂S

Typical Concentration Range:

- 0.001 % mol for permanent gases and C2 hydrocarbons on TCD, except for H₂S, 0.01 % mol for H₂S
- 0.001 % for C1 to C6+ hydrocarbons
- 0.001 % for C6 to C14 hydrocarbons

Reference Methods:

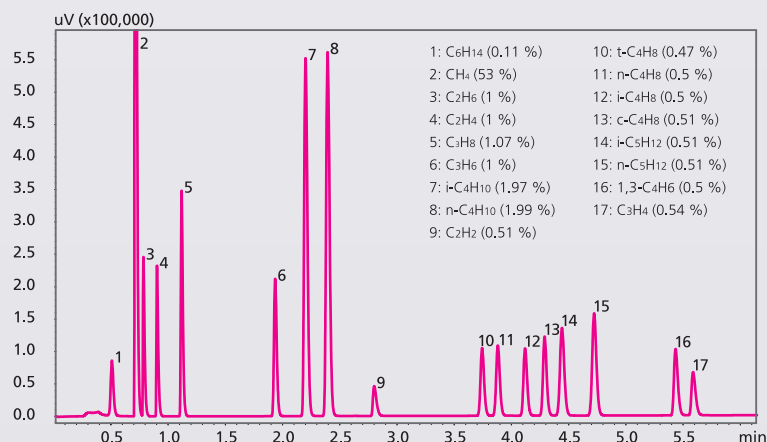
- ASTM D-1946, D-1945, D-3588, GPA-2286

Features

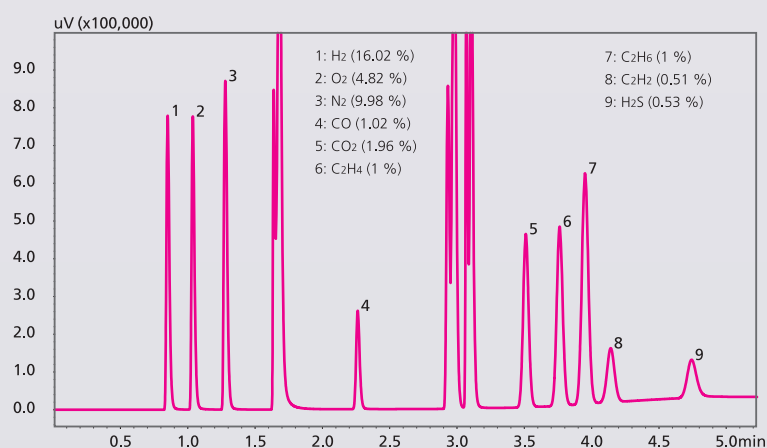
- 1 BID channel
- FID for C1 to C6+ hydrocarbons
- 2nd FID for C6 to C14 hydrocarbons
- Rugged packed and capillary columns
- 10 minute analysis time

Typical Chromatogram

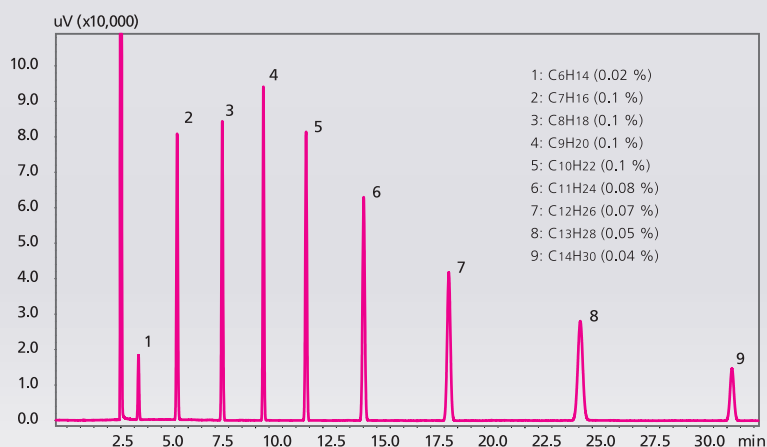
FID-1



BID



FID-2



Liquefied Petroleum Gases



Accurately Measure Calorific Value and Cleanliness of Liquefied Gaseous Fuel

LPG is mainly composed of propane and butane, which are liquefied, and supplied in pressurized cylinders more easily than other fuels. Therefore, it is useful for heating and cooking, and for industrial use in remote areas.

LPG is a mixture of many kinds of resources, such as petroleum, natural gases, byproduct of other chemical processes, etc. It is critical to measure its composition and calculate its heating value.

Shimadzu LPG analyzers are configured with vaporization apparatus for injectors and FID/TCD detectors to comply with customers' requirements. ISO6976/BTU calorific value software outputs in accordance with each industry standard.

Hydrocarbons in LPG Analyzer

Nexis GC-2030LPGHC1 with Vaporizer / Nexis GC-2030LPGHC2 with Liquid Sampling Valve

Analyzer Description

System Configuration:

- 1 valve / 1 column (capillary) / Split and Splitless injector / FID / Vaporiser

Sample Information:

- Liquefied petroleum gas

Compounds Analyzed:

- Hydrocarbons (C1 to C6)

Typical Concentration Range:

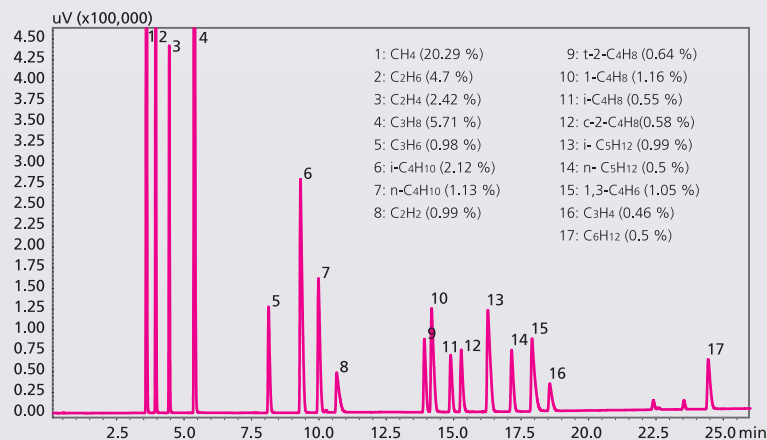
- 0.001 %

Reference Method:

- ASTM D-2163

Typical Chromatogram

FID



Features

- Single channel with Split / Splitless injector, vaporizer or liquid sampling valve for liquefied petroleum gas
- Configured with PLOT Alumina column for separation of the C1 to C6 hydrocarbons
- 30 minute analysis time

Trace Gases

Meeting Strict Requirements

Measuring feedstock impurities at progressively lower concentrations is important for processing control and to ensure a high-quality final product. Recently, customers and regulators have increased their requirements for ethylene and propylene monomer feedstock. In addition to chemical industries, the purity of feedstock is crucial for the food and semiconductor industries. Fewer contaminants can result in less damage to production equipment and assets, and can minimize the consumption of high-priced catalysts.

Shimadzu's trace gas analyzers are equipped to meet specific customer requirements and needs. Each GC system is factory assembled and tested to ensure the highest performance and maximize productivity.

Trace Gases Analyzer - CO₂ / CO / CH₄

Nexis GC-2030CCC1

Analyzer Description

System Configuration:

- 1 valve / 2 columns (packed) / methanizer FID

Sample Information:

- H₂ or light gaseous hydrocarbons

Compounds Analyzed:

- CO₂, CO and CH₄

Typical Concentration Range:

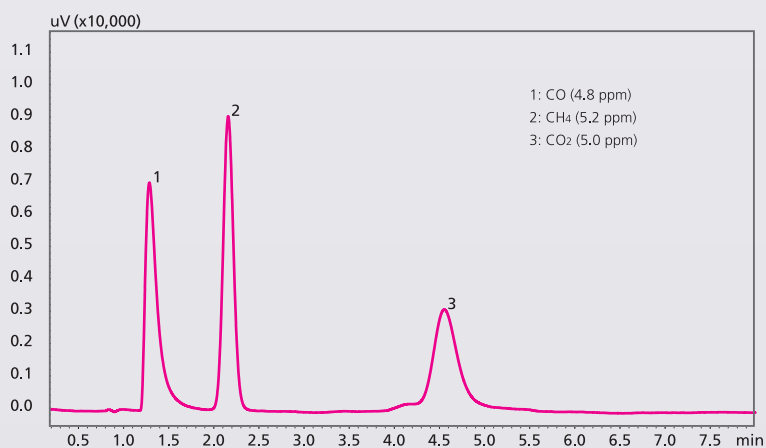
- 1 ppm for CO₂, CO and CH₄

Reference Method:

- UOP 603

Typical Chromatogram

FID



Features

- Single channel with rugged packed column
- Trace detection level of CO₂ and CO analysis by conversion to CH₄ and detection by methanizer FID
- 8 minute analysis time

Trace Gases Analyzer - CO₂ / CO / CH₄

Nexis GC-2030CCC2

Analyzer Description

System Configuration:

- 1 valve / 2 columns (packed) / TCD

Sample Information:

- Light gas (H₂, O₂, N₂, Ar)

Compounds Analyzed:

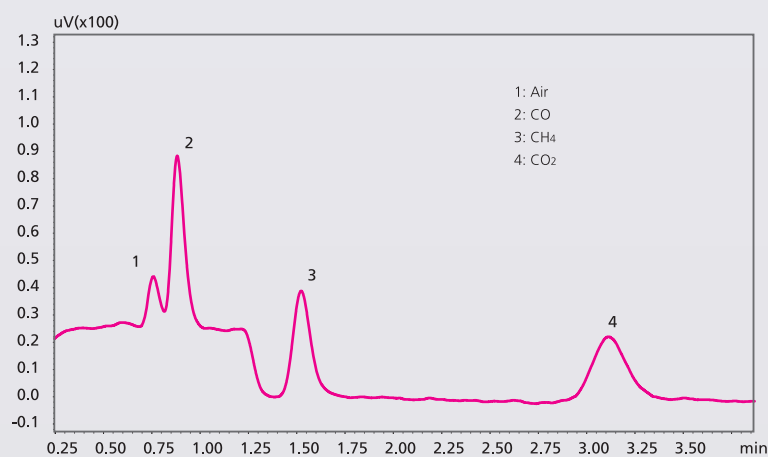
- CO₂, CO and CH₄

Typical Concentration Range:

- 0.01 % for CO₂, CO and CH₄

Typical Chromatogram

TCD



Features

- Single TCD channel with rugged packed column
- % detection level of CO₂, CH₄ and CO analysis
- 18 minute analysis time

Trace Gases Analyzer - CO₂ / CO / CH₄

Nexis GC-2030CCC3

Analyzer Description

System Configuration:

- 2 valves / 4 columns (packed) / TCD / methanizer FID

Sample Information:

- H₂ or light gaseous hydrocarbons or Light gas (H₂, O₂, N₂, Ar)

Compounds Analyzed:

- CO₂, CO and CH₄

Typical Concentration Range:

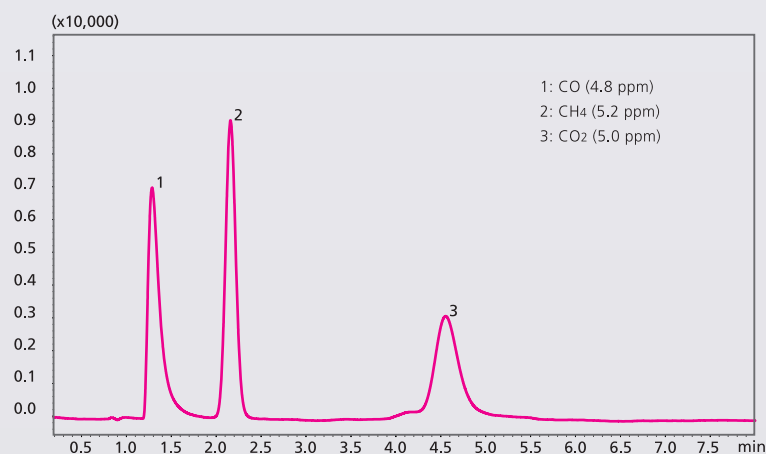
- 1 ppm for CO₂, CO and CH₄
- 0.01% for CO₂, CO and CH₄

Reference Method:

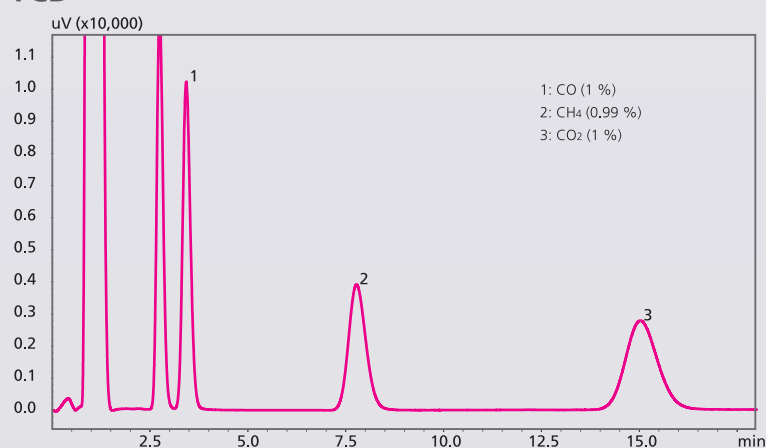
- UOP 603

Typical Chromatogram

FID



TCD



Features

- Separate channels with rugged packed columns
- % detection level of CO₂, CH₄ and CO analysis
- Trace detection level of CO₂ and CO analysis by conversion to CH₄ and detection by methanizer FID
- 16 minute analysis time

Trace Gases Analyzer - CO₂ / CO / CH₄

Nexis GC-2030CCC4

Analyzer Description

System Configuration:

- 2 valves / 4 columns (packed) / methanizer FID

Sample Information:

- H₂ or light gaseous hydrocarbons

Compounds Analyzed:

- CO₂, CO and CH₄

Typical Concentration Range:

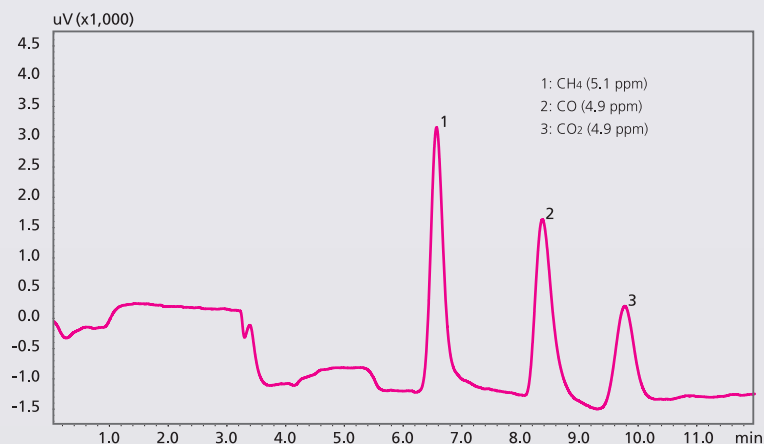
- 1 ppm for CO₂, CO and CH₄
* O₂ concentration in sample should be 1 % or lower

Reference Method:

- UOP 603

Typical Chromatogram

FID



Features

- Single channel with rugged packed columns
- Trace detection level of CO₂ and CO analysis by conversion to CH₄ and detection by methanizer FID
- 11 minute analysis time

Trace Gases Analyzer - CO₂ / CO / CH₄

Nexis GC-2030TCC

Analyzer Description

System Configuration:

- 3 valves / 5 columns (packed) / methanizer FID

Sample Information:

- C2 or light gaseous hydrocarbons

Compounds Analyzed:

- CO₂, CO and CH₄

Typical Concentration Range:

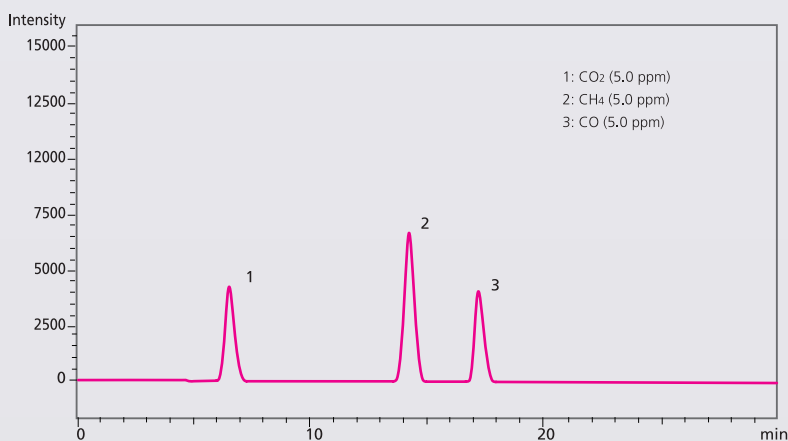
- 0.5 ppm for CO₂, CO and CH₄

Reference Method:

- ASTM D-2504

Typical Chromatogram

FID-1



Features

- Single channel with rugged packed columns with vent valve
- Trace detection level of CO₂ and CO analysis by conversion to CH₄ and detection by methanizer FID
- 20 minute analysis time

Trace H₂ Analyzer

Nexis GC-2030TH2

Analyzer Description

System Configuration:

- 1 valve / 2 columns (packed) / TCD

Sample Information:

- Municipal gas or similar gaseous mixture

Compounds Analyzed:

- H₂ and O₂

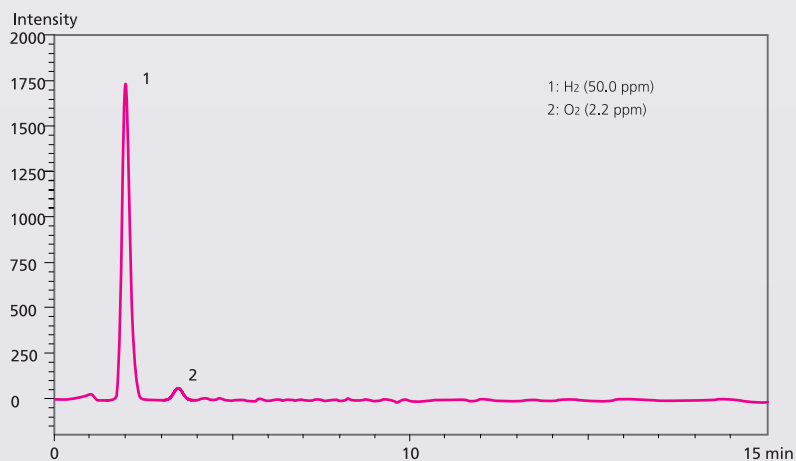
Typical Concentration Range:

- 50 ppm for permanent gases (H₂)

Reference Method:

- ASTM D-2504

Typical Chromatogram



Features

- TCD channel
- Trace detection level
- Rugged packed columns
- 5 minute analysis time

Trace O₂ and N₂ Analyzer

Nexis GC-2030TNO

Analyzer Description

System Configuration:

- 1 valve / 2 columns (packed) / TCD

Sample Information:

- Municipal gas or similar gaseous mixture

Compounds Analyzed:

- O₂ and N₂

Typical Concentration Range:

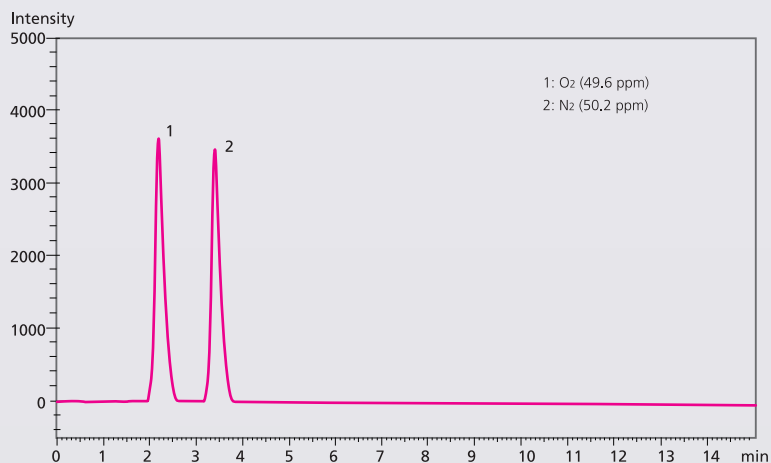
- 50 ppm for permanent gases (O₂ and N₂)

Reference Method:

- ASTM D-2504

Typical Chromatogram

TCD-1



Features

- TCD channel
- Trace detection level
- Rugged packed columns
- 5 minute analysis time

Methane Purity Analyzer

Nexis GC-2030HC2

Analyzer Description

System Configuration:

- 3 valves / 6 columns (packed) / 2 TCDs

Sample Information:

- Municipal gas or similar gaseous mixture

Compounds Analyzed:

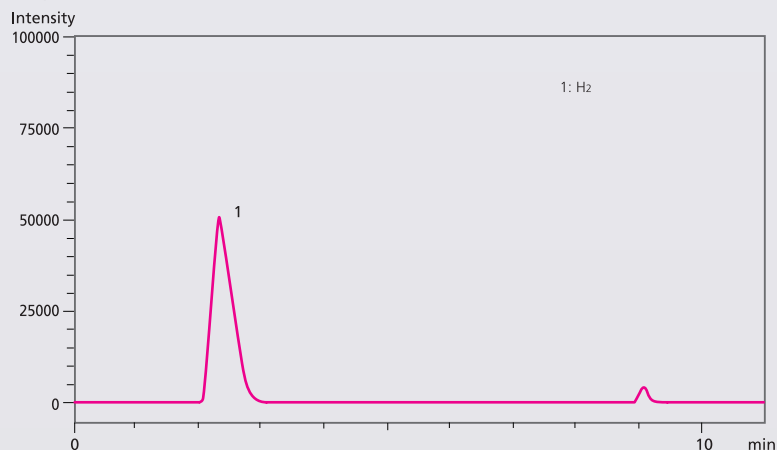
- H₂, Ar/O₂, N₂, CO, CO₂, C₂H₆, C₂H₄, C₂H₂

Typical Concentration Range:

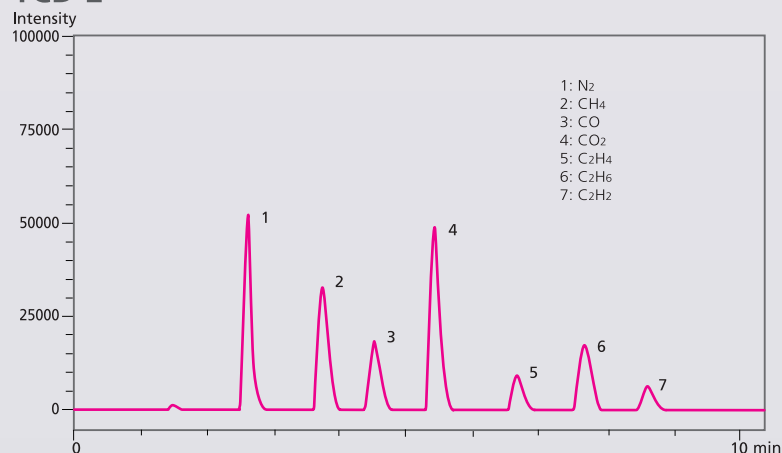
- 50 ppm mol for permanent gases (H₂, Ar/O₂, N₂, CH₄, CO, CO₂) and C2 hydrocarbons

Typical Chromatogram

TCD-1



TCD-2



Features

- Dual TCD channels
- Rugged packed columns
- 10 minute analysis time

Trace Sulfur



Enhance Product Quality and Environmental Protection

Sulfurs occur naturally in natural gas and crude oil. Controlling sulfur compounds at a low level is essential to maintaining the quality of fuels and hydrocarbon products. Sulfur impurities in fuels are also regulated in each country. Therefore, trace sulfurs analysis is very important.

Trace sulfur contaminants can corrode equipment and reduce product yields. They can also cause catalyst degradation, poisoning and contamination, and production downtime.

In addition, sulfur oxides (SO_x) are harmful to human health and the environment. Emissions with sulfurs cause acid rain, and the EPA has recently imposed limits on the amount of sulfur contaminants in hydrocarbon products.

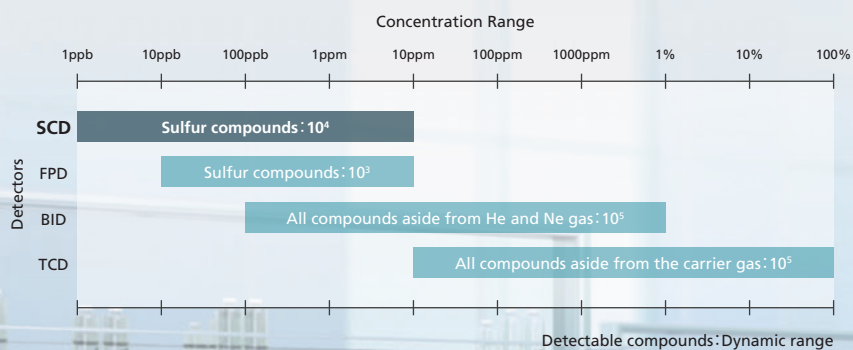
Shimadzu's sulfur analyzers enable the precise measurement of trace-level sulfurs. These factory-assembled and tested GC analyzers help ensure compliance with global sulfur standards.

The Next Industry Standard SCD

The Nexis™ SCD-2030 is a next-generation sulfur chemiluminescence detection system. It has been developed to fulfill the unmet needs of laboratories the world over. The dramatically enhanced sensitivity and reliability, the excellent maintainability, and the automation functions, a first for the industry, will improve laboratory productivity.

- The New Standard in Reliability
- Dramatically Improved Productivity
- Best-in-Class Sensitivity

Sulfur Chemiluminescence Detector has the highest sensitivity among all GC detectors.



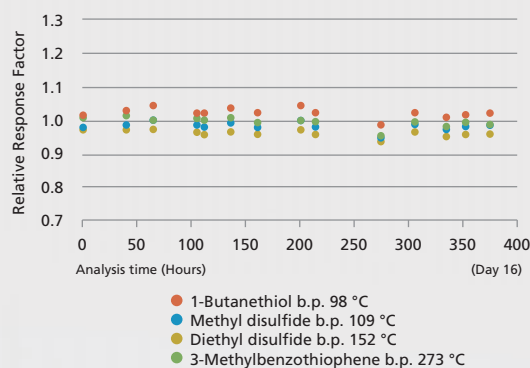
The New Standard in Reliability

The highest stability in its class and excellent equimolar response yields truly reliable results.

Excellent Long-Term Stability

The newly designed high efficiency redox cell enables long-term stable analysis. We evaluated the stability of the response for four sulfur compounds commonly found in gasoline.

Measurements were performed for a period of 16 days. Stability was evaluated by measuring the fluctuations of the target compound's response in relation to the internal standard (Diphenyl Sulfide); this is in accordance with ASTM D 5623. The relative standard deviation for peak area was 1.2% to 1.9%, this is impressive stability for a SCD.



Dramatically Improved Productivity

Dramatically Improved Productivity with Simplified Maintenance and Automation Functions.

Easy Pyro-Tube Replacement

Shimadzu's unique horizontal redox cell makes it quicker to replace the inner pyro-tube. It is easy to access the inner pyro-tube and unnecessary to disassemble the redox cell.



Best-in-Class Sensitivity

It is well known that the SCD gives the highest sensitivity for sulfur compounds among the existing detection methods. By incorporating an ultrashort flow path and a high efficiency redox cell, the Nexis SCD-2030 further raises the bar for sulfur chemiluminescence detection.

