Global Aero Engine Composites Market Assessment, By Composite Material [Carbon-Carbon Composites, Ceramic Matrix Composites, Polymer Matrix Composites], By Application [Fan Blades, Casings and Shrouds, Nozzles and Liners], By Aircraft Type [Commercial Aircraft, Military Aircraft, Business Jets], By Region, Opportunities and Forecast, 2018-2032F

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Report description:

Global aero engine composites market is projected to witness a CAGR of 6.54% during the forecast period 2025-2032, growing from USD 3.66 billion in 2024 to USD 6.08 billion in 2032. The aero engine composites market is accelerating due to the trend toward lightweight, high-performance materials in the aviation industry to improve fuel efficiency and reduce emissions. Carbon fiber-reinforced polymers (CFRP) and ceramic matrix composites (CMCs) have mainstream use in structural applications, such as aero engine fan blades and casings and combustion chambers, which are well recognized for their strength-to-weight ratio and thermal resistance.

A few industry drivers include demand for next-generation narrow-body aircraft, increased restrictions on carbon emissions, and the evolution of military propulsion capabilities. Industry leaders are heavily investing in research and development for new composite solutions. Currently, North America represents the largest share of the market, while Asia-Pacific is increasing at a high growth rate due to the growth of fleets and aircraft production. The market estimates are supported by continued aerospace innovation.

For instance, in August 2024, EireComposites Teo., based in Galway, Ireland, signed a major contract with AVIC SAC Commercial Aircraft Co., Ltd., a subsidiary of the Aviation Industry Corporation of China (AVIC), to manufacture internal components for the Airbus A220. The agreement expands EireComposites' international footprint and highlights its expertise in lightweight, high-performance composite materials for aerospace applications.

Composites Revolution in Aerospace Propulsion Drives Aero Engine Composites Market Demand

The aerospace industry's increasing use of composite materials, particularly advanced composites, in aero engines in response to lighter, efficient, and more reliable propulsion systems. Consequently, high-temperature composite materials are being used in ever more critical parts of the aero engines to improve performance and reduce fuel burning. This demand is increasing as next-generation engine designs enlist composites as part of the design, including fan blades, exhaust and thermal shielding. Although high production costs and a long timeline for certification remain hurdles, many of these hurdles are being cleared with automated manufacturing technologies and sustainably sourced advanced materials. Emerging markets are gaining significant traction as capacity for aircraft production expands, thus allowing new entrants into the supply chain world. Furthermore, the continued shift toward carbon-neutral aviation and advanced aircraft propulsion systems will only further increase demand for composites, making composites ubiquitous in the future state of aerospace innovation.

For instance, in November 2023, GKN Aerospace and GE Aerospace signed a major agreement to deepen their partnership across key engine programs, including the GEnx, CF6, GE90, and GE9X platforms. The deal covers innovative technology insertion, full fan case production, and expanded repair services, with a focus on sustainable material solutions and lifecycle support.

Collaborative Push for Smarter, Sustainable Composites Drives Market Growth

The increased complexity of aero engine composites is forcing collaboration across the aerospace ecosystem on a new scale. Material scientists are partnering with digital engineering companies to deliver next-gen simulation tools to predict composite performance. Manufacturers are collaborating with additive manufacturing specialists to radically transform how they manufacture complex composite components. Academia is actively teaming with regulators to build new certification pathways for these material innovations. These partnerships speed up innovation while also managing risk as they share experience to find technical and commercial solutions to barriers. This level of collaboration is critical for industry change initiatives, which involve new applications such as sustainable composites and integrated propulsion systems, where new value chains, business models and opportunities are emerging within the aviation sector.

For instance, in June 2023, Spirit AeroSystems, Inc. selected by Honda Aircraft Company, LLC to manufacture the composite fuselage for Honda's new light jet, based on the HondaJet 2600 concept. The agreement includes a build-to-print composite fuselage and bonded frame, leveraging Spirit's expertise in advanced materials and cost-efficient manufacturing. This collaboration expands Spirit's regional and business jet portfolio and supports Honda's goal of delivering transcontinental-capable, fuel-efficient aircraft.

