

Specialty Gases Market - Global Industry Size, Share, Trends, Opportunity, and Forecast, 2018-2028

Segmented By Product Type (High purity, Nobel, Carbon, Halogen, Others), By Application (Manufacturing, Electronics, Healthcare, Others), By Region and Competition

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Abstracts

Global Specialty Gases Market has valued at USD12.15 billion in 2022 and is anticipated to project robust growth in the forecast period with a CAGR of 5.08% through 2028. Specialty gases are gaseous substances of high purity and exceptional quality, playing a vital role in a wide range of industries. These industries include healthcare, environmental, petrochemical, semiconductor, pharmaceutical, and chemical markets. Specialized gases are extensively used in various industrial processes, serving as analytical lab gases and intermediates. The most common types of specialty gases include high purity gases, noble gases, carbon gases, and halogen gases.

These gases can be pure gases or gas mixtures with varying concentrations, ranging from the percent range down to part per billion and sometimes even part per trillion. They find applications in analytical methods such as fourier transform infrared (FTIR) and non-dispersive infrared (NDIR), as well as gas and liquid chromatography. Moreover, specialty gases are crucial in the electronics sector, where they are utilized in the production of integrated circuits, silicon wafers, compound semiconductors, and flat panel display products.

The specialty gas industry is a complex and comprehensive business that supports advancements in chip architectures, which require new materials and increased

material consumption per chip. With the growing demand for advanced technologies such as augmented reality (AR), artificial intelligence (AI), internet of things (IoT), virtual reality (VR), aerospace, automotive applications, and the rise of remote work, online gaming, e-commerce, mobile devices, personal computers, and virtual learning, the semiconductor sector is experiencing an unprecedented level of growth.

Specialty gases are widely used across different applications in the semiconductor chip production process, with nitrogen being one of the extensively used gases. Nitrogen is employed in abatement systems for purging vacuum pumps and as a process gas. In large, advanced fabs, nitrogen consumption can reach up to 50,000 cubic meters per hour, highlighting the need for low-energy and cost-effective on-site nitrogen generators.

Several factors are expected to drive the growth of the global specialty gas market. The high growth of end-user industries, increased demand for photovoltaic products and plasma display panels, rising environmental awareness, growing demand from the healthcare industry, increased usage of specialty gases in the electronic industry, and surging demand for bio-based products are all crucial factors contributing to the specialty gas market's growth during the forecast period.

Specialty gases are predicted to gain traction in the healthcare industry, particularly due to their rising consumption in medical applications such as anesthesia, reanimation processes, mechanical ventilation, and Magnetic Resonance Imaging (MRI). These gases, including medical gases and specialty gas mixtures, play a vital role in various medical procedures, pathology, patient care, and research. They are supplied in portable cylinders or directly through pipelines to hospital wards, ensuring a reliable and efficient supply. Manufacturers like Messer Group GmbH offer a wide range of specialty gases, along with services that encompass consultation on gas delivery, planning, installation, and maintenance of supply systems.

However, it is important to note that the specialty gas market also faces certain challenges. Increasing regulations and restrictions on the production and quality control of specialty gases, along with the presence of substitutes, can hamper market growth. On the contrary, the production of new environmentally friendly technologies and products, coupled with emerging markets, presents lucrative growth opportunities for the specialty gas industry. These developments pave the way for a promising future, where specialty gases continue to play a crucial role in various sectors, driving innovation and enabling advancements in technology and research.

Key Market Drivers

Increasing Demand of Specialty Gases in Electronics Industry

Specialty gases play a crucial role in the manufacturing processes of electronic devices. These gases, which may be pure or mixed, include high purity gases, noble gases, carbon gases, and halogen gases. They are used in various stages of semiconductor manufacturing and support advancements in chip architectures that require new materials and increased material consumption.

As the demand for electronic devices across various sectors continues to spike, so does the need for specialty gases in their production. This trend is especially pronounced in South Asia, which continues to lead the market, while East Asia is also showing impressive growth rates. The increasing demand for electronic devices, driven by factors such as technological advancements and consumer preferences, is fueling the demand for specialty gases. This, in turn, is contributing to the growth of the global specialty gases market.

One of the key factors driving the demand for specialty gases in the electronics industry is the expansion within the semiconductor industry. With leading-edge logic and 3D NAND technologies gaining traction, the requirement for specialty gases in their production processes is on the rise. These innovative technologies necessitate the use of specialty gases to achieve precise and reliable results.