Ultra Short Flow Path

Patent Pending

In order to prevent losses in sensitivity, Nexis SCD-2030 introduces unstable components generated in the redox cell into the reaction chamber at the high speeds. This is accomplished by utilizing the industry's first ultrashort flow path. As the flow path becomes shorter, about 2.5 times higher sensitivity for both peak area and signal to noise ratio can be obtained when compared to other SCDs currently offered in the market.



Trace Sulfur Analyzer

Nexis GC-2030SUL1

Analyzer Description

System Configuration:

- 1 column (Packed) / FPD

Sample Information:

- Gaseous fuel

Compounds Analyzed:

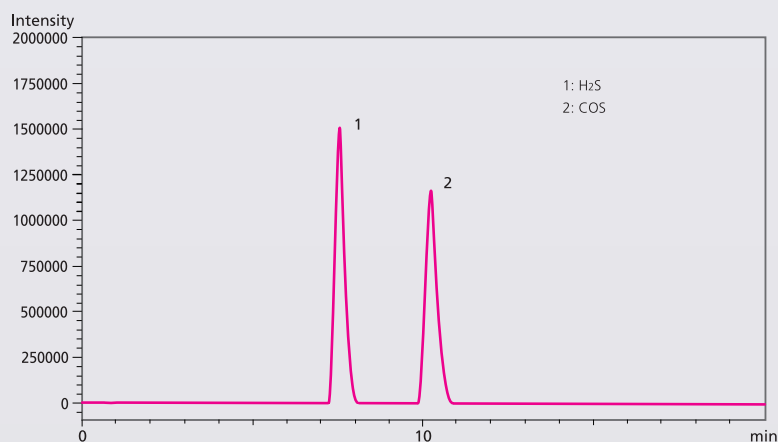
- H₂S, COS

Typical Concentration Range:

- 0.1 ppm for H₂S, COS

Typical Chromatogram

FPD



Features

- Can switch between Sulfur or Phosphorous mode for measurement
Utilizes packed column for gaseous fuel samples.
- 13 minute analysis time

Trace Sulfur Analyzer

Nexis GC-2030SCD1

Analyzer Description

System Configuration:

- 1 column (capillary) / Split and Splitless Injector / SCD

Sample Information:

- Natural gas or similar gaseous mixture

Compounds Analyzed:

- Volatile sulfur compounds

Typical Concentration Range:

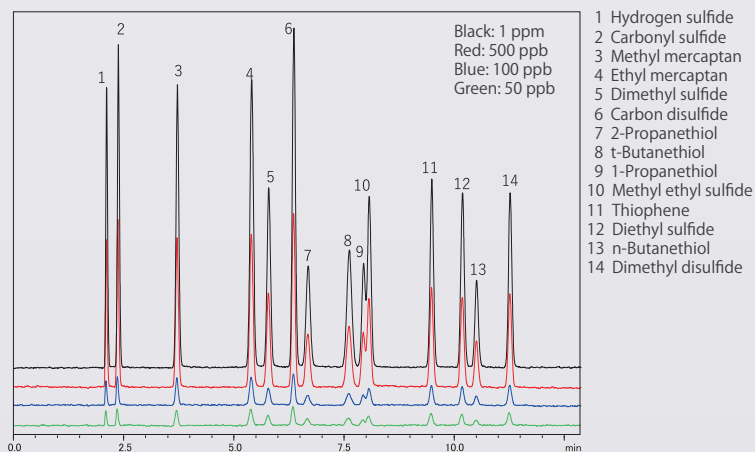
- 0.01 ppm for sulfur compounds

Reference Method:

- ASTM D-5504

Typical Chromatogram

SCD



Features

- Single channel with high sensitive SCD detector for ppb level.
- High selectivity and linearity for sulfur containing compounds and minimizes the quenching effects of hydrocarbons.

Trace Sulfur Analyzer

Nexis GC-2030SCD2

Analyzer Description

System Configuration:

- 1 column (capillary) / Split and Splitless Injector / SCD

Sample Information:

- Motor gasoline fuel or similar light petroleum liquids

Compounds Analyzed:

- Sulfur compounds

Typical Concentration Range:

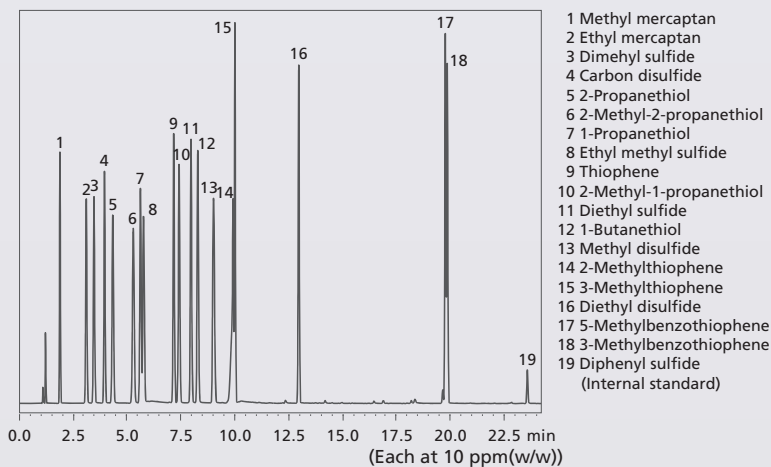
- 0.1 ppm for sulfur compounds

Reference Method:

- ASTM D-5623

Typical Chromatogram

SCD



Features

- Single channel with high sensitive SCD detector for ppb level
- Very good linearity and repeatability for all sulfur compounds
- Excellent stability for the long-term analysis

Reformulated Fuel



Ensure Compliance to Environmental Regulations

Reformulated gasoline incorporates oxygenates deliberately added in order to help improve the atmosphere. Environmental regulators have set limitations on the amount of volatile organic compounds and other toxic chemicals that emit from exhaust gases.

Fuel producers must design fuels that maintain good engine efficiency and performance, and also ensure the quality of feedstock, such as naphtha and additive oxygenates.

Shimadzu's reformulated fuel analyzers measure oxygenates in gasoline. These GC analyzers have been factory-assembled and tested to meet applicable ASTM methods.

Reformulated Fuel Analyzer - BT

Nexis GC-2030BTA1

Analyzer Description

System Configuration:

- 1 valve / 2 columns (Packed) / WBI Injector / FID

Sample Information:

- Aviation and motor gasoline fuel

Compounds Analyzed:

- Benzene, Toluene and Butanone

Typical Concentration Range:

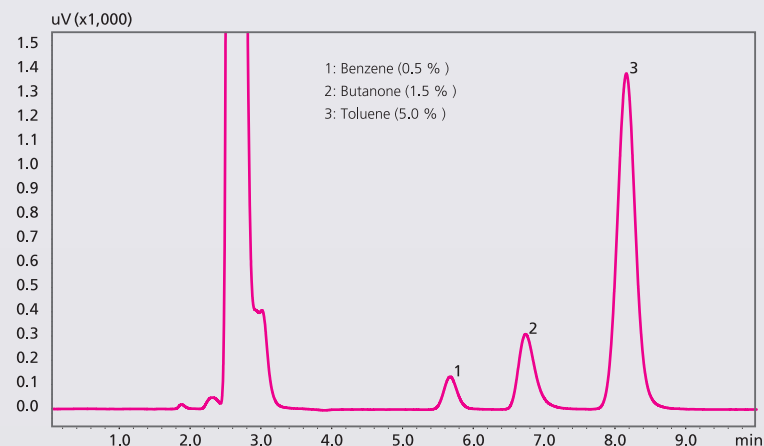
- 0.001 % for Benzene and 0.02 % for Toluene

Reference Method:

- ASTM D-3606

Typical Chromatogram

FID



Features

- Single channel configured with dual packed columns to determine benzene and toluene in aviation and motor gasoline fuel
- Independent heating valve system to prevent condensation of a sample's heavy components.
- 10 minute analysis time

Reformulated Fuel Analyzer - BT

Nexis GC-2030FBTA1

Analyzer Description

System Configuration:

- Flow Switch / 2 columns (capillary) / Split and Splitless Injector / FID

Sample Information:

- Aviation and motor gasoline fuel

Compounds Analyzed:

- Benzene, Toluene and MEK

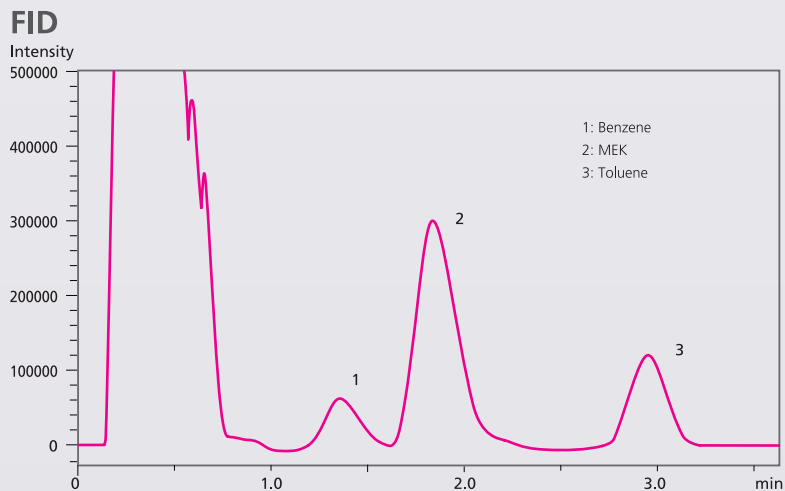
Typical Concentration Range:

- 1 ppm for Benzene and Toluene

Reference Method:

- ASTM D-3606

Typical Chromatogram



Features

- Single channel configured with dual capillary columns to determine benzene and toluene in aviation and motor gasoline fuel
- Flow switching technique to shorten analysis time (4 minute)

Reformulated Fuel Analyzer – Aromatics

Nexis GC-2030ACA1

Analyzer Description

System Configuration:

- 1 valve / 2 columns (capillary) / Split and Splitless Injector / FID

Sample Information:

- Aviation and motor gasoline fuel

Compounds Analyzed:

- Benzene, toluene, 2-hexanone, ethylbenzene, xylene, C9 and heavier aromatics, total aromatics

Typical Concentration Range:

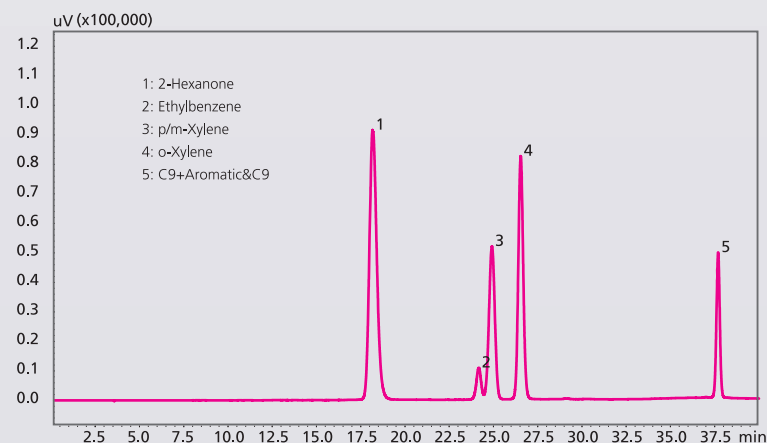
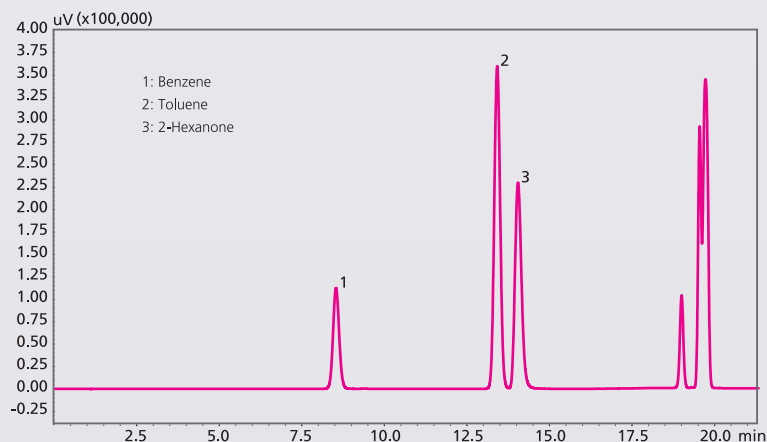
- 0.1 % for Benzene, 1 % for Toluene and 0.5 % for C8 aromatics

Reference Method:

- ASTM D-5580

Typical Chromatogram

FID



Features

- Single channel configured with dual columns to determine benzene, toluene, ethylbenzene and xylene in finished gasoline fuel
- Configured with newly improved TCEP column to improve method stability
- 40 minute analysis time

Reformulated Fuel Analyzer - Oxygenates

Nexis GC-2030OAS

Analyzer Description

System Configuration:

- 1 valve / 2 columns (packed and capillary) / Split and Splitless Injector / FID

Sample Information:

- Aviation and motor gasoline fuel

Compounds Analyzed:

- Ethers and Alcohols

Typical Concentration Range:

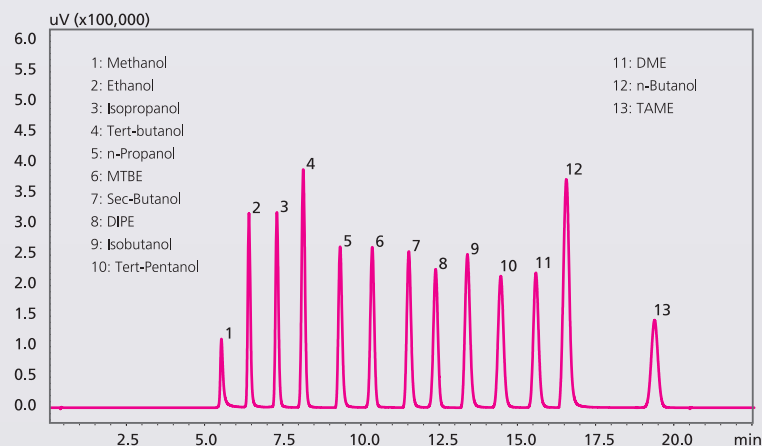
- 0.1 % for Ethers and 0.1 % for Alcohols

