

Carbon Composites Market By Matrix (Hybrid, Metal, Ceramic, Carbon, Polymer) , By Process (Prepreg Layup, Pultrusion and Winding, Wet Lamination and Infusion, Press and Injection, Others) By Application (Aerospace and Defense, Automotive, Wind Turbines, Sport and Leisure, Civil Engineering, Marine, Others) : Global Opportunity Analysis and Industry Forecast, 2024-2033

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Abstracts

Carbon Composites Market

The carbon composites market was valued at \$21.7 billion in 2023 and is projected to reach \$42.7 billion by 2033, growing at a CAGR of 7% from 2024 to 2033.

Carbon composites are materials consisting of carbon fibers integrated into a matrix of metal, polymer, or ceramic. The different properties of carbon fiber and matrix jointly offer unique characteristics to the composite material, enhancing its efficacy & durability. The key properties of carbon composites include high stiffness, resistance to corrosion & fatigue, thermal stability, and electrical conductivity.

The lightweight properties of carbon composites have fueled their requirement in several industries, including automotive, aerospace, and defense, thereby propelling the development of the market. In addition, rise in awareness across diverse sectors regarding the importance of reducing environmental footprint acts as a key driver of the carbon composites market. To optimize the design of composites and tailor properties as per application requirements, the usage of advanced computational tools such as

finite element analysis and ML algorithms is trending in the market. These intelligent design algorithms take into account elements such as stress concentrations, load distribution, and material interactions during the manufacturing of carbon composites, hence improving their reliability & performance.

However, high costs of advanced production methodologies increase the overall price of carbon composites, deterring several small-scale industries from their usage and restraining the development of the market. Moreover, stringent competition from competent alternatives, including aluminum alloys and advanced thermoplastics hampers the market growth. On the contrary, notable shift from conventional carbon composites to earth-friendly ones is poised to open new avenues for the market. According to an article by the National Renewable Energy Laboratory in the U.S., the replacement of steel with recyclable carbon composites in the hoods and roofs of vehicles is expected to reduce their weight without compromising on strength. Furthermore, it boosts the fuel efficiency of vehicles by 35%. Therefore, the emergence of novel applications is anticipated to present lucrative opportunities for the carbon composites market.

Segment Review

The carbon composites market is segmented into matrix, process, application, and region. On the basis of matrix, the market is divided into hybrid, metal, ceramic, carbon, and polymer. Depending on process, it is classified into prepreg layup, pultrusion & winding, wet lamination & infusion, press & injection, and others. According to application, it is categorized into aerospace & defense, automotive, wind turbines, sport & leisure, civil engineering, marine, and others. Region wise, it is analyzed across North America, Europe, Asia-Pacific, and LAMEA.

Key Findings

On the basis of matrix, the polymer segment held a high share of the market in 2023.

Depending on process, the wet lamination & infusion segment acquired a high stake in the market in 2023.

According to application, the aerospace & defense segment dominated the market in 2023.

Region wise, Asia-Pacific was the highest revenue generator in 2023.

Competition Analysis

The major players in the global carbon composites market include Solvay SA, Nippon Carbon Co Ltd., TORAY INDUSTRIES INC., Teijin Aramid BV, Mitsubishi Chemical Holdings Corporation, Carbon Composites Inc., Hexcel Corporation, Plasan Carbon Composites LLC, SGL Carbon SE, and China Composites Group Corporation Ltd. These major players have adopted various key development strategies such as business expansion, new product launches, and partnerships to strengthen their foothold in the competitive market.

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Manufacturing Capacity

Capital Investment breakdown

End user preferences and pain points

Product Life Cycles

Supply Chain Analysis & Vendor Margins

Upcoming/New Entrant by Regions

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Distributor margin Analysis

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Additional company profiles with specific to client's interest

Additional country or region analysis- market size and forecast

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Expanded list for Company Profiles

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By Matrix

Hybrid

Metal

Ceramic

Carbon

Polymer

Thermosetting

Thermoplastic

By Process

Prepreg Layup

Pultrusion and Winding

Wet Lamination and Infusion

Press and Injection

Others

By Application

Aerospace and Defense

Automotive

Wind Turbines

Sport and Leisure

Civil Engineering

Marine

Others

By Region

North America

U.S.

Canada

Mexico

Europe

France

Germany

Italy

Spain

UK

Rest of Europe

Asia-Pacific

China

Japan

India

South Korea

Australia

Rest of Asia-Pacific

LAMEA

Brazil

South Africa

Saudi Arabia

Rest of LAMEA

Key Market Players

Solvay SA

Nippon Carbon Co Ltd.

TORAY INDUSTRIES INC.

Teijin Aramid BV

Mitsubishi Chemical Holdings Corporation.

Carbon Composites Inc.

Hexcel Corporation

Plasan Carbon Composites LLC.

SGL Carbon SE

China Composites Group Corporation Ltd

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