

Gas Chromatography - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts 2019 - 2029

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Report description:

h3> Key Highlights

-The gas chromatography market is expected to witness a CAGR of 5.6% during the forecast period.

-The onset of COVID-19 hampered the market for gas chromatography in the initial days of 2020 due to the closure of diagnostic centers and research institutes. However, during the later phases of the pandemic, or in 2021 due to higher incidences of breathing incidents among the target population, an urgent need to have reliable technologies to diagnose post-coronavirus disease syndrome (PCS) and related complications increased worldwide, as demand for breath-analysis was increased due to the point-of-care benefits of the process. According to a study published in the Journal of Analytical and Bioanalytical Chemistry in March 2022, different methods were available for breath analysis during the pandemic, including gas chromatography (GC) and gas chromatography-mass spectrometry (GC-MS), among other technologies.

-In addition, as per the source above, GC-MS was adopted widely during the pandemic, which provided individual molecular identification. Thus, as per the analysis, the demand for GC and GC-MS increased during the later phases, that is, during 2021 or further, and it positively impacted the studied market growth. Further, with growing instances of the number of variants of the SARS-CoV-2 virus and related complications, the demand for GC is anticipated to increase and is expected to contribute to the market growth during the forecast period.

-The factors driving the market growth include the growing importance of chromatography tests in the drug approval process and the rising adoption of GC-MS for disease detection.

-Gas chromatography (GC) is widely accepted in both scientific and legal arenas as one of the powerful analytical techniques for the separation, quantification, and identification of drug analytes, especially at low levels of concentration. As per the January 2023 update by Sigma-Aldrich Solutions, GC is a common analytical technique used to separate and analyze volatile and semi-volatile compounds such as exhaled human breath, blood, saliva, and other secretions in a mixture. Also, it is a popular analytical technique that combines exceptional resolving power with speed and sensitivity. In addition, various sources have

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suggested that GC has a profound use in analytical chemistry, owing to its ability to offer excellent features, like accurate separation capabilities, reproducibility, and quicker separation. GC is used extensively in different fields, such as pharmaceuticals, cosmetics, and environmental toxins. Thus, owing to such advantages and benefits, the demand for GC is increasing and is predicted to fuel the growth of the market during the forecast period.

-Additionally, the GC can be used to characterize microorganisms chemically. Hence, it is used for the detection of various infectious diseases. Also, it can be used for the fine detection of various inflammatory diseases. As per a research study published in the Research Square journal in May 2022, exhaled gas is derived from substances in inhaled air originating from the external environment and from substances produced in the body, and this exhaled gas can be analyzed with nearly 1,000 end-metabolites or more being detected in extremely small amounts on the order of parts per billion by GC-MS. As exhaled gas analysis is non-invasive and can record changes over time, it is a very helpful technique for continuous monitoring. Much progress has been made in the analysis of volatile organic compounds thanks to recent developments in GC-MS technology. Thus, the application of GC-MS in such research and analytical platforms is anticipated to fuel the overall market growth.

-Moreover, technological advancements in the studied market with new product launches, partnerships, and other strategic initiatives by key market players will boost the market. For instance, in June 2022, Agilent Technologies launched several new LC/MS and GC/MS quadrupole mass spectrometers, which are raising the level of built-in instrument intelligence and a higher level of instrument diagnostics to maximize system uptime, allowing proactive scheduling of routine maintenance, and minimizes the impact on lab productivity by allowing operators to focus on their analyses rather than on their instruments. Such innovations are expected to propel the gas chromatography market growth over the forecast period.

-However, the high cost of gas chromatography equipment and a lack of skilled professionals to operate the procedures are expected to hinder the market's growth.

Gas Chromatography (GC) Market Trends

Pharmaceutical and Bioindustries is Expected to Hold a Significant Market Share Over the Forecast Period

- In combination with proper detectors selective to the type of analyte in the sample, gas chromatography finds application in qualitative and quantitative analysis in the pharmaceutical and biopharmaceutical industry.