Reference Method:

- ASTM D-4815

Typical Chromatogram

FID



Features

- Single channel configured with dual columns to determine benzene, toluene, ethylbenzene and xylene in finished gasoline fuel
- Configured with newly improved TCEP column to improve method stability

Oxygenate Analyzer

Nexis GC-2030OAS3

Analyzer Description

System Configuration:

- 2 valves / 2 columns (capillary) / FID

Sample Information:

- LPG or naphtha

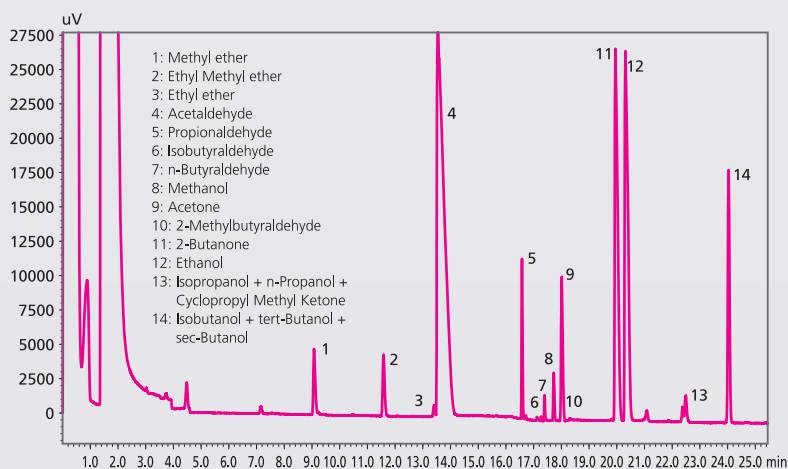
Typical Concentration Range:

- Hydrocarbons (C1 to C5 alcohols, C2 to C6 carbonyls/ethers)
- 1 ppm to 10,000 ppm

Reference Method:

- UOP 960

Typical Chromatogram



Features

- LPG sample is introduced using a LSV or vaporizer (optional)
- Configured with PLOT LOWOX column for separation of more than 30 kinds of hydrocarbons
- Hydrogen gas sensor for safe use of hydrogen carrier gas

Reformulated Fuel Analyzer - BT / ARO / OXY

Nexis GC-2030 3606-4815-5580-1

Analyzer Description

System Configuration:

- 2 valves / 4 columns (packed and capillary) / Split / Splitless and Packed Injector / FID / TCD

Sample Information:

- Aviation and motor gasoline fuel

Compounds Analyzed:

- Benzene and Toluene
- MTBE, Ethers and Alcohols
- Benzene, toluene, 2-hexanone, ethylbenzene, xylene, C9 and heavier aromatics, total aromatics

Typical Concentration Range:

- 0.1 % for Benzene and 2 % for Toluene
- 0.1 % for Ethers and Alcohols
- 0.1 % for Benzene, 1 % for Toluene and 0.5 % for Ethylbenzene and Xylene, 5 % for C9 aromatics and 10 % for total aromatics

Reference Methods:

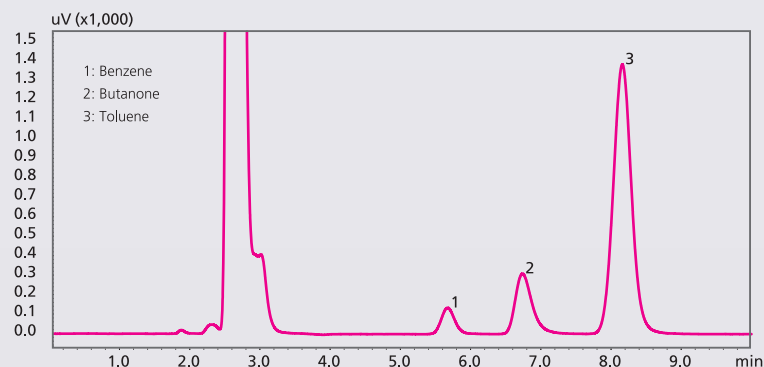
- ASTM D-4815, D-5580, D-3606

Features

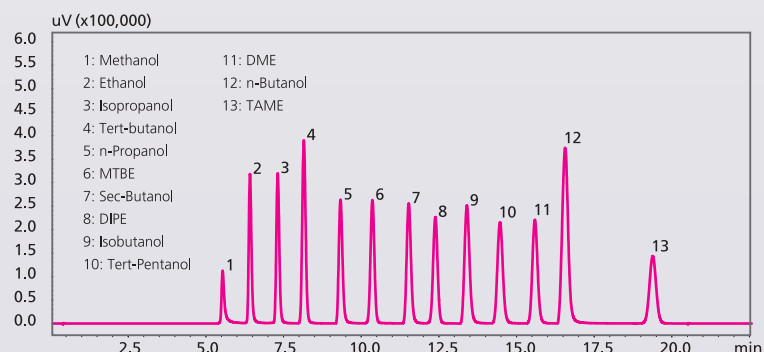
- Single channel configured with dual columns to determine benzene, toluene, ethylbenzene and xylene in finished gasoline fuel
- Configured with newly improved TCEP column to improve method stability
- 40 minute analysis time

Typical Chromatogram

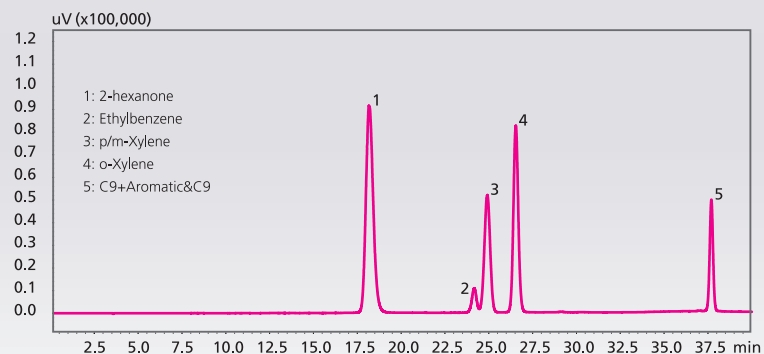
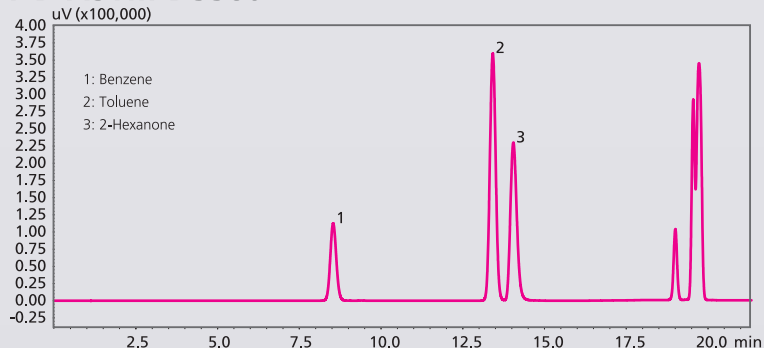
FID ASTM-D3606



FID ASTM-D4815



FID ASTM-D5580



Detailed Hydrocarbons Analysis



Precise and Accurate Analysis to Enhance Product Value

The purpose of detailed hydrocarbon analysis (DHA) is to determine the bulk hydrocarbon group type composition (PONA: Paraffins, Olefins, Naphthenes and Aromatics) of gasoline and other spark ignition engine fuels that contain oxygenate blends (methanol, ethanol, MTBE, ETBE, and TAME).

Nexis GC-2030's intelligent Advance Flow Controller realizes precise linear velocity control to provide accurate and stable analytical results.

Utilizing Envantage Dragon DHA software™*, identifying several hundreds of peaks will be easier, and misidentification will be prevented by utilizing a preset database.

* Envantage DHA Dragon software is a trademark of Envantage, Inc

Detailed Hydrocarbons Analyzer

Nexis GC-2030 PONA Series

Analyzer Description

System Configuration:

- 1 column (capillary) / Split or Splitless injector / FID

Sample Information:

- Spark ignition engine fuels, naphtha

Compounds Analyzed:

- Paraffins, Olefins, Naphthenes, Aromatics

Typical Concentration Range:

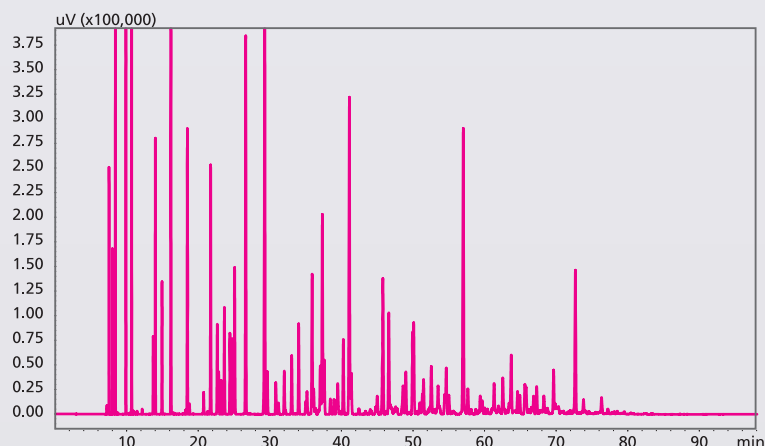
- 0.1 %

Reference Methods:

- ASTM D-5134, D-6729, D-6730

Typical Chromatogram

FID



Features

- Complies with ASTM methods D-5134, D-6729, D-6730
- Includes Envantage Dragon software
 - Fast peaks identification and report processing
 - Automatic re-calculation when changes are made
 - Hydrocarbon group type filtering
 - Full preview and printing of reports
 - Data files are saved as CDF (AIA) format and can be accessed by 3rd party applications that support AIA format files
 - Full reports are stored with results for easy retrieval without reprocessing
- Built-in Chemical and Physical Property Calculations:
 - Vapor Pressure
 - Oxygenate Content
 - Relative Density
 - Average Molecular Weight
 - Calculated Research Octane Number
 - % Carbon, % Hydrogen
 - Calculated Bromine Number
 - Mass % and Vol % Multi substituted Ring Aromatics

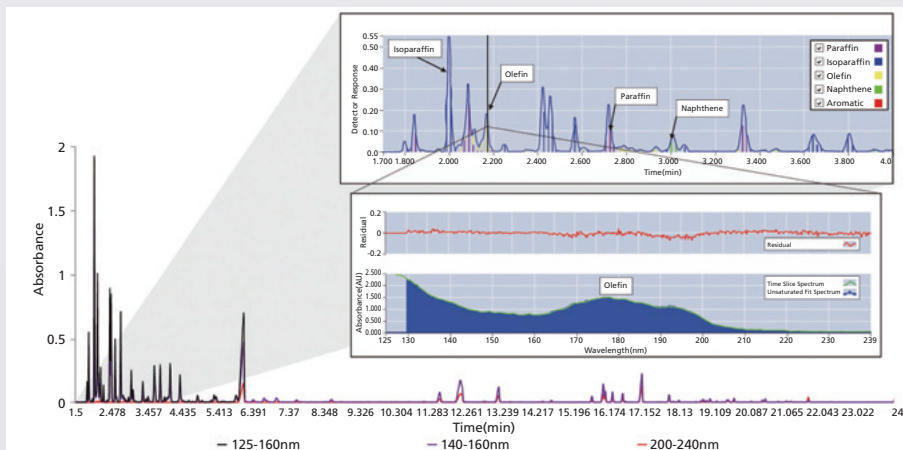
VUV PIONA+ Analyzer

Nexis GC-2030 with VGA-100

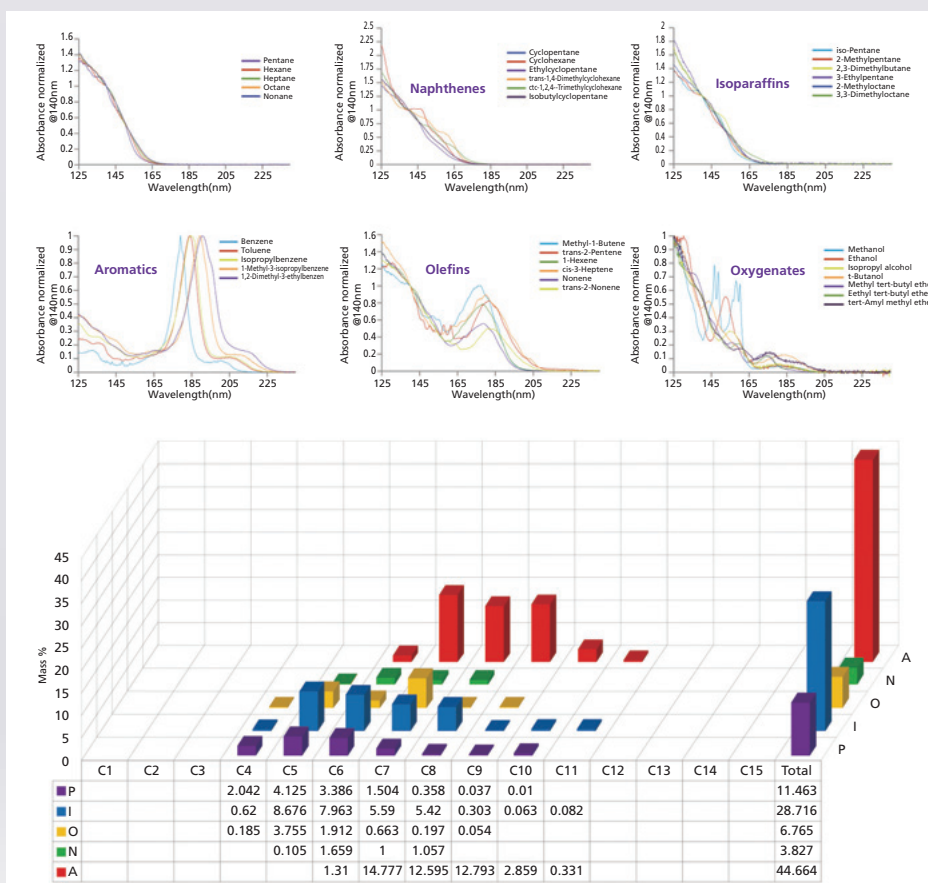
Fuel analysis simplified

Hydrocarbon mix chromatogram.

