

**Hydrogen Membrane Market By Product Type (Polymer Membrane, Ceramic Membrane, Metal Membrane), By Application (Hydrogen Production, Fuel Cells, Chemical Processing, Others): Global Opportunity Analysis and Industry Forecast, 2024-2033**

Market Report | 2025-01-01 | 245 pages | Allied Market Research

**AVAILABLE LICENSES:**

- Cloud Access License \$2655.00
- Business User License \$4425.00
- Enterprise License \$7412.00

**Report description:**

The hydrogen membrane market was valued for \$2.1 billion in 2023 and is estimated to reach \$4.2billion by 2033, exhibiting a CAGR of 7.1% from 2024 to 2033.

A hydrogen membrane refers to a type of membrane technology that selectively permits the passage of hydrogen gas while blocking other gases. This capability is driven by the unique properties of the membrane material, which can be made from various materials such as palladium, palladium alloys, carbon, or advanced polymer composites. The fundamental purpose of these membranes is to separate hydrogen from a mixture of gases, particularly in processes that require high purity hydrogen or its isolation from other substances.

The expansion of the hydrogen economy is one of the most significant drivers of growth in the hydrogen membrane market. As governments, industries, and research institutions worldwide ramp up efforts to reduce carbon emissions, hydrogen has emerged as a key player in the clean energy transition. This growing focus on hydrogen has led to substantial investments in hydrogen infrastructure, such as production, storage, transportation, and distribution networks. These investments are vital for establishing a sustainable hydrogen ecosystem that can support various industries and applications, such as energy, transportation, and manufacturing. All these factors are expected to drive the demand for the hydrogen membrane market during the forecast period. However, the rise of hydrogen-powered vehicles is playing a pivotal role in expanding the need for hydrogen purification and separation technologies, particularly in the transportation sector. Hydrogen fuel cell vehicles (FCVs) are seen as a promising solution to reduce carbon emissions from transportation, especially in heavy-duty applications such as buses, trucks, and trains, where battery electric vehicles may face limitations in range and charging times

Hydrogen membranes play a central role in producing high-purity hydrogen for these fuel cell vehicles. Membrane technologies,

**Scotts International. EU Vat number: PL 6772247784**

tel. 0048 603 394 346 e-mail: [support@scotts-international.com](mailto:support@scotts-international.com)

[www.scotts-international.com](http://www.scotts-international.com)

such as polymeric and palladium-based membranes, can separate hydrogen from other gases, including contaminants such as carbon monoxide, methane, and nitrogen. By using membranes, hydrogen producers can ensure that the fuel used in transportation applications meets the stringent purity standards required for optimal fuel cell operation. This is particularly important as the hydrogen industry seeks to scale up to meet the growing demand for fuel cell vehicles and their infrastructure. All these factors hamper hydrogen membrane market growth.

The expansion of the hydrogen economy is one of the most significant drivers of growth in the hydrogen membrane market. As governments, industries, and research institutions worldwide ramp up efforts to reduce carbon emissions, hydrogen has emerged as a key player in the clean energy transition. This growing focus on hydrogen has led to substantial investments in hydrogen infrastructure, such as production, storage, transportation, and distribution networks. These investments are vital for establishing a sustainable hydrogen ecosystem that support various industries and applications, including energy, transportation, and manufacturing.

The increasing adoption of fuel cell technologies further fuels the demand for hydrogen membranes. Fuel cells, which convert hydrogen into electricity through an electrochemical process, are seen as a clean alternative to traditional fossil fuel-based power generation. They are used in a range of applications, from hydrogen-powered vehicles to stationary power generation systems. For fuel cells to operate effectively, they require hydrogen that is highly purified, which is where hydrogen membranes come into play.

