

# Natural Gas Overview Quick Reference Guide

Natural gas has emerged as one of the most important energy sources in the world. Its abundant availability, low carbon emissions, and versatility have made it a preferred choice for a wide range of applications, including power generation, heating, and transportation. However, ensuring the safety, quality, and efficiency of natural gas requires accurate and reliable analysis. This is where natural gas analysers play a pivotal role.

Natural gas analysers are advanced instruments designed to measure and analyse the composition and properties of natural gas. They provide valuable insights into key parameters such as the concentration of different gases, calorific value, impurities, and other relevant characteristics. This information is crucial for various stakeholders in the natural gas industry, including producers, distributors, regulators, and end-users.

The primary function of a natural gas analyser is to determine the composition of the gas mixture. Natural gas is not a homogeneous substance; its composition varies from source to source and even within a single source. The major components of natural gas are methane (CH<sub>4</sub>), along with smaller amounts of ethane (C<sub>2</sub>H<sub>6</sub>), propane (C<sub>3</sub>H<sub>8</sub>), butane (C<sub>4</sub>H<sub>10</sub>), and traces of other hydrocarbons. Additionally, natural gas can contain impurities such as nitrogen (N<sub>2</sub>), carbon dioxide (CO<sub>2</sub>), hydrogen sulphide (H<sub>2</sub>S), and water vapor (H<sub>2</sub>O). Accurate measurement and monitoring of these components are critical for several reasons. First and foremost, the composition of natural gas affects its energy content and thus its value as a fuel. The calorific value, commonly expressed in British Thermal Units (BTU) per cubic foot or megajoules per cubic meter, indicates the heating capacity of the gas. This information is essential for determining pricing, evaluating the performance of gas-fired equipment, and ensuring compliance with regulatory standards.

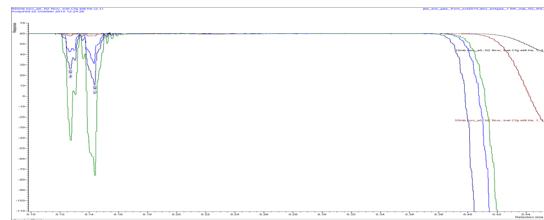
Moreover, the presence of impurities in natural gas can have significant consequences. For instance, high levels of CO<sub>2</sub> can lower the energy content and increase the corrosion potential of the gas. H<sub>2</sub>S is a highly toxic gas that poses safety risks and can corrode pipelines and equipment. Therefore, accurate measurement and continuous monitoring of these impurities are vital for maintaining safety, protecting infrastructure, and complying with environmental regulations.

Natural gas analysers employ various techniques to perform these measurements. The most commonly used methods include gas chromatography, infrared absorption, and mass spectrometry.

Analyzer Model	Description	Published Method(s)
<a href="#">Natural Gas A</a>	Single Channel Natural Gas Analyzer	ASTM D1945, GPA2261 (He/H <sub>2</sub> not included)
<a href="#">Natural Gas B</a>	Dual Channel Natural Gas Analyzer	ASTM D1945, GPA2261 (He/H <sub>2</sub> not included)
<a href="#">Natural Gas C</a>	Extended Natural Gas Analyzer	GPA 2286 (He/H <sub>2</sub> included)
Natural Gas D	Three Channel Bespoke Extended Natural Gas Analyzer	ASTM D1945, GPA2261, GPA 2286 (He/H <sub>2</sub> included)

Gas chromatography is particularly popular due to its high accuracy and versatility. It separates gas components based on their different affinities for a stationary phase, allowing for precise quantification.

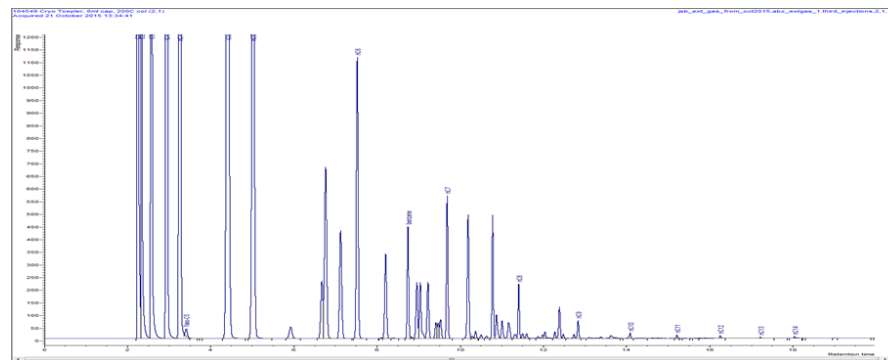
## Hydrogen/Helium Separation



These analysers are typically equipped with advanced sensors, detectors, and software algorithms to ensure accurate and reliable measurements. They are capable of operating in different gas streams, handling a wide range of pressures and temperatures, and providing real-time data. Analysers even offer remote monitoring and control capabilities, enabling operators to access and analyse data from anywhere, at any time.

Natural gas analysers find applications across the entire natural gas value chain. During exploration and production, analysers help in assessing the composition and quality of natural gas reserves. In transmission and distribution, they ensure the proper functioning of gas pipelines and measure the gas quality at different stages. Gas utility companies utilize analysers to monitor the gas composition and ensure compliance with safety standards. Similarly, industrial users rely on analysers to optimize their processes and maintain the efficiency of gas-fired equipment.

## C1—C15 Separation



## Conclusion

Natural gas analyzers are indispensable tools for the accurate and reliable determination of the components present and can provide other useful information such as corrosion issues and calorific values.

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