- The high efficiencies of separation power, the extreme detection sensitivity while detecting small amounts of separated species, and the accuracy and precision of the data from quantitative analyses of extremely complex mixtures are the major reasons why GC is used in the pharmaceutical industry. GC analyses are also less hassle-free while automating from sample introduction to separation. As per the 2023 update by DPS Instruments Europe GmbH, various pharmaceutical Applications can be analyzed using one of the Custom GC configurations of the Series 600 Lab GC offered by the company. In addition, as per the source above, whether the analysis is done in the Lab, in the factory, or out in the field, with the use of these GC systems, pharmaceutical results remain consistent.

- In addition, GC-MS is exclusively used in the bio-analysis of blood and urine for the presence of barbiturates, alcohols, narcotics, residual solvents, drugs like anesthetics, antihistamines, anticonvulsants, and anti-epileptic drugs, sedative-hypnotics, and food items. Toxins and venoms can also be identified by GC-MS. It is extensively used in clinical toxicology as well. For instance, according to a study published in NCBI in February 2022, a GC coupled with a drift tube ion mobility spectrometer (IMS) can obtain relative percentage errors lower than 8.4% and can be a reliable, selective, and sensitive technique for the determination of psychoactive substances in oral fluids. Therefore, as a result of the aforementioned main advantages and reliable results, GC is extensively used for quality control purposes in the pharmaceutical and biotechnology industries. Hence, the above-mentioned factors are anticipated to fuel the segment's growth over the forecast period.

North America is Expected to Hold a Significant Share of the Market During the Forecast Period

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- North America is expected to hold a major share of the gas chromatography market during the forecast period, owing to the increasing adoption of GC techniques and increasing research in the pharmaceutical and biopharmaceutical sectors. In addition, chromatography instrumentation has proven to be an effective technology for final production testing, pharmaceutical applications, environmental monitoring, and food testing, among others. Other factors propelling the growth of the market in the region include the rising prevalence of chronic diseases coupled with the increasing need for drug discovery and the augmented demand for personalized medicines.
- The increasing focus on the research and development (R&D) of improved and novel drug assessment techniques, which have been used to discover highly complex drugs, is playing a vital role in the evolution of new chromatographic methods in the region. For instance, in June 2022, Focussed Photonics, Inc. launched an industrial online gas chromatography analyzer that is distinct from the conventional laboratory setting chromatography. It uses a high-precision program-controlled column-cutting technology and column system sampling technology through which the measured components can be analyzed and obtained swiftly. Such developments are expected to drive the market growth in the region.
- Furthermore, the increased adoption of chromatography techniques, majorly in the food and beverage and pharmaceutical industries, drives the demand for GC in the region. With the rising number of critical diseases, the R&D investments in the pharmaceutical industry for drug discovery and production are increasing, which has further increased the demand for chromatography techniques in North America. For instance, as per the data updated by the Pharmaceutical Research and Manufacturers of America (PhRMA) trade group, in 2021, the R&D expenditure of its member companies reached nearly USD 79,610 2021, which increased from USD 72,412 in the previous year in the country. This high expenditure on pharmaceuticals in the country is expected to contribute to new drug discovery in the United States and propel the demand for GC used for drug discovery applications. This is expected to fuel the market growth in the country and drive the overall growth of the market studied market during the forecast period.

Gas Chromatography (GC) Industry Overview

The gas chromatography market is highly competitive and consists of a number of players. Companies like Agilent Technologies Inc., Chromatotec, Restek Corporation, Danaher Corporation, Merck KgaA, Teledyne Technologies, PerkinElmer Inc., Scion Instruments, Shimadzu Corporation, and Thermo Fisher Scientific Inc., among others, hold substantial market shares in the gas chromatography market. Many strategic initiatives have recently been taken in the market by the major players to strengthen their market presence.

Additional Benefits:

- The market estimate (ME) sheet in Excel format
- 3 months of analyst support

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