Membranes are crucial for separating and purifying hydrogen from other gases, ensuring the high purity required for fuel cell efficiency and performance. In June 2024, TotalEnergies and Air Products and Chemicals Inc. entered into a 15-year agreement to supply 70,000 tons of green hydrogen annually across Europe, starting in 2030. Air Products will deliver the green hydrogen to TotalEnergies' refineries in Northern Europe, helping to reduce approximately 700,000 tons of CO<sub>2</sub> emissions annually. Thus, the growing popularity of green hydrogen is expected to provide lucrative opportunities in the growth of hydrogen membrane market. All these factors are anticipated to offer new growth opportunities for the hydrogen membrane market during the forecast period. The hydrogen membrane market is segmented into product type, application, and region. On the basis of product type, the market is categorized into polymer membrane, ceramic membrane, and metal membrane. On the basis of application, the market is divided into hydrogen production, fuel cells, chemical processing, and others. Region-wise, the hydrogen membrane is Analyzed across North America, Europe, Asia-Pacific, and LAMEA.

On the basis of product type, the market is categorized into polymer membrane, ceramic membrane, and metal membrane. The polymer membrane segment accounted for more than half of the hydrogen membrane market share in 2023 and is expected to maintain its dominance during the forecast period. This dominance is attributed to the superior performance characteristics of polymer membranes, such as high efficiency, durability, and cost-effectiveness in hydrogen separation and purification processes. Their widespread adoption in fuel cells and hydrogen production applications, coupled with ongoing advancements in polymer technologies, continues to drive the hydrogen membrane market growth.

On the basis of application, the market is segmented into hydrogen production, fuel cells, chemical processing, and others. The hydrogen production segment accounted for more than two-fifth of the hydrogen membrane market share in 2023 and is expected to maintain its dominance during the forecast period. Hydrogen production drive the demand for hydrogen across various industries such as transportation, energy, and industrial processes. Hydrogen membranes are critical in enhancing the efficiency of hydrogen production methods such as steam methane reforming, electrolysis, and coal gasification by enabling precise separation and purification.

Region-wise, the market is analyzed across North America, Europe, Asia-Pacific, and LAMEA. The Asia-Pacific region accounted for more than two fifth of the hydrogen membrane market share in 2023 and is expected to maintain its dominance during the forecast period. Hydrogen membranes are primarily used in hydrogen purification and separation processes, enabling the production of high-purity hydrogen for industrial, energy, and transportation sectors. Countries such as Japan and South Korea are leading in the adoption of hydrogen membranes. These nations have robust hydrogen strategies focused on integrating hydrogen into their energy and transportation systems. Hydrogen membranes are utilized in fuel cell vehicles, where they ensure the purity of hydrogen to optimize fuel cell performance.

Key players in the hydrogen membrane market include JSC Grasy, Agfa-Gevaert Group, The Chemours Company, Air Liquide, Linde PLC, Evonik Industries AG, Nitto Denko Corporation, Borsig GmbH, Parker Hannifin Corporation, TORAY INDUSTRIES, INC.,

**Scotts International. EU Vat number: PL 6772247784**

tel. 0048 603 394 346 e-mail: [support@scotts-international.com](mailto:support@scotts-international.com)

[www.scotts-international.com](http://www.scotts-international.com)

and others.

Key findings of the study

-On the basis of product type, the ceramic membrane segment is anticipated to grow at the fastest CAGR of 7.5% during the forecast period.

-On the basis of application, the fuel cells segment is anticipated to grow at the fastest CAGR of 7.5% during the forecast period.

-Region-wise, Asia-Pacific has the highest share in 2022 in terms of revenue.

Key Benefits For Stakeholders

-This report provides a quantitative analysis of the market segments, current trends, estimations, and dynamics of the hydrogen membrane market analysis from 2023 to 2033 to identify the prevailing hydrogen membrane market opportunities.

-The market research is offered along with information related to key drivers, restraints, and opportunities.

-Porter's five forces analysis highlights the potency of buyers and suppliers to enable stakeholders make profit-oriented business decisions and strengthen their supplier-buyer network.

-In-depth analysis of the hydrogen membrane market segmentation assists to determine the prevailing market opportunities.

-Major countries in each region are mapped according to their revenue contribution to the global market.

-Market player positioning facilitates benchmarking and provides a clear understanding of the present position of the market players.

-The report includes the analysis of the regional as well as global hydrogen membrane market trends, key players, market segments, application areas, and market growth strategies.

