Environmental Regulation & Stringent Emission Standards: Global Gas Separation Membrane Market; says TNR

Global Gas Separation Membrane Market to Reach US$ 2.5 Bn by 2034; Anticipated to Experience CAGR of 7.6% During 2024 – 2034

WILMINGTON, DELAWARE, UNITED STATES, June 3, 2024 /EINPresswire.com/ -- Gas separation membranes are selective barriers used to separate and purify gas mixtures based on differences in the size, shape, and affinity of gas molecules. These membranes are engineered to allow the passage of certain gas molecules while blocking or retarding others, thereby enabling the separation of desired gases from gas mixtures. Gas separation membranes operate on the principle of selective permeation, where gas molecules diffuse through the membrane material at different rates depending on their molecular properties. The membrane's structure and composition are designed to preferentially allow the passage of specific gas molecules, while excluding or reducing the permeation of other gases. Gas separation membranes find applications in various industries, including oil and gas, petrochemicals, chemicals, refining, power generation, electronics manufacturing, food and beverage, pharmaceuticals, and environmental protection. They are used for a wide range of gas separation processes, such as air separation, hydrogen purification, carbon dioxide capture, natural gas processing, biogas upgrading, vapor recovery, and water treatment.

Global Gas Separation Membrane Market: Growth Drivers

Increasing Water Scarcity: The growing demand for clean water and the need to address water scarcity drive the adoption of gas separation membranes for water and wastewater treatment applications. Membrane-based processes such as reverse osmosis, nanofiltration, and membrane distillation are used to remove contaminants, desalinate seawater, and recover valuable resources from wastewater streams, driving market growth in the water treatment sector.

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Rising Demand for Clean Energy: The global transition towards clean and renewable energy sources such as hydrogen and biogas fuel the demand for gas separation membranes for hydrogen purification, natural gas processing, and biogas upgrading applications. Membrane-based processes enable the production of high-purity gases required for fuel cells, power generation, and industrial applications, supporting the growth of the clean energy sector.

Market Expansion in Emerging Economies: The gas separation membrane market is witnessing significant growth in emerging economies, driven by industrialization, urbanization, and infrastructure development. Countries in Asia-Pacific, Latin America, and the Middle East are investing in gas separation technologies to meet growing industrial and environmental challenges, creating opportunities for market expansion and technological advancement.

By Material Type, which is the Fastest Growing Segment in the Gas Separation Membrane Market During the Forecast Period

Polysulfone are most widely used in gas separation membrane and is projected as the fastest growing segment in the Gas Separation Membrane market in 2023. Polysulfone exhibits excellent chemical resistance, making it suitable for use in gas separation membranes for various industrial applications. Its resistance to harsh chemicals and solvents ensures the durability and longevity of gas separation membranes, reducing maintenance costs and downtime. Polysulfone membranes possess high mechanical strength and dimensional stability, enabling them to withstand high pressures and temperature fluctuations during gas separation processes. This robustness ensures the integrity and reliability of gas separation membranes under challenging operating conditions, contributing to market growth. Polysulfone membranes offer a cost-effective solution for gas separation compared to alternative membrane materials such as ceramics or specialty polymers. The availability of polysulfone at relatively lower costs, coupled with its performance benefits, makes it an attractive option for industrial gas separation applications, driving market adoption and growth.

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Based on the Application Segment, which is the Fastest Growing Segment in the Gas Separation Membrane Market During the Forecast Period?

Hydrogen recovery application is anticipated to be the fastest growing segment in the Gas Separation Membrane market during the forecast period. Gas separation membranes facilitate the purification and compression of hydrogen for storage and distribution in various forms, including compressed gas, liquid hydrogen, and hydrogen-rich compounds. Membrane-based hydrogen recovery systems enable on-site production and supply of high-purity hydrogen, supporting the development of hydrogen infrastructure for fueling stations, industrial plants, and energy storage facilities. Ongoing advancements in membrane materials, module designs,

and process optimization drive innovation in gas separation membranes for hydrogen recovery applications. Innovations such as thin-film composite membranes, mixed matrix membranes, and membrane surface modifications improve separation efficiency, selectivity, durability, and fouling resistance, enhancing the performance and competitiveness of membrane-based hydrogen recovery systems.

Based on Region Segment, which is the Fastest Growing Region in the Gas Separation Membrane Market in 2023?

North America region is projected as the fastest growing region in the Gas Separation Membrane market in 2023. Environmental regulations in North
America encourage industries to adopt cleaner and more sustainable technologies for gas separation processes. Gas separation membranes offer an eco-friendly alternative to traditional separation methods by reducing energy consumption, emissions, and waste generation, thereby driving market growth. The growth of shale gas production in North America creates opportunities for gas separation membrane technologies in natural gas processing and purification. Membrane-based gas separation processes enable the removal of impurities such as carbon dioxide, hydrogen sulfide, and water vapor from shale gas streams, enhancing gas quality and market value. The gas separation membrane market in North America experiences growth due to increasing focus on environmental sustainability, growing demand for industrial gases, technological advancements, energy efficiency requirements, investments in renewable energy, expansion of shale gas production, and market penetration in water treatment applications.

A few of the key companies operating in the gas separation membrane market are listed below:

- Air Liquide Advanced Separations LLC
- Air Products and Chemicals Inc.
- Atlas Copco AB
- DIC Corporation
- Evonik Industries
- Fujifilm Manufacturing Europe B.V
- GENERON LLC
- GMT Membrantechnik GmbH
- GRASYS JSC
- Honeywell International (Honeywell UOP)
- Mahler AGS
- Membrane Technology and Research Inc
- Parker-Hannifin Corporation
- Schlumberger Ltd

- UBE Industries Ltd
- Other Industry Participants

Global Gas Separation Membrane Market

By Material Type
- Polyimide & Polyaramide
- Polysulfone
- Cellulose acetate
- Other

By Module
- Spiral Wound
- Hollow fiber
- Plate & Frame
- Others

By Application
- Nitrogen generation & Oxygen enrichment
- Hydrogen Recovery
- Carbon Dioxide Removal
- Vapor/Gas Separation
- Vapor/Vapor Separation
- Air Dehydration
- H2S Removal
- Others

By Region
- North America (U.S., Canada, Mexico, Rest of North America)
- Europe (France, The UK, Spain, Germany, Italy, Nordic Countries (Denmark, Finland, Iceland, Sweden, Norway), Benelux Union (Belgium, The Netherlands, Luxembourg), Rest of Europe
- Asia Pacific (China, Japan, India, New Zealand, Australia, South Korea, Southeast Asia (Indonesia, Thailand, Malaysia, Singapore, Rest of Southeast Asia), Rest of Asia Pacific
- Middle East & Africa (Saudi Arabia, UAE, Egypt, Kuwait, South Africa, Rest of Middle East & Africa)
- Latin America (Brazil, Argentina, Rest of Latin America)

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