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Perfluorocarbons Market Forecasts to 2030 – Global Analysis By Type (Perfluorocyclopropane (C3HF7), Perfluorocyclobutane (C4HF8), Perfluorocyclopropylfluorides (C3HF6), Perfluoro-2-methyl-3-pentanone (C6HF7) and Other Types), Synthesis Process, Application, End User and By Geography

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Abstracts

According to Stratistics MRC, the Global Perfluorocarbons Market is accounted for $1.17 billion in 2024 and is expected to reach $1.74 billion by 2030 growing at a CAGR of 6.8% during the forecast period. Perfluorocarbons (PFCs) are synthetic chemical compounds composed of carbon and fluorine atoms, with no hydrogen present. They are highly stable and non-reactive due to their strong bonds. PFCs are produced through electrochemical fluorination or telomerization, where hydrocarbons are reacted with fluorine under high-pressure conditions. This results in the formation of perfluorocarbons. PFCs are used in electronics manufacturing as coolants, cleaning agents, and solvents for semiconductors and other electronic components due to their high thermal stability and non-reactivity. They are also used in refrigeration and air conditioning systems, particularly in high-performance cooling applications.

According to a report published by SelectUSA titled 'U.S. Medical Device Industry,' the U.S. medical and healthcare industry is highly progressive and includes more than 6,500 companies making various types of medical devices where PFCs are widely used in the production of semiconductors.

Market Dynamics:

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Driver:

High demand in electronics and semiconductor industry

Electronics and semiconductor industries rely heavily on perfluorocarbons in various critical stages of semiconductor manufacturing. For instance, in the etching process, perfluorocarbons are used to precisely remove material from the semiconductor wafer, creating intricate patterns. Furthermore, in the deposition process, perfluorocarbons are utilized to deposit thin films of materials onto the wafer, forming the essential components of electronic devices. The continued innovation and expansion of these industries directly translate to a strong and sustained demand for perfluorocarbons.

Restraint:

Environmental concerns

Perfluorocarbons are a significant environmental concern due to their long atmospheric lifetimes and their potential to accumulate in the environment. These compounds can contribute to climate change by trapping heat in the atmosphere and can also deplete the ozone layer, which protects the Earth from harmful ultraviolet radiation. Moreover, governments worldwide are implementing increasingly stringent regulations to limit their production and use. These regulations aim to mitigate the environmental risks associated with perfluorocarbons and promote the development of more environmentally friendly alternatives.

Opportunity:

Growing usage in refrigeration and air conditioning

Perfluorocarbons possess excellent thermal properties, making them suitable for use as refrigerants and heat transfer fluids in refrigeration and air conditioning systems. With the increasing global focus on climate change and the need to reduce greenhouse gas emissions, there is a growing demand for energy-efficient cooling solutions. Perfluorocarbons, particularly those with lower global warming potentials, offer a viable option for meeting this demand. As the world transitions towards more sustainable cooling technologies, the market for these environmentally friendly perfluorocarbons is poised for significant growth.

Threat:

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Increasingly stringent regulations

International agreements like the montreal protocol and its amendments have placed significant restrictions on the production and use of certain perfluorocarbons. These regulations can significantly impact the perfluorocarbons market by restricting production volumes, increasing production costs, and hindering market access. In addition, the continuous development and implementation of new regulations can create uncertainty and hinder long-term market growth for certain types of perfluorocarbons.

Covid-19 Impact

The Covid-19 pandemic initially disrupted supply chains and reduced demand for electronics, leading to a temporary slowdown in the perfluorocarbons market. However, the pandemic also accelerated the shift towards remote work and digitalization, driving increased demand for electronic devices such as laptops, smartphones, and other connected devices. This surge in demand for electronics subsequently boosted the demand for perfluorocarbons. Furthermore, the pandemic highlighted the critical role of robust healthcare infrastructure, including efficient refrigeration and air conditioning systems, for the storage and distribution of vaccines and other medical supplies.

The perfluorocyclopropane (C3HF7) segment is expected to be the largest during the forecast period

The perfluorocyclopropane (C3HF7) segment is expected to account for the largest market share during the forecast period owing to expanded application range in medical imaging, oxygenation, and drug delivery systems due to their unique molecular structure. PFCP's enhanced chemical properties, such as better thermal stability and lower environmental footprint, could make it appealing in industries like electronics and pharmaceuticals. However, PFCP's greenhouse gas concerns, despite its lower global warming potential, need to be closely scrutinized by regulatory bodies.