?

Additional benefits you will get with this purchase are:

- Quarterly Update and\* (only available with a corporate license, on listed price)
- 5 additional Company Profile of client Choice pre- or Post-purchase, as a free update.
- Free Upcoming Version on the Purchase of Five and Enterprise User License.
- 16 analyst hours of support\* (post-purchase, if you find additional data requirements upon review of the report, you may receive support amounting to 16 analyst hours to solve questions, and post-sale queries)
- 15% Free Customization\* (in case the scope or segment of the report does not match your requirements, 15% is equivalent to 3 working days of free work, applicable once)
- Free data Pack on the Five and Enterprise User License. (Excel version of the report)
- Free Updated report if the report is 6-12 months old or older.
- 24-hour priority response\*
- Free Industry updates and white papers.

Possible Customization with this report (with additional cost and timeline, please talk to the sales executive to know more)

- Analysis of raw material in a product (by %)
- Manufacturing Capacity
- Technology Trend Analysis
- New Product Development/ Product Matrix of Key Players
- Regulatory Guidelines
- Additional company profiles with specific to client's interest
- Historic market data
- Import Export Analysis/Data
- Key player details (including location, contact details, supplier/vendor network etc. in excel format)
- List of customers/consumers/raw material suppliers- value chain analysis
- SWOT Analysis

Key Market Segments

By Product Type

**Scotts International. EU Vat number: PL 6772247784**

tel. 0048 603 394 346 e-mail: support@scotts-international.com

www.scotts-international.com

- Polymer Membrane
- Ceramic Membrane
- Metal Membrane
- By Application
  - Hydrogen Production
  - Fuel Cells
  - Chemical Processing
  - Others
- By Region
  - North America
    - ? U.S.
    - ? Canada
    - ? Mexico
  - Europe
    - ? Germany
    - ? France
    - ? UK
    - ? Spain
    - ? Italy
    - ? Rest of Europe
  - Asia-Pacific
    - ? China
    - ? India
    - ? Japan
    - ? South Korea
    - ? Australia
    - ? Rest of Asia-Pacific
  - LAMEA
    - ? Brazil
    - ? South Africa
    - ? Saudi Arabia
    - ? Rest of LAMEA
- Key Market Players
  - ? Agfa-Gevaert Group
  - ? Nitto Denko Corporation
  - ? Linde PLC
  - ? TORAY INDUSTRIES, INC.
  - ? JSC Grasy
  - ? Air Liquide
  - ? Evonik Industries AG
  - ? Parker Hannifin Corporation
  - ? Borsig GmbH
  - ? The Chemours Company

**Table of Contents:**

CHAPTER 1: INTRODUCTION

1.1. Report description

**Scotts International. EU Vat number: PL 6772247784**

tel. 0048 603 394 346 e-mail: support@scotts-international.com

www.scotts-international.com

- 1.2. Key market segments
- 1.3. Key benefits to the stakeholders
- 1.4. Research methodology
  - 1.4.1. Primary research
  - 1.4.2. Secondary research
  - 1.4.3. Analyst tools and models
- CHAPTER 2: EXECUTIVE SUMMARY
- 2.1. CXO perspective
- CHAPTER 3: MARKET OVERVIEW
- 3.1. Market definition and scope
- 3.2. Key findings
  - 3.2.1. Top impacting factors
  - 3.2.2. Top investment pockets
- 3.3. Porter's five forces analysis
  - 3.3.1. Moderate bargaining power of suppliers
  - 3.3.2. Moderate threat of new entrants
  - 3.3.3. Moderate threat of substitutes
  - 3.3.4. Moderate intensity of rivalry
  - 3.3.5. Moderate bargaining power of buyers
- 3.4. Market dynamics
  - 3.4.1. Drivers
    - 3.4.1.1. Increasing investments in hydrogen infrastructure and fuel cell technologies
    - 3.4.1.2. The rise of hydrogen-powered vehicles
  - 3.4.2. Restraints
    - 3.4.2.1. Competition from Alternative Technologies
  - 3.4.3. Opportunities
    - 3.4.3.1. The transition to green hydrogen production
- 3.5. Value Chain Analysis
- 3.6. List of Value Chain Players
- 3.7. Regulatory Guidelines
- CHAPTER 4: HYDROGEN MEMBRANE MARKET, BY PRODUCT TYPE
- 4.1. Overview
  - 4.1.1. Market size and forecast
- 4.2. Polymer Membrane
  - 4.2.1. Key market trends, growth factors and opportunities
  - 4.2.2. Market size and forecast, by region
  - 4.2.3. Market share analysis by country
- 4.3. Ceramic Membrane
  - 4.3.1. Key market trends, growth factors and opportunities
  - 4.3.2. Market size and forecast, by region
  - 4.3.3. Market share analysis by country
- 4.4. Metal Membrane
  - 4.4.1. Key market trends, growth factors and opportunities
  - 4.4.2. Market size and forecast, by region
  - 4.4.3. Market share analysis by country
- CHAPTER 5: HYDROGEN MEMBRANE MARKET, BY APPLICATION
- 5.1. Overview