Inset shows how VUV Analyze identifies peaks by compound class based on their spectral response.



The VUV detector VGA-100 significantly simplifies PIONA compound analysis in finished gasoline. The VUV absorption spectra demonstrate obvious class similarities, allowing for simplified compound class separation.



* The VUV detector VGA-100 is a product of VUV ANALYTICS, INC.



VUV PIONA+ Analyzer

Nexis GC-2030VUV1

Analyzer Description

System Configuration:

- 1 column (capillary) / Split or Splitless injector / VUV

Sample Information:

- Spark ignition engine fuels, naphtha

Compounds Analyzed:

- Paraffins, Isoparaffins, Olefins, Naphthenes, Aromatics, Oxygenates

Typical Concentration Range:

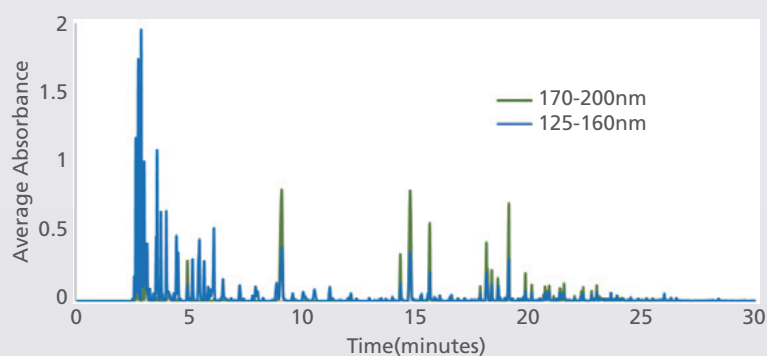
- 0.1 %

Reference Method:

- ASTM D-8071

Typical Chromatogram

VUV



Features

- Complies to method ASTM D-8071
- Single injection
- Single 30m capillary column
- ~30 minute run time
- No traps, pre-column tuning, or calibration requirements
- No special setup
- Pre-configured compound library
- Pre-configured response factors
- Pre-established "dynamic retention" markers

Simulated Distillation



Dedicated Hardware and Easy-to-Use Software to Comply with ASTM Methods

Simulated distillation GC analysis applies a gas chromatograph with a nonpolar column to the boiling-point distribution analysis of petroleum fractions, such as kerosene, diesel oil, lubricating oil, and heavy oil.

The Shimadzu simulated distillation system employs dedicated on cool column injector (OCI-2030) and LabSolutions simulated distillation GC analysis software to meet all applicable ASTM, ISO, EN, and JIS standards.

Permitting accurate and highly reproducible analysis of high-boiling components in crude oil samples, it is the optimal system for product quality control and process management in oil refinery plants.

Compliance Method	Carbon Number
ASTM D 3710, D -7096	n-C3 to n-C15
JIS K 2254	-
ASTM D -2887 (ISO3924, IP406)	n-C5 to n-C44
ASTM D -6417	n-C8 to n-C60
ASTM D -7213 (Extended D2887)	n-C7 to n-C60
ASTM D -6352	n-C10 to n-C90
ASTM D -7500	n-C7 to n-C100
EN 15199-1 (IP480, DIN)	n-C7 to n-C120
ASTM D -5307	n-C44 Max
ASTM D- 7169, EN 15199-2 (IP 507)	n-C7 to n-C100

Simulated Distillation Analyzer

Nexis GC-2030SDA

Analyzer Description

System Configuration:

- 1 column (capillary) / OCI-PTV injector / FID

Sample Information:

- Base stock, lube oil, crude oil, petroleum distillate fractions (naphtha, gasoline, diesel, jet fuel, kerosene)

Compounds Analyzed:

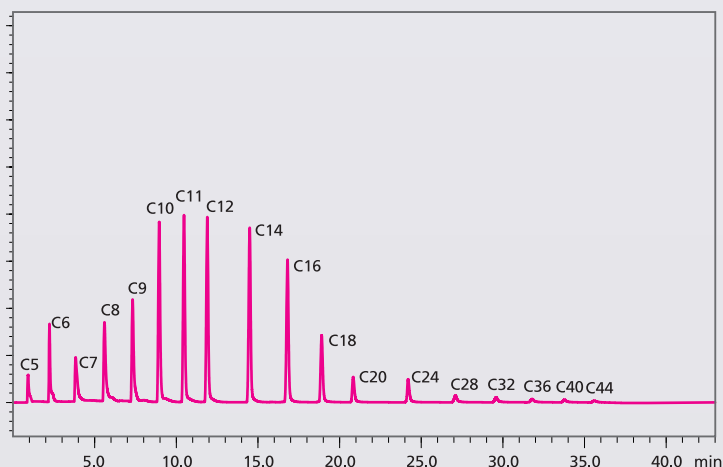
- Hydrocarbons from n-C3 to n-C120

Typical Concentration Range:

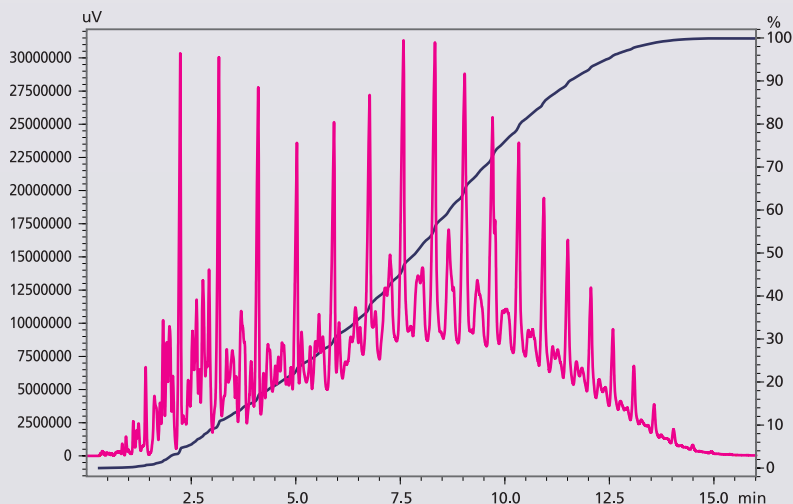
- 0.1 %

Typical Chromatogram

Chromatogram of Calibration Mix Standard



Sample Analysis of ASTM-D2887 Light Oil (Distillation Curve and Chromatogram)



Features

- Complies with methods ASTM D-3710, JIS K 2254, D-2887, D-5307, D-6417, D-7213 (Extended D2887), D-6352, D-7169, D-7500, EN 15199-1
- 7-step temperature programmable vaporization injector
- High-performance column designed and suited for SIMDIST
- SIMDIST software integrated with LabSolutions
- Easy operation with multi-reporting option

Permanent Gases

A photograph of an industrial facility, likely a refinery or chemical plant. The image shows a complex network of large, silver-colored metal pipes and structural steel beams. In the background, there are various industrial vessels, including tall distillation columns and storage tanks. The sky is blue with some white clouds. The overall scene is a detailed view of industrial infrastructure.

Control Processing Gases for Better Plant Operation

Permanent gases such as oxygen, nitrogen, and carbon dioxide are contained in air. These gases are utilized for a variety of manufacturing processes and applications, including in refineries and for fuel cells and fertilizer. In recycling blast furnace gas in the steel field, a gas chromatograph is useful for monitoring the gas composition.

Shimadzu offers various kinds of permanent gases analyzers, and one single system can simultaneously analyze He, H₂, O₂, N₂, CO, CO₂, CH₄ and C₂.

Permanent Gases Analyzer - CO / CO₂

Nexis GC-2030PCC1

Analyzer Description

System Configuration:

- 2 valves / 4 columns (packed) / TCD

Sample Information:

- Permanent gases

Compounds Analyzed:

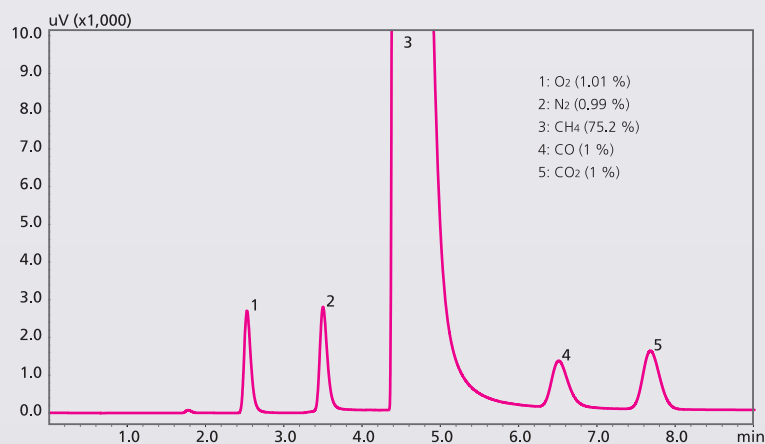
- Permanent gases (O₂, N₂, CH₄, CO and CO₂)

Typical Concentration Range:

- 0.01 % (O₂, N₂), 0.01 % (CO₂, CO),
0.01 % (CH₄)

Typical Chromatogram

TCD-1



Features

- Single-channel TCD with rugged packed columns
- Backflush of water and C2 + heavier hydrocarbons
- Configured for analysis of various gas mixtures with similar compositions
- 10 minute analysis time

Permanent Gas Analyzer - O₂ / CO / Ar

Nexis GC-2030PNC

Analyzer Description

System Configuration:

- 3 valves / 5 columns (packed) / 2 TCDs

Sample Information:

- Permanent gases

Compounds Analyzed:

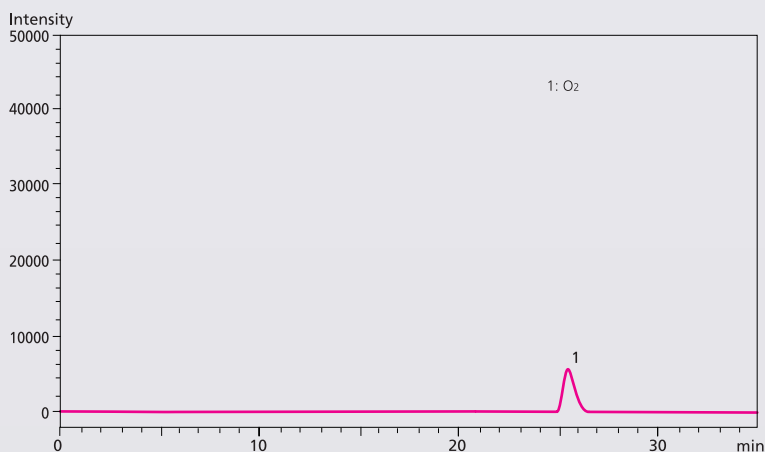
- Permanent gases (Ar, O₂, N₂, CH₄ and CO)

Typical Concentration Range:

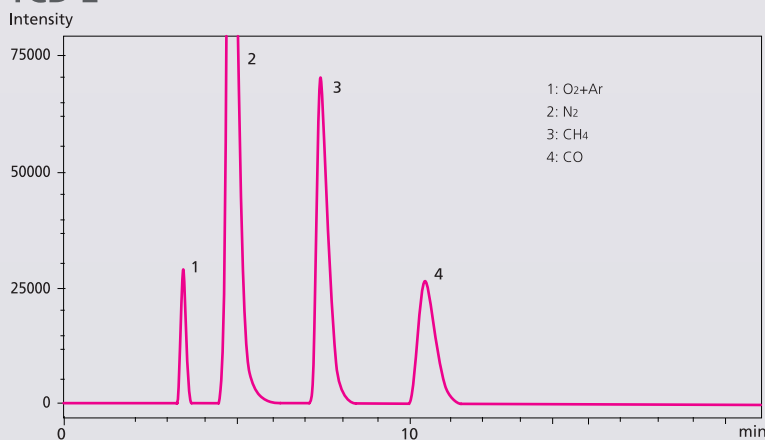
- 0.05 % (Ar+O₂), 0.05 % (N₂),
0.05 % (O₂, CO), 0.05 % (CH₄)

Typical Chromatogram

TCD-1



TCD-2



Features

- Dual-channel TCDs with rugged packed columns
- Backflush of water and C2 + heavier hydrocarbons
- Configured for analysis of various gas mixtures with similar compositions
- Independent channel for O₂ analysis
- 30 minute analysis time

Permanent Gas Analyzer

Nexis GC-2030PGAS1

Analyzer Description

System Configuration:

- 2 valves / 4 columns (packed) / 2 TCDs

Sample Information:

- Permanent gases

Compounds Analyzed:

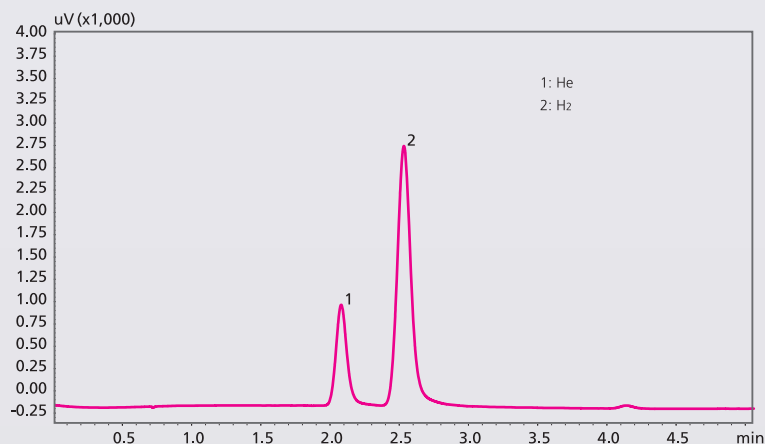
- Permanent gases (He, H₂ and Ar / O₂, N₂, CH₄ and CO)