Moreover, rapid advancements in the electronics industry have led to the development of complex end-to-end businesses that rely heavily on specialty gases. From research and development to manufacturing and testing, the entire supply chain of electronic devices relies on the availability and quality of specialty gases. As such, the growth of the electronics industry directly influences the specialty gases market.

However, these challenges also present opportunities for growth and innovation. As the specialty gases market continues to grow, driven by the increasing demand from the electronics industry, research and development efforts could lead to the development of alternative gases or more efficient usage methods. Innovations in gas purification, packaging, and delivery systems could further enhance the performance and sustainability of specialty gases.

In conclusion, the increasing demand for specialty gases in the electronics industry is a significant driver of the global specialty gases market. As electronic devices become

increasingly integral to our daily lives, this trend is expected to continue, offering ample opportunities for growth and innovation in the specialty gases market. By staying at the forefront of technological advancements and addressing the evolving needs of the electronics industry, the specialty gases industry can thrive and contribute to the ongoing progress of the electronic devices we rely on.

Increasing Demand of Specialty Gases in Healthcare Industry

Specialty gases are high purity gases that have specific applications across a wide range of industries. In the healthcare sector, these gases play a crucial role in various applications, spanning from clinical to laboratory settings. For example, nitrous oxide is commonly used as an anesthetic, helium is utilized in MRI machines, and oxygen is essential for respiratory therapy.

Moreover, specialty gases like nitrogen and argon find extensive usage in cryogenics and cryosurgery, while gases such as neon, krypton, and xenon have applications in laser eye surgery. As the demand for healthcare services continues to grow, so does the need for specialty gases.

The rising global population, coupled with an increase in chronic and lifestyle diseases, has led to a significant surge in the demand for healthcare services. Consequently, this surge drives the requirement for specialty gases in various healthcare applications.

Additionally, advances in medical technology and the development of new therapeutic techniques have further contributed to the increased usage of specialty gases. The ongoing COVID-19 pandemic has also highlighted the critical role of specialty gases, particularly medical oxygen, in providing essential healthcare support.

The increasing demand for specialty gases in the healthcare industry acts as a key driver for the growth of the global specialty gases market. As healthcare services continue to evolve and expand, this trend is expected to persist, offering ample growth opportunities for players in the specialty gases market.

In conclusion, given the vital role of specialty gases in the healthcare industry and the continuous expansion of the sector, the global specialty gases market exhibits a positive outlook for the foreseeable future. The ongoing advancements in medical technology and the rising demand for healthcare services further reinforce the significance of specialty gases in enabling quality patient care and treatment.

Key Market Challenges

Volatility in Price of Feedstock

Feedstocks play a crucial role in the production of specialty gases. They are raw materials used in the intricate process of creating these high-purity gases, which encompass noble gases, carbon gases, halogen gases, and various others. The cost of these feedstocks directly impacts the price of the final product, i.e., specialty gases. With intricate supply chains and strict quality control measures, the production of specialty gases relies heavily on the availability and affordability of feedstocks.

Price volatility, referring to the rapid rate at which the price of an asset fluctuates for a given set of returns, poses a significant challenge in the specialty gases market. In the case of feedstocks, factors such as geopolitical concerns, energy transition challenges, and supply-demand imbalances often contribute to price fluctuations. These volatile prices not only impact the cost of feedstocks but also create a ripple effect throughout the entire specialty gases industry.

The implications of price volatility in the specialty gases market are far-reaching. When feedstock prices increase, it leads to higher production costs for specialty gases, as manufacturers have to bear the burden of elevated input costs. In turn, these increased costs are often passed on to the consumers, resulting in higher prices for specialty gases. This poses challenges for both producers and consumers alike, as they grapple with the impact of price fluctuations on their budgets and operations.

Furthermore, price volatility creates obstacles for companies in planning their budgets and making long-term business decisions. The uncertainty surrounding feedstock prices makes it difficult to forecast and allocate resources effectively. The stability of the supply chain is also affected, as companies face challenges in securing a consistent and reliable supply of feedstocks. These complications further exacerbate the production and distribution challenges faced by the specialty gases industry.

In summary, the role of feedstocks and the impact of price volatility are crucial considerations in the specialty gases market. Understanding the complexities of feedstock procurement, price fluctuations, and their implications is essential for industry stakeholders to navigate the challenges and ensure the sustainable production and availability of specialty gases.