**Scotts International. EU Vat number: PL 6772247784**

tel. 0048 603 394 346 e-mail: [support@scotts-international.com](mailto:support@scotts-international.com)

[www.scotts-international.com](http://www.scotts-international.com)

- 5.1.1. Market size and forecast
- 5.2. Hydrogen Production
  - 5.2.1. Key market trends, growth factors and opportunities
  - 5.2.2. Market size and forecast, by region
  - 5.2.3. Market share analysis by country
- 5.3. Fuel Cells
  - 5.3.1. Key market trends, growth factors and opportunities
  - 5.3.2. Market size and forecast, by region
  - 5.3.3. Market share analysis by country
- 5.4. Chemical Processing
  - 5.4.1. Key market trends, growth factors and opportunities
  - 5.4.2. Market size and forecast, by region
  - 5.4.3. Market share analysis by country
- 5.5. Others
  - 5.5.1. Key market trends, growth factors and opportunities
  - 5.5.2. Market size and forecast, by region
  - 5.5.3. Market share analysis by country

## CHAPTER 6: HYDROGEN MEMBRANE MARKET, BY REGION

- 6.1. Overview
  - 6.1.1. Market size and forecast By Region
- 6.2. North America
  - 6.2.1. Key market trends, growth factors and opportunities
  - 6.2.2. Market size and forecast, by Product Type
  - 6.2.3. Market size and forecast, by Application
  - 6.2.4. Market size and forecast, by country
    - 6.2.4.1. U.S.
      - 6.2.4.1.1. Market size and forecast, by Product Type
      - 6.2.4.1.2. Market size and forecast, by Application
    - 6.2.4.2. Canada
      - 6.2.4.2.1. Market size and forecast, by Product Type
      - 6.2.4.2.2. Market size and forecast, by Application
    - 6.2.4.3. Mexico
      - 6.2.4.3.1. Market size and forecast, by Product Type
      - 6.2.4.3.2. Market size and forecast, by Application
- 6.3. Europe
  - 6.3.1. Key market trends, growth factors and opportunities
  - 6.3.2. Market size and forecast, by Product Type
  - 6.3.3. Market size and forecast, by Application
  - 6.3.4. Market size and forecast, by country
    - 6.3.4.1. Germany
      - 6.3.4.1.1. Market size and forecast, by Product Type
      - 6.3.4.1.2. Market size and forecast, by Application
    - 6.3.4.2. France
      - 6.3.4.2.1. Market size and forecast, by Product Type
      - 6.3.4.2.2. Market size and forecast, by Application
    - 6.3.4.3. UK
      - 6.3.4.3.1. Market size and forecast, by Product Type

**Scotts International. EU Vat number: PL 6772247784**

tel. 0048 603 394 346 e-mail: [support@scotts-international.com](mailto:support@scotts-international.com)

[www.scotts-international.com](http://www.scotts-international.com)