Typical Concentration Range:

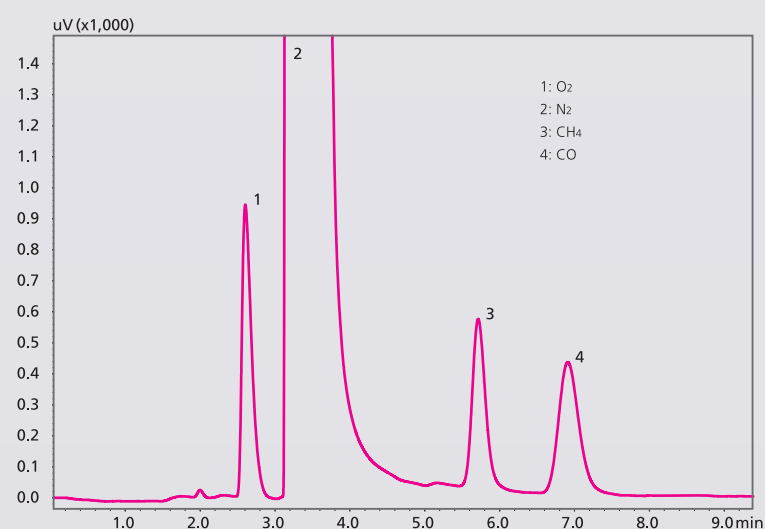
- 0.005 % (He, H₂ and Ar), 0.005 % (O₂), 0.005 % (N₂)

Typical Chromatogram

TCD-1



TCD-2



Features

- Dual-channel TCDs with packed and capillary columns
- Backflush of water and C2 + heavier hydrocarbons
- Configured for analysis of various gas mixtures with similar compositions
- Dedicated channel for He and H₂ analysis
- 10 minute analysis time

Town Gas



Ensure Your Product Quality Meets the Strictest Standards

Municipal gas is widely used for generating power for both industrial and household use. The monitoring of calorific values is important for ensuring a stable supply of municipal gas.

The composition of municipal gases varies according to their generation source. Typical municipal gas contains C2 to C3 hydrocarbons (C_2H_6 , C_2H_4 , C_2H_2 , C_3H_8); O_2 , N_2 , CO , CO_2 , H_2 as well as other contaminants like hydrogen sulfide may also present.

Shimadzu town gas analyzers are provided with dedicated calorific calculation software to calculate and generate the heating value report. Each GC is configured for analyzing permanent gases (O_2 , N_2 , CO , CO_2 , H_2) and hydrocarbons content (C2 and C3) in municipal gases.

Town Gas Analyzer

Nexis GC-2030TGA1 with Hydrogen / Nexis GC-2030TGA2 without Hydrogen

Analyzer Description

System Configuration:

- 3 valves / 6 columns (packed) / 2 TCDs

Sample Information:

- Municipal gas or similar gaseous mixture

Compounds Analyzed:

- He, H₂, O₂, N₂, CO, CO₂, C₂H₆, C₂H₄, C₂H₂, C₃H₈

Typical Concentration Range:

- 0.01 % mol for permanent gases (He, H₂, O₂, N₂, CH₄, CO, CO₂) and C2 to C3 hydrocarbons

Reference Method:

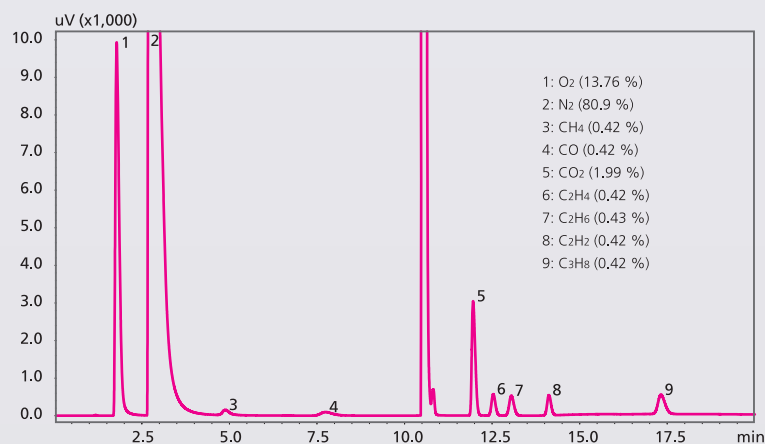
- ASTM D-1946

Features

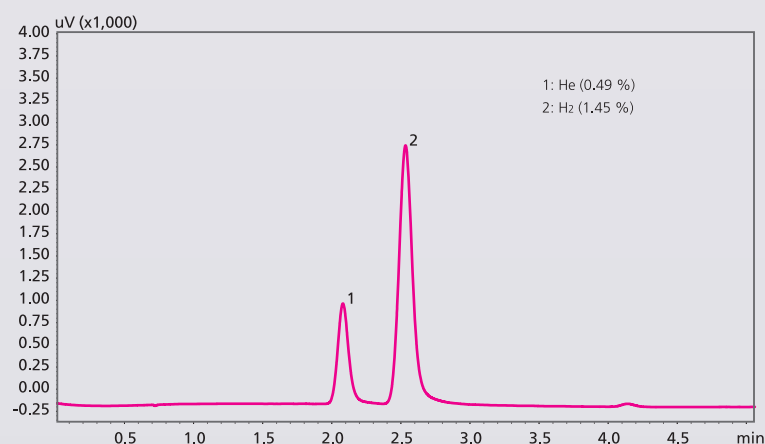
- Dual TCD channels
- Dedicated channel for Helium and Hydrogen
- Rugged packed columns
- 20 minute analysis time
- Optional BTU Calorific and Specific Gravity Calculation Software

Typical Chromatogram

TCD-1



TCD-2



Simple Town Gas Analyzer

Nexis GC-2030TGA3

Analyzer Description

System Configuration:

- 2 valves / 4 columns (packed) / TCD

Sample Information:

- Municipal gas or similar gaseous mixture

Compounds Analyzed:

- H_2 , O_2 , N_2 , CO , CO_2 , C_2H_6 , C_2H_4 , C_2H_2

Typical Concentration Range:

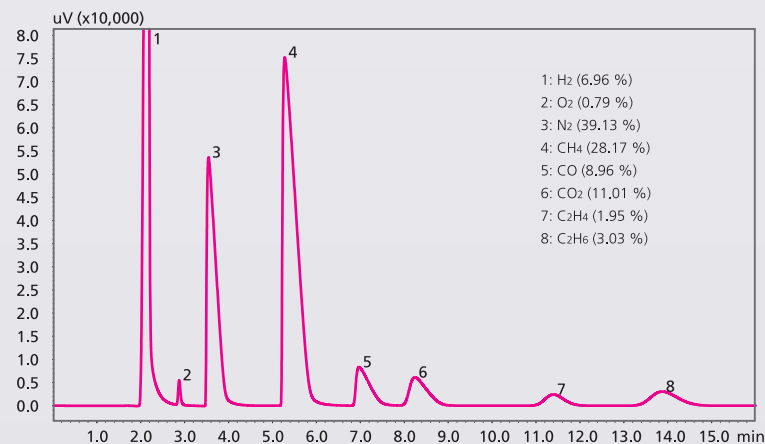
- 0.01 % mol for permanent gases (H_2 , O_2 , N_2 , CH_4 , CO , CO_2) and C2 hydrocarbons

Reference Method:

- ASTM D-1946

Typical Chromatogram

TCD-1



Features

- Single TCD channel
- Rugged packed columns
- 16 minute analysis time
- Optional BTU Calorific and Specific Gravity Calculation Software

Greenhouse Gases



Monitoring of Gases That Contribute to Climate Change

An increase in fossil fuels consumption contributes to more greenhouse gases, mainly CO₂, CH₄ and N₂O, in our atmosphere, which trap heat and affect the Earth's temperature.

The continuous monitoring of these GHG concentrations helps with tracking emissions trends and aids in the fight against climate change.

The concentration of the main compounds of GHGs differs significantly depending on the exhausting source. Shimadzu offers the best concentration range solution for each monitoring source with a combination of multiple detectors, such as FID, TCD, ECD and BID.

Greenhouse Gases Analyzer - N₂O

Nexis GC-2030N₂O1

Analyzer Description

System Configuration:

- 2 valves / 3 columns (Capillary) / ECD

Sample Information:

- Greenhouse gases and soil gases

Compounds Analyzed:

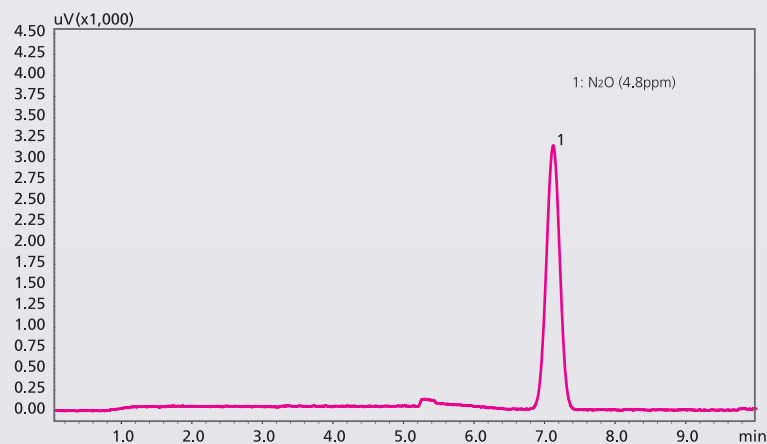
- N₂O

Typical Concentration Range:

- 50ppb N₂O

Typical Chromatogram

ECD



Features

- Single channel with high-sensitivity ECD detector for ppb level analysis
- Easily expands to include SF₆
- 9 minute analysis time

Greenhouse Gases Analyzer - N₂O / CH₄ / CO₂

Nexis GC-2030N₂OCC1

Analyzer Description

System Configuration:

- 4 valves / 7 columns (packed and capillary) / ECD / TCD / FID

Sample Information:

- Greenhouse gases and soil gases

Compounds Analyzed:

- N₂O, CO₂, CH₄

Typical Concentration Range:

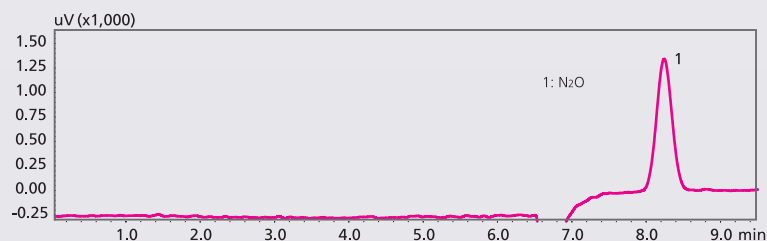
- 50 ppb N₂O, 1 ppm CH₄, 100 ppm CO₂

Features

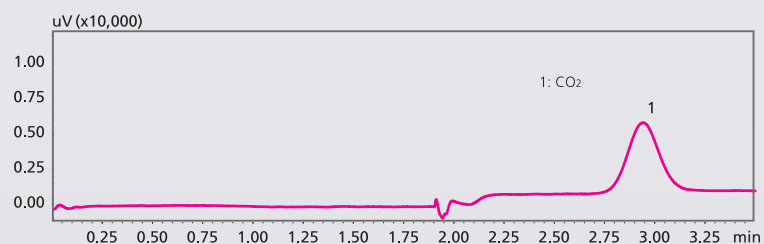
- Dual channel with high-sensitivity ECD detector for N₂O ppb level, CH₄ and CO₂ for TCD and FID at ppm level.
- Easily expands to include SF₆
- 9 minute analysis time

Typical Chromatogram

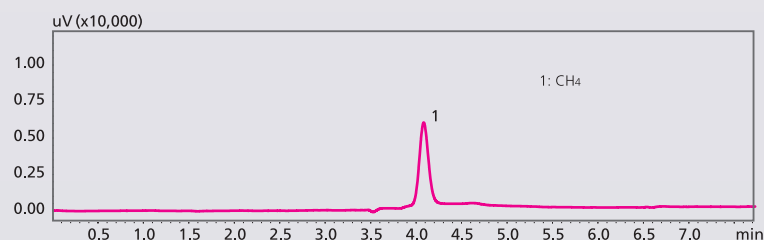
ECD



TCD



FID



Greenhouse Gases Analyzer - N₂O / CH₄ / CO₂ / CO

Nexis GC-2030N₂OCCC1

Analyzer Description

System Configuration:

- 5 valves / 7 columns (packed and capillary) / ECD / TCD / methanizer FID

Sample Information:

- Greenhouse gases and soil gases

Compounds Analyzed:

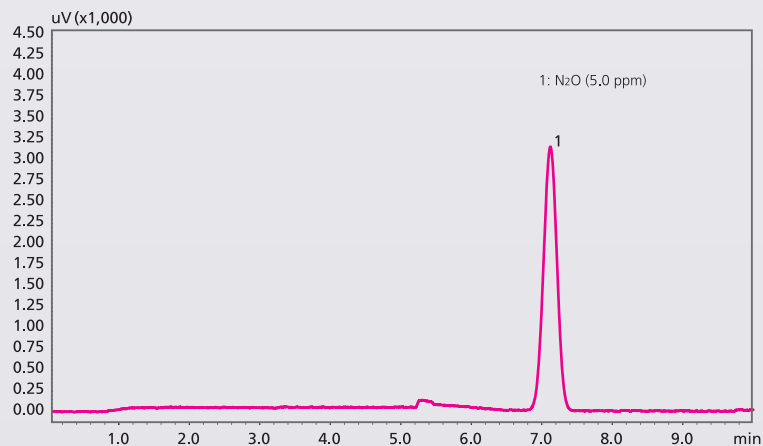
- N₂O, CO₂, CH₄, CO, O₂, N₂

Typical Concentration Range:

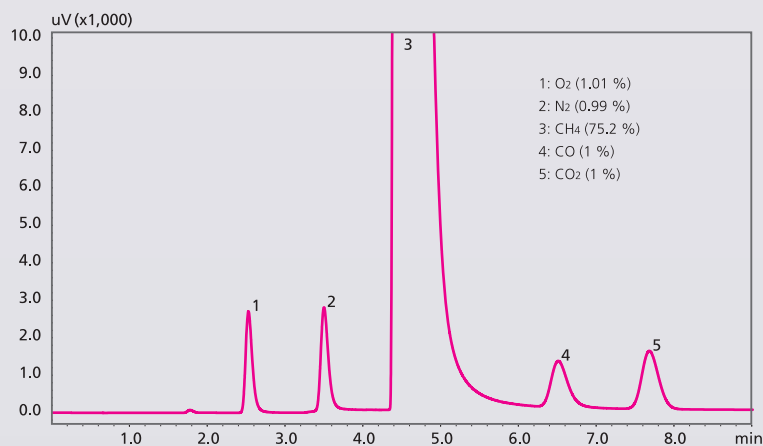
- 50 ppb N₂O, 1 ppm CH₄, 1 ppm CO₂, 1 ppm CO, 0.01 % CO₂, 0.01 % CO, 0.01 % CH₄, 0.01 % O₂, 0.01 % N₂

Typical Chromatogram

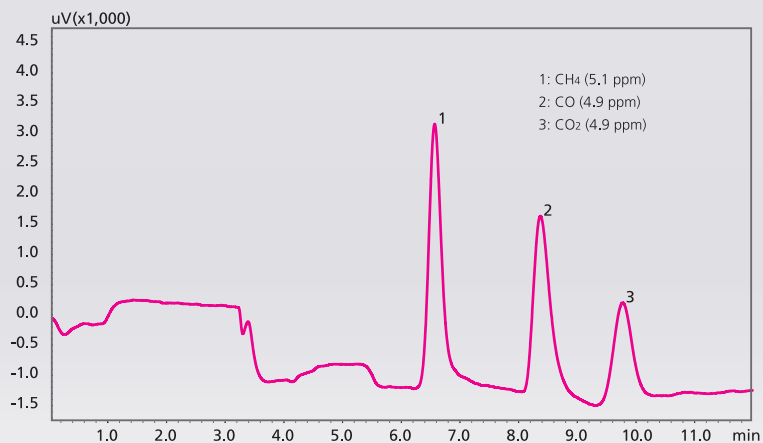
ECD



TCD-1



FID



Features

- Dual channel with high-sensitivity ECD detector for N₂O ppb level, O₂, N₂, CH₄, CO and CO₂ for TCD at % level and CH₄, CO and CO₂ for methanizer FID at ppm level.
- Easily expands to include SF₆
- 11 minute analysis time

Transformer Oil Gas



Transformer Oil Monitoring as a Preventive Measure

When an oil-type transformer malfunctions, degradation of oil inside the transformer may occur by heating or arc-discharge. This gas dissolves into the oil. The malfunction can be determined by extracting and analyzing the gas. Shimadzu offers GC systems compliant with ASTM D-3612 Method B (oil stripper sampling) and ASTM D-3612 Method C (headspace sampling).

Transformer Oil Gas Analyzer - D3612 Method B (Oil Stripper Column)

Nexis GC-2030TOGAS1

Analyzer Description

System Configuration:

- 2 valves / 6 columns (packed) / Oil Stripper / methanizer FID / TCD

Sample Information:

- Transformer oil

Compounds Analyzed:

- H₂, O₂, N₂, CO₂, CH₄, CO, C₂H₆, C₂H₄ and C₂H₂

Typical Concentration Range:

- 20 ppm for H₂, 500 ppm for O₂, 500 ppm for N₂, 1 ppm for CH₄, 2 ppm for CO and CO₂, 1 ppm for C₂ hydrocarbons (C₂H₆, C₂H₄, C₂H₂).

Reference Method:

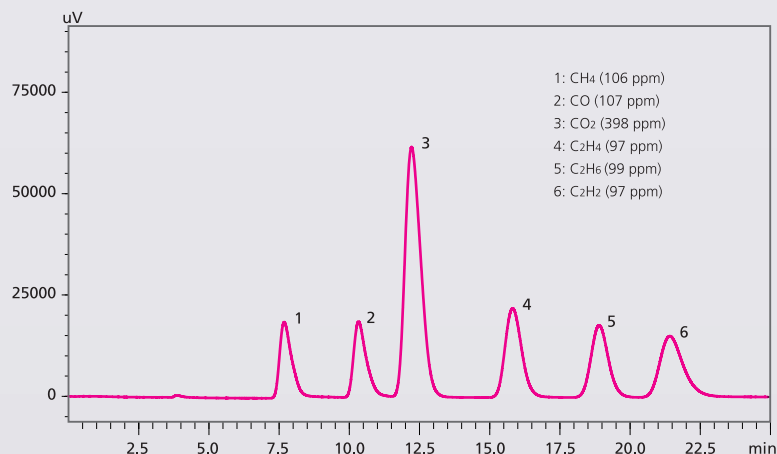
- ASTM D-3612 Method B

Features

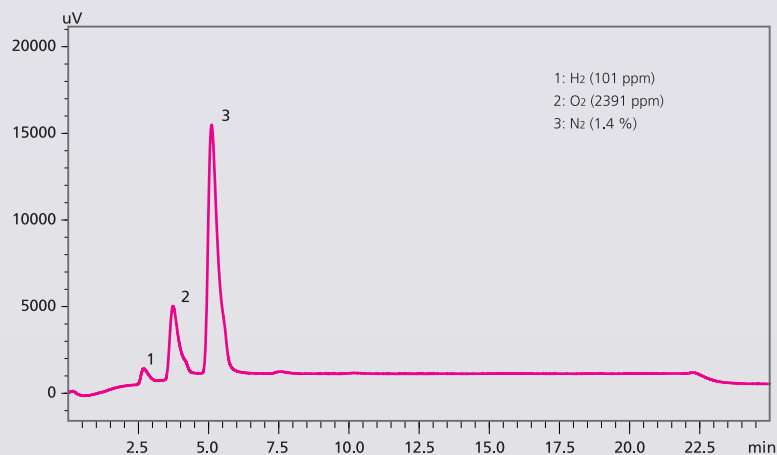
- Trace levels of CO and CO₂ can be converted to CH₄ for FID detection
- Direct oil sample injection through oil stripper.
- 17 minute analysis time

Typical Chromatogram

FID



TCD



Transformer Oil Gas Analyzer - D3612 Method C (Headspace Sampling)

Nexis GC-2030TOGAS2

Analyzer Description

System Configuration:

- 2 valves / 3 columns (packed) /
Packed injector for Headspace option
/ methanizer FID / TCD

Sample Information:

- Transformer oil

Compounds Analyzed:

- H₂, O₂, N₂, CO₂, CH₄, CO, C₂H₆, C₂H₄
and C₂H₂

Typical Concentration Range:

- 2.5 ppm for H₂, 50ppm for O₂,
50 ppm for N₂, 1 ppm for CH₄, CO,
CO₂ and C2 hydrocarbons (C₂H₆,
C₂H₄, C₂H₂).

Reference Method:

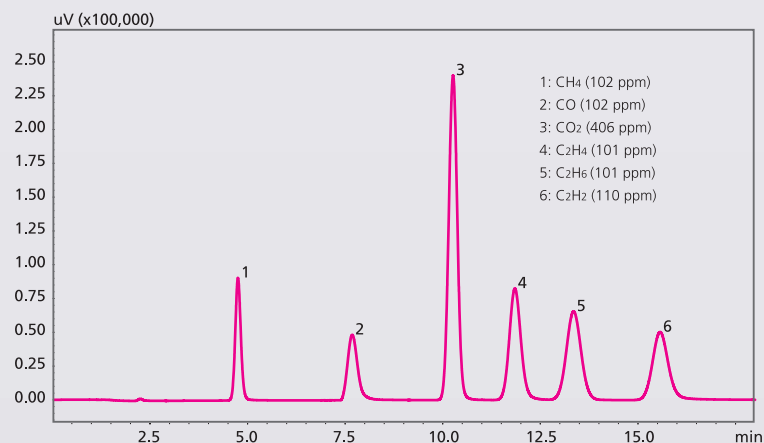
- ASTM D-3612 Method C

Features

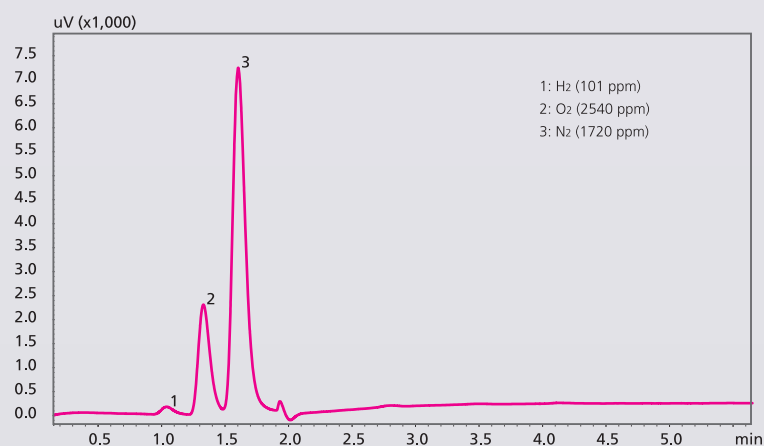
- Trace levels of CO and CO₂ can be
converted to CH₄ for FID detection
- Manual sampling with Headspace
option
- 17 minute analysis time

Typical Chromatogram

FID



TCD



Transformer Oil Gas Analyzer - D3612 Method C

Nexis GC-2030TOGAS3

Analyzer Description

System Configuration:

- 3 valves / 3 columns (packed) /
Packed injector for Headspace option
/ methanizer FID / TCD / PDHID

Sample Information:

- Transformer Oil

Compounds Analyzed:

- H₂, O₂, N₂, CO₂, CH₄, CO, C₂H₆,
C₂H₄, C₂H₂, C₃H₈, C₃H₆ and i-C₄H₁₀

Typical Concentration Range:

- 0.1 ppm for H₂, 50 ppm for O₂,
50 ppm for N₂, 0.1 ppm for CH₄ and
CO, 1 ppm for CO₂, 0.1 ppm for C₂
hydrocarbons (C₂H₆, C₂H₄, C₂H₂),
0.2 ppm for C₃ hydrocarbons (C₃H₈,
C₃H₆) and 1 ppm for i-C₄H₁₀.

Reference Method:

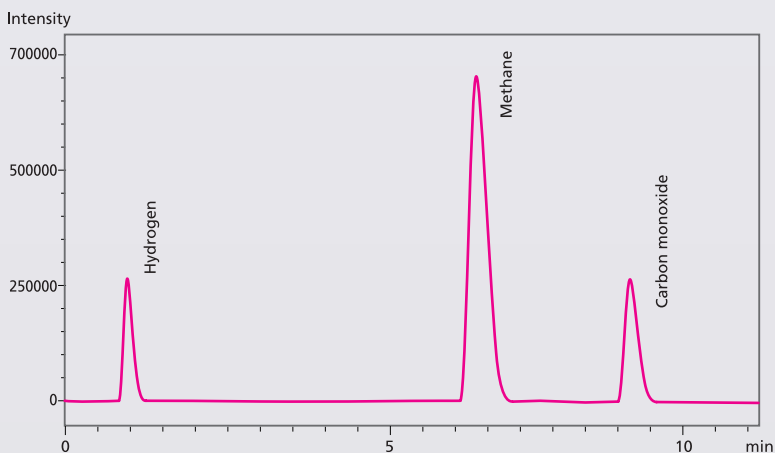
- ASTM D-3612 Method C

Features

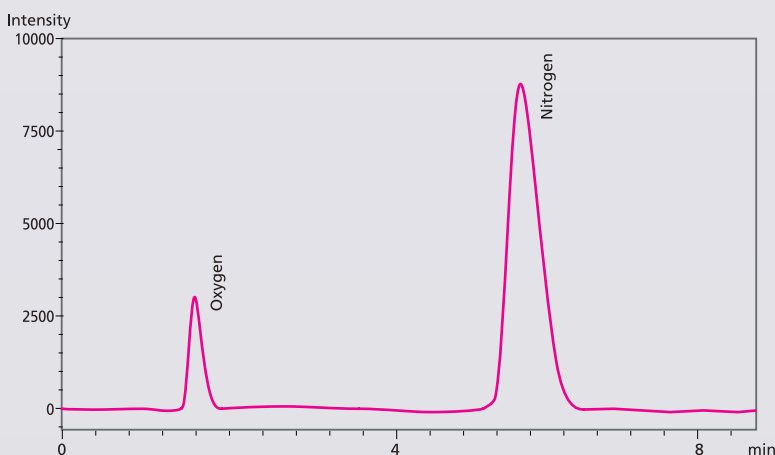
- Trace levels of H₂, CH₄ and CO
detected by PDHID
- Trace levels of CO and CO₂ can be
converted to CH₄ for FID detection
- Detection of hydrocarbons from C₂
to C₄ using FID.
- Manual sampling with Headspace
option
- 20 minute analysis time