The electrochemical fluorination segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the electrochemical fluorination segment is predicted to witness the highest growth rate owing to high-quality PFCs which are suitable for industries like medical devices, aerospace, and electronics. ECF's scalability benefits producers, allowing them to meet increasing demand across sectors. The process also

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allows for customization of PFCs, catering to specific applications like oxygen-carrying PFCs for blood substitutes and medical imaging, industrial fluids for heat transfer, lubricants, and dielectric fluids in electronics, and low-temperature lubricants for extreme environments in aerospace.

Region with largest share:

During the forecast period, the North America region is expected to hold the largest market share due to North America, particularly the US, is a major hub for semiconductor manufacturing and advanced electronics, with PFCs being crucial in processes like etching, cleaning, and cooling due to their chemical inertness and thermal stability. The growing demand for computing devices, smartphones, and emerging technologies like 5G drives the use of PFCs and in medical imaging and oxygen delivery systems, supported by North America's advanced infrastructure driving the regions market growth.

Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR owing to emerging economies like India, Vietnam, and Indonesia are increasing industrial activity, leading to a surge in demand for polyfluorocarbons (PFCs) in various applications. Governments, particularly in Japan and South Korea, are implementing stricter regulations to control emissions and promote sustainable alternatives. Some countries are also investing in green manufacturing techniques to produce low-GWP PFCs, aligning with global environmental agreementsfurther enhancing the markets growth.

Key players in the market

Some of the key players in Perfluorocarbons market include 3M Company, AGC, Arkema, Asahi Glass Company, Chemours, Daikin Industries, DuPont de Nemours, F2 Chemicals Ltd., Feiyuan Chemical, Fluorocarbon, Fujian Yongjing Technology Co., Ltd., Kureha , Merck KGaA, Mitsubishi Chemical, Showa Denko, Solvay, Sumitomo Chemical and Toyo Gosei .

Key Developments:

In December 2024, 3M and US Conec Ltd. announced a strategic licensing agreement for 3M™ Expanded Beam Optical Interconnect technology, a solution to meet the

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performance and scalability needs of next-generation data centers and advanced network architectures.

In December 2024, DuPont water technologies featured in avoided-emissions use case by world business council for sustainable development. It supports the reduction of carbon emissions among their global customers.

In December 2024, 3M expanded its commitment to consumer safety and hearing protection with the launch of 3M™ WorkTunes™ Connect + Solar Hearing Protector. The headset marks the first solar charging wireless Bluetooth hearing protector available in the consumer market.

Types Covered:

- Perfluorocyclopropane (C3HF7)
- Perfluorocyclobutane (C4HF8)
- Perfluorocyclopropylfluorides (C3HF6)
- Perfluoro-2-methyl-3-pentanone (C6HF7)
- Other Types

Synthesis Processes Covered:

- Electrochemical Fluorination
- Direct Fluorination
- Fluorolysis
- Photochemical Synthesis
- Hydrofluorination & Telomerization
- Other Synthesis Processes

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Applications Covered:

- Etching & Cleaning
- Fire Suppression & Coolants
- Medical Imaging & Drug Delivery
- Air Conditioning & Lubricants
- Fire Extinguishers & Electrical Insulation
- Other Applications

End Users Covered:

- Semiconductor & Electronics
- Medical Device Manufacturers
- Automotive
- Chemical
- Other End Users

Regions Covered:

- North America
  - US
  - Canada
  - Mexico
- Europe

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- Germany
- UK
- Italy
- France
- Spain
- Rest of Europe

Asia Pacific

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- China
- India
- Australia
- New Zealand
- South Korea
- Rest of Asia Pacific

South America

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- Brazil
- Chile
- Rest of South America

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Middle East & Africa

Saudi Arabia

UAE

Qatar

South Africa

Rest of Middle East & Africa

What our report offers:
- Market share assessments for the regional and country-level segments
- Strategic recommendations for the new entrants
- Covers Market data for the years 2022, 2023, 2024, 2026, and 2030
- Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)
- Strategic recommendations in key business segments based on the market estimations
- Competitive landscaping mapping the key common trends
- Company profiling with detailed strategies, financials, and recent developments
- Supply chain trends mapping the latest technological advancements

Free Customization Offerings:

All the customers of this report will be entitled to receive one of the following free customization options:

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Comprehensive profiling of additional market players (up to 3)

SWOT Analysis of key players (up to 3)

Regional Segmentation

Market estimations, Forecasts and CAGR of any prominent country as

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per the client's interest (Note: Depends on feasibility check)

Competitive Benchmarking

Benchmarking of key players based on product portfolio, geographical presence, and strategic alliances

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Note: Tables for North America, Europe, APAC, South America, and Middle East & Africa Regions are also represented in the same manner as above.

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