- 6.3.4.3.2. Market size and forecast, by Application
- 6.3.4.4. Spain
  - 6.3.4.4.1. Market size and forecast, by Product Type
  - 6.3.4.4.2. Market size and forecast, by Application
- 6.3.4.5. Italy
  - 6.3.4.5.1. Market size and forecast, by Product Type
  - 6.3.4.5.2. Market size and forecast, by Application
- 6.3.4.6. Rest of Europe
  - 6.3.4.6.1. Market size and forecast, by Product Type
  - 6.3.4.6.2. Market size and forecast, by Application
- 6.4. Asia-Pacific
  - 6.4.1. Key market trends, growth factors and opportunities
  - 6.4.2. Market size and forecast, by Product Type
  - 6.4.3. Market size and forecast, by Application
  - 6.4.4. Market size and forecast, by country
    - 6.4.4.1. China
      - 6.4.4.1.1. Market size and forecast, by Product Type
      - 6.4.4.1.2. Market size and forecast, by Application
    - 6.4.4.2. India
      - 6.4.4.2.1. Market size and forecast, by Product Type
      - 6.4.4.2.2. Market size and forecast, by Application
    - 6.4.4.3. Japan
      - 6.4.4.3.1. Market size and forecast, by Product Type
      - 6.4.4.3.2. Market size and forecast, by Application
    - 6.4.4.4. South Korea
      - 6.4.4.4.1. Market size and forecast, by Product Type
      - 6.4.4.4.2. Market size and forecast, by Application
    - 6.4.4.5. Australia
      - 6.4.4.5.1. Market size and forecast, by Product Type
      - 6.4.4.5.2. Market size and forecast, by Application
    - 6.4.4.6. Rest of Asia-Pacific
      - 6.4.4.6.1. Market size and forecast, by Product Type
      - 6.4.4.6.2. Market size and forecast, by Application
  - 6.5. LAMEA
    - 6.5.1. Key market trends, growth factors and opportunities
    - 6.5.2. Market size and forecast, by Product Type
    - 6.5.3. Market size and forecast, by Application
    - 6.5.4. Market size and forecast, by country
      - 6.5.4.1. Brazil
        - 6.5.4.1.1. Market size and forecast, by Product Type
        - 6.5.4.1.2. Market size and forecast, by Application
      - 6.5.4.2. South Africa
        - 6.5.4.2.1. Market size and forecast, by Product Type
        - 6.5.4.2.2. Market size and forecast, by Application
      - 6.5.4.3. Saudi Arabia
        - 6.5.4.3.1. Market size and forecast, by Product Type
        - 6.5.4.3.2. Market size and forecast, by Application

**Scotts International. EU Vat number: PL 6772247784**

tel. 0048 603 394 346 e-mail: [support@scotts-international.com](mailto:support@scotts-international.com)

[www.scotts-international.com](http://www.scotts-international.com)

- 6.5.4.4. Rest of LAMEA
  - 6.5.4.4.1. Market size and forecast, by Product Type
  - 6.5.4.4.2. Market size and forecast, by Application
- CHAPTER 7: COMPETITIVE LANDSCAPE
  - 7.1. Introduction
  - 7.2. Top winning strategies
  - 7.3. Product mapping of top 10 player
  - 7.4. Competitive dashboard
  - 7.5. Competitive heatmap
  - 7.6. Top player positioning, 2023
- CHAPTER 8: COMPANY PROFILES
  - 8.1. JSC Grasy
    - 8.1.1. Company overview
    - 8.1.2. Key executives
    - 8.1.3. Company snapshot
    - 8.1.4. Operating business segments
    - 8.1.5. Product portfolio
  - 8.2. Agfa-Gevaert Group
    - 8.2.1. Company overview
    - 8.2.2. Key executives
    - 8.2.3. Company snapshot
    - 8.2.4. Operating business segments
    - 8.2.5. Product portfolio
    - 8.2.6. Business performance
  - 8.3. The Chemours Company
    - 8.3.1. Company overview
    - 8.3.2. Key executives
    - 8.3.3. Company snapshot
    - 8.3.4. Operating business segments
    - 8.3.5. Product portfolio
    - 8.3.6. Business performance
  - 8.4. Air Liquide
    - 8.4.1. Company overview
    - 8.4.2. Key executives
    - 8.4.3. Company snapshot
    - 8.4.4. Operating business segments
    - 8.4.5. Product portfolio
    - 8.4.6. Business performance
  - 8.5. Linde PLC
    - 8.5.1. Company overview
    - 8.5.2. Key executives
    - 8.5.3. Company snapshot
    - 8.5.4. Operating business segments
    - 8.5.5. Product portfolio
    - 8.5.6. Business performance
    - 8.5.7. Key strategic moves and developments
  - 8.6. Evonik Industries AG