Typical Chromatogram

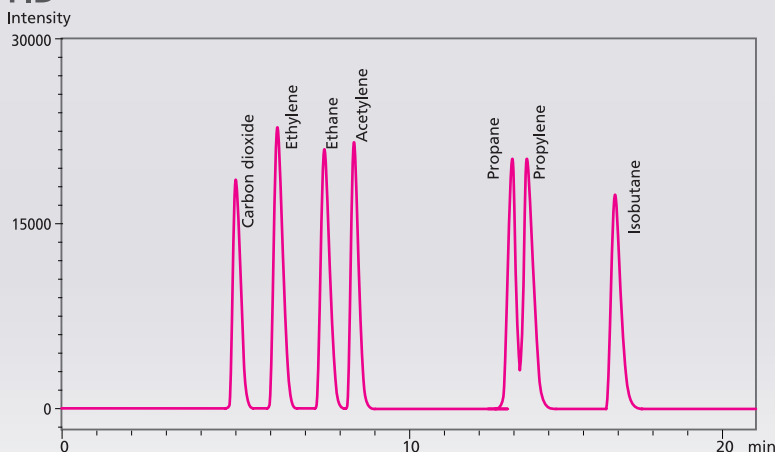
PDHID



TCD



FID



Analyzer BY REFERENCE

Natural Gas

Model	Description	Configured per Published Method
Nexis GC-2030NGA1	Natural Gas Analyzer with He/H ₂ Analysis	ASTM D-1945, D-3588, GPA-2261
Nexis GC-2030NGA2	Natural Gas Analyzer without He/H ₂ Analysis	ASTM D-1945, D-3588, GPA-2261
Nexis GC-2030FNGA1	Fast Natural Gas Analyzer with He/H ₂ Analysis	ASTM D-1945, D-3588, GPA-2261
Nexis GC-2030FNGA2	Fast Natural Gas Analyzer without He/H ₂ Analysis	ASTM D-1945, D-3588, GPA-2261
Nexis GC-2030ENGA1	Extended Natural Gas Analyzer (Single Oven)	ASTM D-1945, D-3588, GPA-2286
Nexis GC-2030ENGA2	Extended Natural Gas Analyzer (Dual Oven)	ASTM D-1945, D-3588, GPA-2286
Nexis GC-2030ISO6974-3	Natural Gas Analyzer (ISO6974-3)	ISO6974-3
Nexis GC-2030ISO6974-4	Natural Gas Analyzer (ISO6974-4)	ISO6974-4
Nexis GC-2030 BIDUFNGA	BID Ultra-Fast Natural Gas Analyzer	ASTM D-1945, D-3588, GPA-2261

Refinery Gas

Model	Description	Configured per Published Method
Nexis GC-2030FRGA1	Refinery Gas Analyzer with He/H ₂ Analysis	ASTM D-1945, D-3588, GPA-2261
Nexis GC-2030FRGA2	Refinery Gas Analyzer without He/H ₂ analysis	ASTM D-1945, D-3588, GPA-2261
Nexis GC-2030HSRGA1	High-Speed RGA with He/H ₂ analysis	ASTM D-1945, D-3588, GPA-2261
Nexis GC-2030HSRGA2	High-Speed RGA without He/H ₂ analysis	ASTM D-1945, D-3588, GPA-2261
Nexis GC-2030ERGA1	Extended Refinery Gas Analyzer with He/H ₂ analysis	ASTM D-1945, D-3588, GPA-2261
Nexis GC-2030ERGA2	Extended Refinery Gas Analyzer without He/H ₂ analysis	ASTM D-1945, D-3588, GPA-2261
Nexis GC-2030CERGA1	Complete Extended Refinery Gas Analyzer	ASTM D-1945, D-3588, GPA-2261
Nexis GC-2030 BIDUFRGA	BID Ultra-Fast RGA with BID-2010 analysis	ASTM D-1945, D-3588, GPA-2261
Nexis GC-2030 BIDERGA-S	BID Extended RGA with BID-2010 analysis (Single Oven)	ASTM D-1945, D-3588, GPA-2261
Nexis GC-2030 BIDERGA-D	BID Extended RGA with BID-2010 analysis (Dual Oven)	ASTM D-1945, D-3588, GPA-2261

Liquefied Petroleum Gases

Model	Description	Configured per Published Method
Nexis GC-2030LPGHC1	Hydrocarbons in LPG Analyzer with Vaporizer	ASTM D-2163
Nexis GC-2030LPGHC2	Hydrocarbons in LPG Analyzer with Liquid Sampling Valve	ASTM D-2163

Analyzer BY REFERENCE

Trace Gases

Model	Description	Configured per Published Method
Nexis GC-2030CCC1	Trace gases analyzer - CO ₂ , CO and CH ₄	UOP 603
Nexis GC-2030CCC2	Trace gases analyzer - CO ₂ , CO and CH ₄	
Nexis GC-2030CCC3	Trace gases analyzer - CO ₂ , CO and CH ₄	UOP 603
Nexis GC-2030CCC4	Trace gases analyzer - CO ₂ , CO and CH ₄	UOP 603
Nexis GC-2030CCC5	Trace gases analyzer - CO ₂ , CO and CH ₄	UOP 603
Nexis GC-2030TCC	Trace gases analyzer - CO ₂ , CO and CH ₄	ASTM D-2504
Nexis GC-2030TH2	Trace H ₂ Analyzer	ASTM D-2504
Nexis GC-2030TNO	Trace O ₂ /N ₂ Analyzer	ASTM D-2504
Nexis GC-2030HC2	Methane Purity Analyzer	

Trace Sulfur

Model	Description	Configured per Published Method
Nexis GC-2030SUL1	Trace Sulphur Analyzer	
Nexis GC-2030SCD1	Trace Sulphur Analyzer	ASTM D-5504
Nexis GC-2030SCD2	Trace Sulphur Analyzer	ASTM D-5623

Reformulated Fuel

Model	Description	Configured per Published Method
Nexis GC-2030BTA1	Reformulated Fuel Analyzer - BT	ASTM D-3606
Nexis GC-2030FBTA1	Reformulated Fuel Analyzer - BT	ASTM D-3606
Nexis GC-2030ACA1	Reformulated Fuel Analyzer - Aromatics	ASTM D-5580
Nexis GC-2030OAS	Reformulated Fuel Analyzer - Oxygenates	ASTM D-4815
Nexis GC-2030OAS3	Reformulated Fuel Analyzer - Oxygenates	UOP 960
Nexis GC-2030_3606-4815-5580_1	Reformulated Fuel Analyzer - BT / ARO / OXY	ASTM D-3606, ASTM D-5580, ASTM D-4815

Detailed Hydrocarbons Analysis

Model	Description	Configured per Published Method
Nexis GC-2030 PONA Series	Detailed Hydrocarbons Analyzer	ASTM D-6729, ASTM D-6730, ASTM D-5134
Nexis GC-2030VUV1	VUV PIONA+ Analyzer	ASTM D-8071

Simulated Distillation

Model	Description	Configured per Published Method
Nexis GC-2030SDA	Simulated Distillation Analyzer	ASTM D-2887, D-3710, D-5307, D-6417, D-7213, D-6352, D-7169, D-7500, D-7096, EN 15199-1, JIS K 2254

Permanent Gases

Model	Description	Configured per Published Method
Nexis GC-2030PCC1	Permanent Gases Analyzer - CO / CO ₂	
Nexis GC-2030PNC	Permanent Gas Analyzer - O ₂ / CO / Ar	
Nexis GC-2030PGAS1	Permanent Gas Analyzer	

Town Gas

Model	Description	Configured per Published Method
Nexis GC-2030TGA1	Town Gas Analyzer with He / H ₂ analysis	ASTM D-1946
Nexis GC-2030TGA2	Town Gas Analyzer without He / H ₂ analysis	ASTM D-1946
Nexis GC-2030TGA3	Simple Town Gas Analyzer	ASTM D-1946

Greenhouse Gases

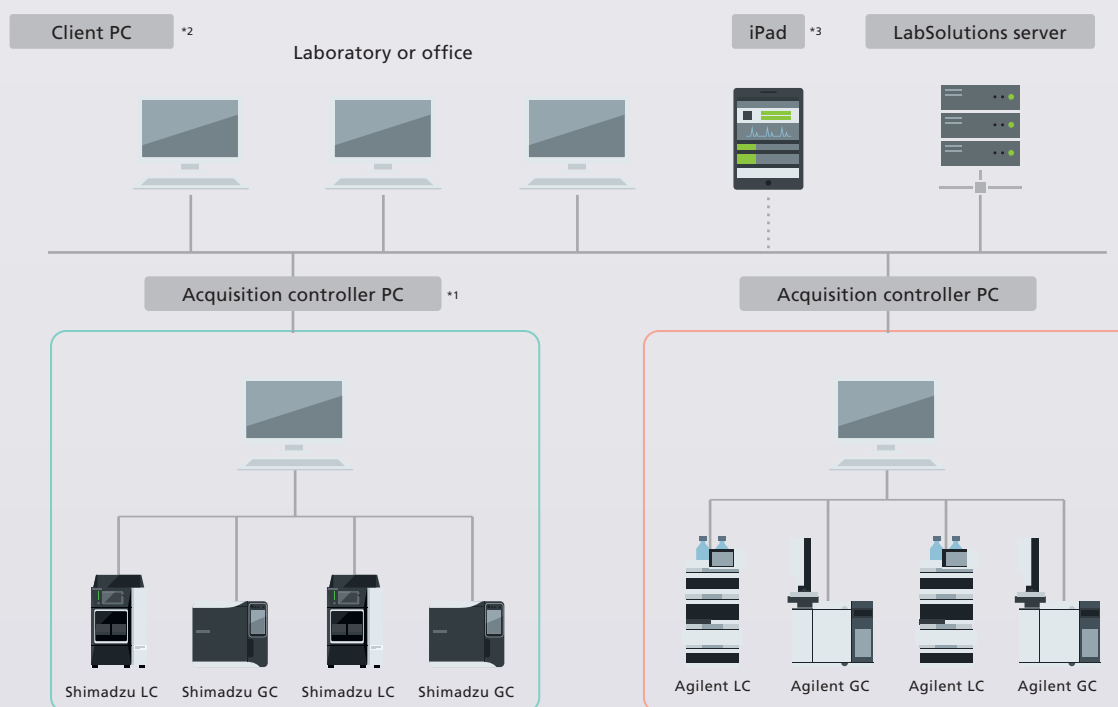
Model	Description	Configured per Published Method
Nexis GC-2030N ₂ O1	Greenhouse Gases Analyzer - N ₂ O	
Nexis GC-2030N ₂ OCC1	Greenhouse Gases Analyzer - N ₂ O / CH ₄ / CO ₂	
Nexis GC-2030N ₂ OCCC1	Greenhouse Gases Analyzer - N ₂ O / CH ₄ / CO ₂ / CO	

Transformer Oil Gas

Model	Description	Configured per Published Method
Nexis GC-2030TOGAS1	Transformer Oil Gas Analyzer - D3612 Method B (Oil Stripper Column)	ASTM D-3612 B
Nexis GC-2030TOGAS2	Transformer Oil Gas Analyzer - D3612 Method C (Headspace Sampling)	ASTM D-3612 C

LabSolutions CS

Controlling other vendor's GC and HPLC using LabSolutions DB/CS



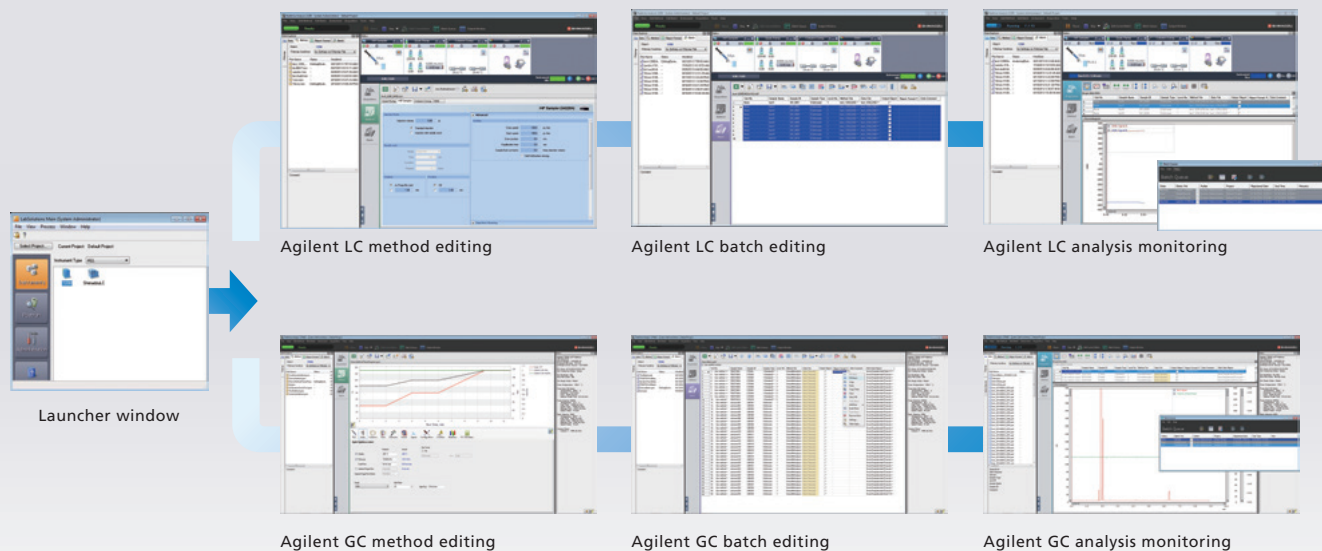
*1 The acquisition controller PC controls the analytical instruments.

Analysis directions and re-analysis of data can be performed using a client PC.

*2 It is not necessary to install LabSolutions software on the client PC for terminal service.

*3 When using an iPad, the installation of Citrix's XenApp is required. iPad is a registered trademark of Apple Inc.

Simple User Interface





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