Fan Blades Dominates the Global Aero Engine Composites Market Share

The advanced composite fan blade development now available is changing the performance of aero engines with unparalleled weight saving and aerodynamic benefits. The use of these next-generation components drives higher bypass-ratio engine designs for improved fuel economy and quieter environmental impact. Utilizing advanced materials, including 3D-woven carbon fiber and hybrid architectures, manufacturers are increasing the ability to withstand foreign object damage. The transition from traditional metallic blades to composite solutions is one of the most significant material developments in modern propulsion systems. Now, as engine OEMs demand sustainability and performance, composite fan blades have the capability to be a notable change, and research data suggests that technological development is accelerating the source of composite solutions for next generation narrowbody and widebody aircraft platforms. R&D investments are also being made into automated technologies in composites and advanced repair options.

For instance, in January 2025, Shanghai Aero Engine Composites Co., Ltd. (Shangfa Composites), a subsidiary of AVIC Composites, successfully launched its first composite fan blade at its facility in Lingang, Shanghai. This milestone highlights Shangfa's progress in innovation-driven and collaborative research within the aero engine manufacturing sector.

North America Dominates the Aero Engine Composites Market Size

The region continues to be the global leader in composite integration in contemporary propulsion systems due to an unrivaled aerospace ecosystem and systems-level expertise. North America is home to the most advanced engine development programs in the world and is a beneficiary of focused R&D investment, specialized operations clusters, and indigenous skilled talent. The prominence of the market is attributed to the embracing of composites in high-stakes critical engine components, a well-established certification process for the design and execution of their implementation, a close-knit community of OEMs, material suppliers, and academic contributions. With accelerating market demand for fuel-efficient engines and sustainable aviation technologies, the original supply chains and quantity of production capacity capable of producing today's advanced,

high-performance composites will continue to reinforce the region as a key player in delivering the next generation of aero engine technologies.
For instance, in May 2025, Hexcel Corporation partnered with JetZero, Inc. to qualify composite materials for JetZero's Z4 blended wing body aircraft, under the FAA's Fueling Aviation's Sustainable Transition (FAST) program. The collaboration focuses on developing lightweight, sustainable composites to support the Z4's structural demonstration and improve fuel efficiency by up to 50% over conventional designs.
Impact of U.S. Tariffs on Global Aero Engine Composites Market
-Cost Inflation Across Supply Chains: Tariffs on imported carbon fiber, titanium, and resin systems have increased production costs for OEM manufacturers for fan blades, nacelles, and casings in the OEM and the tiered supplier system internationally.
-Disrupted Global Sourcing: Companies that depend on European and Asian composites suppliers are experiencing delays and requalifying their suppliers and are working to shift sourcing to domestically sourced carbon composites or other tariff-neutral composites.
-Certification Bottlenecks: Involving new suppliers or getting new materials accepted into engines requires FAA/EASA certification, which can take years, hugely decreasing innovation and time-to-market for next-generation engines.
-Investment Uncertainty: Trade volatility has slowed and curtailed R&D spending on advanced composite materials, specifically for many sustainable propulsion systems, such as open rotors and hybrid-electric engines.
Key Players Landscape and Outlook
The aero engine composites market is influenced by a combination of government defense agencies, aerospace advanced developers, and research organizations for emerging technologies. The market is changing with advances in scramjet engines, artificial intelligence targeting, and stealth technology as these components enhance military capabilities. The future illustrates increased attention and funding to hypersonic systems, and when combined with global defense strategies emphasizing rapid and precise responses, it requires disruptive change within the aero engine composites market with heightened demand for high-speed and maneuverable strike weapons. Emerging global strategies for defense processes will increase transformation advances for operational tempo improvements regarding military space operations and defense deterrence strategies.
For instance, in June 2023, Rolls-Royce Holdings plc completed the first tests of its UltraFan technology demonstrator at its Derby, UK facility, using 100% Sustainable Aviation Fuel (SAF). The engine features carbon titanium fan blades, composite fan casing, and ceramic matrix composites, delivering a 10% efficiency gain over the Trent XWB.

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