

Hydrocarbon Mixtures

Tailor made for your application



The fields of application for hydrocarbon mixtures are as diverse as their composition, which can often consist of over 20 different components. Such mixtures are usually referred to when talking about calibration mixtures in the petrochemical industry and the processing of crude oil and natural gas as feedstock for numerous uses. And also in other industries which are based on natural gas in terms of energy production

or consumption, such as natural gas processing plants, grid operators (interstate transmission pipelines and local distribution companies), energy supply companies or producers of burners. Messer supplies hydrocarbon calibration gas mixtures in order to ensure analyses that meet the various quality requirements as part of a safe, efficient and environmentally compatible production process.



Natural gas pipelines

Natural Gas

Natural gas is a fossil fuel which was formed millenniums ago from plant and animal decomposition in the absence of oxygen, deep under the earth's surface. The main component of natural gas is methane, but it also contains other hydrocarbons (ethane, propane, butane, pentane, etc.), and nonhydrocarbon contaminants, such as carbon dioxide, nitrogen, hydrogen sulphide, water vapour, or even helium. The exact composition depends on the source and may vary a lot, often even on daily or seasonal basis.

However, before natural gas is used as source of energy in homes or by utility companies it needs to pass through some carefully and precisely controlled processing steps. Its final composition has to meet many quality standards; these are set by pipeline and distribution companies and are in order to avoid erosion or damage of the natural gas pipelines.

Based on the composition and physical properties, the relative/real density, the Wobbe Index or calorific value can be calculated. The calorific value gives information on the amount of energy released when a known volume of gas is completely combusted (energy content). It serves as a basis for all trading activities dealing with natural gas and for billing gas consumers.

The composition of natural gas is determined with gas chromatographs which have to be calibrated at regular intervals using calibration standards. Messer offers a wide range of high-purity gases and customised hydrocarbon calibration gas mixtures in order to ensure maximum reliability and accuracy in gas quality measurements. All calibration mixtures from our standard product portfolio are supplied with a certificate of analysis providing information on their exact composition according to ISO 6974 (Natural gas – Determination of composition and associated uncertainty by gas chromatography).



Hydrocarbon calibration gas mixture in quality control

Based on the gas chromatographic composition, the Wobbe Index is calculated according to ISO 6976 (Natural gas – Calculation of calorific values, density, relative density and Wobbe Index from composition) and stated on our certificates. Additionally, Messer offers, when requested, calibration standards certified according to ISO 17025.

All gas appliances with atmospheric burners distributed in Europe, including household appliances, e.g. cooking stoves, heaters or boilers, are tested on their operational performance during manufacture.

The standard EN 437 and the Dutch NTA 8837 specify the pressures and gases to be applied during testing (G-mixtures). Messer provides the required test gases in order to ensure safe and efficient testing of the gas burning appliances.



Biogas

The energy industry is undergoing a major transformation worldwide. Especially in terms of sustainability, the production of energy from renewable resources, such as biogas, is gaining more and more importance.

As the name suggests, biogas is the product of a biological process which is widely spread in nature. In humid conditions with the simultaneous absence of oxygen (anaerobic), such as in swamps, at the bottom of a lake or in the digestive tract of ruminants, a lot of different microorganisms break down organic material in order to produce biogas. Besides carbon dioxide and small amounts of hydrogen, hydrogen sulphide, water,

ammonia, etc., biogas consists primarily of methane. Thus, it can be used for any purpose currently satisfied by conventional natural gas.

In biogas plants, this multi-stage decomposition process takes place in an anaerobic digester and is affected by numerous parameters. Different treatment/purification steps are necessary depending on the quality requirements, the composition of the generated biogas and its end use. Messer offers an extensive range of calibration mixtures for different biogas applications including mixtures certified according to ISO 17025.





Petrochemistry

Crude oil is a highly complex mixture of gaseous and liquid hydrocarbons, inorganic compounds containing sulphur, nitrogen, oxygen, carbon dioxide and metals/salts. The refinery process usually consists of desalting and distilling the crude oil mixture into different fractions making the final products for many different purposes and industrial uses. These processes are very demanding and require highly accurate and reliable monitoring measures. Gas chromatography (GC) is a core analytical technique in the petrochemical sector as it is not only used to analyse the main components of the process stream in production, but also to detect trace impurities that can impact the production process and final quality of the product. Thus, the required calibration gas mixtures are often very demanding due to the high number of different components as well as the different balance gases. Calibration gas mixtures also containing heavier liquid hydrocarbons are widely used in the petrochemical sector. Their production is quite complex as different compositions of very precise mixtures in the gas as well as in the liquid phase are required. Moreover, during withdrawal the calibration mixture may tend to alter from its originally certified composition mainly due to a change in liquid vapour equilibrium. Messer assesses and determines such phase characteristics of gas and liquid mixtures by providing customers with concentration change to pressure diagrams. In order to meet high quality requirements, Messer produces liquid phase gas mixtures either in cylinders equipped with dual port cylinder valves with helium overpressure or in piston cylinders to stabilise the concentration of the more volatile compounds.

Service and support

The range of components is very wide and the range of possible gas mixtures is even wider. It is not always easy to choose the right composition mixture. Production and analysis of the calibration gas mixtures are often limiting factors. But storage and handling are also of significant importance as they can impact the quality of the hydrocarbon mixtures. Our consultants will gladly support you in choosing the right high-purity gases, standard and individual mixtures as well as the required gas supply systems.



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