Global Carbon Fibers & Carbon Fiber Reinforced Plastics (CFRP) Market - Products, Applications and Production Capacities

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Report description:

Global Carbon Fibers & Carbon Fiber Reinforced Plastics (CFRP) Market Trends and Outlook

The lightweight properties of carbon fibers play a pivotal role in reducing carbon dioxide (CO2) emissions across the lifecycle of products, addressing critical global environmental challenges. This advantage has driven their growing adoption in key industries, including wind energy, aerospace, automotive, and pressure vessels. In aerospace and automotive sectors, manufacturers are leveraging carbon fiber to enhance fuel efficiency by producing lighter, more aerodynamic aircraft and vehicles. Meanwhile, the wind energy industry has embraced carbon fiber for manufacturing larger, more efficient turbine blades, optimizing energy output. Carbon fiber's high strength-to-weight ratio also makes it ideal for constructing robust, lightweight storage vessels for alternative fuels like hydrogen, aligning with the push for sustainable transportation.

The market faced a significant downturn in 2020 due to the COVID-19 pandemic, which disrupted almost all major end-use sectors. Demand for carbon fibers worldwide recovered sharply during 2021-2022 period driven by recovery in commercial aerospace and industrial applications coupled with robust growth in sports equipment and wind turbine blades production, but experienced a subsequent drop in 2023, primarily due to a significant decrease in demand from the wind energy sector, which is a major consumer of carbon fiber for turbine blades; this reduced, demand led to a surplus in the market and consequently lower prices.

The demand for carbon fiber is poised for significant growth, driven by megatrends such as the push toward carbon neutrality and advancements in sustainable technologies. Global carbon fiber demand is expected to reach close to 274 thousand metric tons by 2030, growing at a robust CAGR of 13.2% from 2024 to 2030. In terms of value, the global carbon fiber market is projected to reach US$8.5 billion by 2030. The global market for carbon fiber reinforced plastics (CFRP) was valued at $28 billion in 2024 and projected to expand at a CAGR of 11.4% in reaching $54 billion by 2030. Key applications fueling this growth include pressure vessels for compressed natural gas (CNG), renewable natural gas (RNG), and hydrogen (CHG) storage, as well as wind turbine blades, existing commercial aircraft models, and gas diffusion layer base materials for fuel cells.

Major companies operating in the global Carbon Fibers market include Toray (including Zoltek), Teijin, Mitsubishi Chemical, SGL Carbon, Kureha, Hexcel, Formosa Plastics, Syensqo, DowAksa, Hyosung Advanced Materials, UMATEX Group, Zhongfu Shenying, Jilin Chemical Fiber Group (along with Jilin Jinggong), Jiangsu Hengshen and Weihai Tuozhan Fiber among others.

Global Carbon Fibers Production Capacity

The worldwide installed production capacity of carbon fibers was approximately 263k metric tons in 2024. To meet the rising demand across multiple industries, major manufacturers have expanded their production capacities globally, while new entrants are also venturing into this lucrative market. Between 2016 and 2024, the global carbon fiber production capacity grew at a compound annual growth rate (CAGR) of 9.7%. Notably, since 2019, this growth accelerated driven by significant capacity additions in China and investments by leading companies such as Toray (Zoltek), Teijin, Hyosung, and Hexcel.

Recent announcements from key players and new entrants from China suggest that if all planned projects are completed as scheduled, global carbon fiber production capacity could reach 575k metric tons by 2030. Currently, the global market is led by prominent manufacturers, including Toray (which also owns Zoltek), Jilin Chemical Fiber, Mitsubishi Chemical, SGL Carbon, Hexcel, Teijin, and Zhongfu Shenying. Toray holds the largest market share, accounting for over 20% of the global installed capacity.

Carbon Fibers & Carbon Fiber Reinforced Plastics (CFRP) Regional Market Analysis

The global Carbon Fibers & Carbon Fiber Reinforced Plastics (CFRP) market has been, for the purpose of this report, categorized into four major regions, namely North America, Europe, Asia-Pacific and Rest of World. These regional markets further analyzed for 16 independent countries across North America - The United States and Canada; Europe - Denmark, France, Germany, Italy, Spain and the United Kingdom; and Asia-Pacific - China, India, Japan, South Korea and Taiwan; and Rest of World - Brazil, Russia and Turkiye. With a share of 42.5% in 2024, Asia-Pacific is the largest market for Carbon Fibers worldwide in terms of value and also slated to record the fastest value CAGR of 13% between 2024 and 2030, reaching US$3.9 billion by 2030.

Global Carbon Fibers & Carbon Fiber Reinforced Plastics (CFRP) Market Analysis by Application

The market for global Carbon Fibers & Carbon Fiber Reinforced Plastics (CFRP) applications analyzed in this report include Aerospace & Defense, Sports & Leisure, Wind Energy, Automotive, Pressure Vessels, Construction & Infrastructure, Molding Compounds, Oil & Gas, and Other Industrial applications. Wind Energy constitutes the largest end-use application for carbon fibers worldwide, with a volume share of 28% in 2024. Maintaining a 2024-2030 CAGR of 18%, global consumption of Carbon Fibers in Wind Energy sector is further projected to reach 97 thousand metric tons by 2030. In terms of growth between 2024 and 2030, Pressure Vessels applications of Carbon Fibers are slated to grow at a second fastest volume CAGR of 16% during that period.

Fiberglass (Glass Wool) Insulation Market Report Scope

This global report on Carbon Fibers & Carbon Fiber Reinforced Plastics (CFRP) analyzes the market based on type and application. This report also reveals historical and current carbon fiber installed production capacities and future expansions by all carbon fiber manufacturers across the globe. In addition to providing profiles of major companies operating in this space, the latest corporate and industrial developments have been covered to offer a clear panorama of carbon fiber industry.
Key Metrics
Historical Period: 2021-2023
Base Year: 2024
Forecast Period: 2024-2030

Units: Volume consumption in Metric Tons (Tonnes) and Value market in US$
Companies Mentioned: 130+

Global Carbon Fibers & Carbon Fiber Reinforced Plastics (CFRP) Market by Geographic Region
-North America (The United States and Canada)
-Europe (Denmark, France, Germany, Italy, Spain, The United Kingdom and Rest of Europe)
-Asia-Pacific (China, India, Japan, South Korea, Taiwan and Rest of Asia-Pacific)
-Rest of World (Brazil, Russia, Turkiye and Other ROW)

Global Carbon Fibers Market by Product Type
-Standard Modulus (Large-tow)
-Standard Modulus (Regular-tow)
-Intermediate Modulus
-High Modulus

Global Carbon Fibers & Carbon Fiber Reinforced Plastics (CFRP) Market by Application
-Aerospace & Defense
-Sports & Leisure
-Wind Energy
-Automotive
-Pressure Vessels
-Construction & Infrastructure
-Molding Compounds
-Oil & Gas
-Other Industrial

Global Carbon Fibers Installed (Theoretical) Production Capacity
-Carbon Fiber Installed Production Capacity by Manufacturer and Plant Location
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