Key Market Trends

Growing Demand of Custom Gas Mixtures

Custom gas mixtures are meticulously formulated combinations of gases, precisely tailored to meet the unique requirements of various applications. These specialized blends can consist of a diverse range of gases, including oxygen, nitrogen, helium, argon, and more.

The demand for these custom gas mixtures has been steadily increasing across multiple industries, such as food and beverage, healthcare, electronics, and manufacturing. This surge in demand can be attributed to the inherent advantages of these bespoke mixtures, which can be fine-tuned to align with specific application needs. As a result, efficiency is enhanced, and waste is minimized, leading to improved overall performance.

The growing demand for custom gas mixtures is an eminent trend observed in the global specialty gases market. As industries actively seek out more efficient and tailored solutions, this demand is anticipated to rise even further, fostering substantial growth in the specialty gases market. While challenges may arise, this trend also presents significant opportunities for innovation and expansion within the market, paving the way for novel advancements and breakthroughs.

Segmental Insights

Product Type Insights

Based on the category of product type, the carbon segment emerged as the dominant player in the global market for Specialty Gases in 2022. Carbon gases, such as carbon dioxide and carbon monoxide, are widely utilized in various medical equipment, including nuclear magnetic resonance imaging (MRI), ophthalmology devices, and more. These gases play a crucial role in enabling accurate diagnoses and effective treatments in the healthcare industry. Moreover, carbon gases find extensive application in sectors like electronics, manufacturing, healthcare, and chemicals due to their diverse properties and functionalities.

The demand for carbon gases is witnessing steady growth, primarily driven by their increasing use in instrument calibration. The precise calibration of instruments is vital for ensuring accurate measurements and reliable performance across industries. As a result, the demand for carbon gases, known for their stability and accuracy, continues to

rise.

In addition to their wide-ranging applications, ultra-high purity gases, known for their exceptional purity levels, are extensively employed in diverse industries. These gases find use in insulation, lighting, and cooling systems within electronics, metal processing, chemical, and oil & gas sectors. Furthermore, the semiconductor industry heavily relies on ultra-high purity gases for the manufacturing of semiconductors, which are the building blocks of modern electronics. Given the continuous growth and innovation in the semiconductor industry, the demand for ultra-high purity gases is expected to witness significant expansion in the coming years.

Application Insights

The healthcare segment is projected to experience rapid growth during the forecast period. The healthcare sector relies on a wide range of specialty gases, including crucial ones like oxygen, medical nitrous oxide, medical air, and medical helium. These gases play a vital role in various medical applications, such as anesthesia, respiratory therapy, and surgical procedures. With governments worldwide increasing healthcare expenditure and the continuous advancement of medical technologies, the demand for these specialty gases is expected to witness significant growth in the market. This growth can be attributed to their essential role in delivering safe and effective healthcare services, ensuring patient well-being, and supporting medical professionals in providing optimal care.

Regional Insights

Asia Pacific emerged as the dominant player in the Global Specialty Gases Market in 2022, holding the largest market share in terms of value. The region, encompassing China, Japan, and India, boasts numerous electronic manufacturing hubs. These hubs, supported by local governments, have spurred the growth of diverse end-use industries including consumer electronics, oil & gas, manufacturing, and healthcare. The region's Production-Linked Incentives (PLI), subsidies, and favorable Foreign Direct Investment (FDI) policies have further propelled the expansion of these industries. As a result, the specialty gas industry has witnessed remarkable growth and established its dominance in the region.

Key Market Players

Air Liquide SA

Airgas, Inc.

Air Products Inc.

Linde plc

Messer group GmbH

MESA International Technologies, Inc.

Norco Inc.

showa denko k.k.

Taiyo Nippon Sanso Corporation

Weldstar, Inc

Report Scope:

In this report, the Global Specialty Gases Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

Specialty Gases Market, By Product Type:

High purity

Nobel

Carbon

Halogen

Others

Specialty Gases Market, By Application:

Manufacturing

Electronics

Healthcare

Others

Specialty Gases Market, By Region:

North America

United States

Canada

Mexico

Europe

France

United Kingdom

Italy

Germany

Spain

Asia-Pacific

China

India

Japan

Australia

South Korea

South America

Brazil

Argentina

Colombia

Middle East & Africa

South Africa

Saudi Arabia

UAE

Kuwait

Turkey

Egypt

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global Specialty Gases Market.

Available Customizations:

Global Specialty Gases Market report with the given market data, Tech Sci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

Detailed analysis and profiling of additional market players (up to five).

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