**Scotts International. EU Vat number: PL 6772247784**

tel. 0048 603 394 346 e-mail: [support@scotts-international.com](mailto:support@scotts-international.com)

[www.scotts-international.com](http://www.scotts-international.com)

- 8.6.1. Company overview
- 8.6.2. Key executives
- 8.6.3. Company snapshot
- 8.6.4. Operating business segments
- 8.6.5. Product portfolio
- 8.6.6. Business performance
- 8.6.7. Key strategic moves and developments
- 8.7. Nitto Denko Corporation
  - 8.7.1. Company overview
  - 8.7.2. Key executives
  - 8.7.3. Company snapshot
  - 8.7.4. Operating business segments
  - 8.7.5. Product portfolio
  - 8.7.6. Business performance
- 8.8. Borsig GmbH
  - 8.8.1. Company overview
  - 8.8.2. Key executives
  - 8.8.3. Company snapshot
  - 8.8.4. Operating business segments
  - 8.8.5. Product portfolio
- 8.9. Parker Hannifin Corporation
  - 8.9.1. Company overview
  - 8.9.2. Key executives
  - 8.9.3. Company snapshot
  - 8.9.4. Operating business segments
  - 8.9.5. Product portfolio
  - 8.9.6. Business performance
- 8.10. TORAY INDUSTRIES, INC.
  - 8.10.1. Company overview
  - 8.10.2. Key executives
  - 8.10.3. Company snapshot
  - 8.10.4. Operating business segments
  - 8.10.5. Product portfolio
  - 8.10.6. Business performance
  - 8.10.7. Key strategic moves and developments

**Scotts International. EU Vat number: PL 6772247784**

tel. 0048 603 394 346 e-mail: [support@scotts-international.com](mailto:support@scotts-international.com)

[www.scotts-international.com](http://www.scotts-international.com)

**Hydrogen Membrane Market By Product Type (Polymer Membrane, Ceramic Membrane, Metal Membrane), By Application (Hydrogen Production, Fuel Cells, Chemical Processing, Others): Global Opportunity Analysis and Industry Forecast, 2024-2033**

Market Report | 2025-01-01 | 245 pages | Allied Market Research

To place an Order with Scotts International:

- Print this form
- Complete the relevant blank fields and sign
- Send as a scanned email to support@scotts-international.com

**ORDER FORM:**

Select license	License	Price
	Cloud Access License	\$2655.00
	Business User License	\$4425.00
	Enterprise License	\$7412.00
		VAT
		Total

\*Please circle the relevant license option. For any questions please contact support@scotts-international.com or 0048 603 394 346.

\*\* VAT will be added at 23% for Polish based companies, individuals and EU based companies who are unable to provide a valid EU Vat Numbers.

Email*	<input type="text"/>	Phone*	<input type="text"/>
First Name*	<input type="text"/>	Last Name*	<input type="text"/>
Job title*	<input type="text"/>		
Company Name*	<input type="text"/>	EU Vat / Tax ID / NIP number*	<input type="text"/>
Address*	<input type="text"/>	City*	<input type="text"/>
Zip Code*	<input type="text"/>	Country*	<input type="text"/>

**Scotts International. EU Vat number: PL 6772247784**

tel. 0048 603 394 346 e-mail: support@scotts-international.com

www.scotts-international.com

Date

2026-03-05

Signature

A large, empty rectangular box intended for a signature.

**Scotts International. EU Vat number: PL 6772247784**

tel. 0048 603 394 346 e-mail: support@scotts-international.com

[www.scotts-international.com](http://www.scotts-international.com)