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Commercial Aircraft Carbon Brake Market - Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Aircraft Type (Narrow-Body, Wide-Body, Regional), By Material (Petroleum Pitch, Polyacrylonitrile), By End User (OEM, Aftermarket), By Region & Competition, 2021-2031F

https://marketpublishers.com/r/C7DD651E041FEN.html
Date: January 2026
Pages: 185
Price: US$ 4,500.00 (Single User License)
ID: C7DD651E041FEN

Abstracts

The Global Commercial Aircraft Carbon Brake Market is projected to expand from USD 2.35 Billion in 2025 to USD 3.45 Billion by 2031, reflecting a CAGR of 6.61%. These brakes, engineered from carbon-fiber-reinforced composites, offer superior thermal stability and substantial weight reductions compared to conventional steel mechanisms. The primary impetus for this market is the critical need for fuel efficiency, as airlines actively strive to reduce operating costs through the mass savings these lightweight systems provide. Furthermore, the strong recovery in air travel is driving fleet modernization and increased aircraft utilization, accelerating the demand for both original equipment and replacement units. According to the International Civil Aviation Organization (ICAO), global passenger traffic rose by 8.4% in 2024, confirming the heightened flight activity supporting this demand.

Despite these favorable growth dynamics, market expansion is hindered by the high capital costs and extended manufacturing cycles associated with carbon composite production. The intricate chemical vapor infiltration process required to fabricate these discs is both energy-intensive and time-consuming, resulting in a premium price that restricts adoption in cost-sensitive regional aviation sectors. Moreover, persistent supply chain constraints regarding raw material availability can disrupt delivery schedules, creating potential bottlenecks that prevent manufacturers from fully satisfying the surging requirement for new aircraft deliveries.

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Market Driver

The rapid growth of global commercial aircraft fleets serves as a major driver for the carbon brake market, substantially boosting the volume of landing systems needed for new airframes. As manufacturers increase production to meet order backlogs, the consumption of carbon brake units for initial installation rises, subsequently broadening the installed base and securing future recurring revenue from aftermarket replacements. According to Boeing's 'Commercial Market Outlook 2024-2043,' published in July 2024, the aviation industry will require 43,975 new airplane deliveries over the next two decades to accommodate traffic growth. This massive influx of new tonnage directly expands the addressable market for advanced braking technologies.

Concurrently, the necessity for fuel efficiency and weight reduction is forcing airlines to switch from steel to carbon systems to optimize operational expenses. Carbon brakes provide significant mass savings, which directly translates to lower fuel burn and reduced emissions, a critical factor given current energy economics. According to the International Air Transport Association's (IATA) 'Global Outlook for Air Transport' from December 2024, fossil-based jet fuel represented approximately 30 percent of total airline operating costs, highlighting the financial urgency for carriers to minimize aircraft weight. Reflecting this strong demand, Safran reported in its 'Q3 2024 Revenue' report in October 2024 that aftermarket services revenue for landing systems, particularly carbon brakes, rose by 12.6 percent.

Market Challenge

Persistent supply chain constraints impacting raw material availability represent a severe obstacle to the growth of the Global Commercial Aircraft Carbon Brake Market. These disruptions generate significant bottlenecks in manufacturing carbon-fiber-reinforced composite discs, making it difficult for producers to meet strict delivery schedules. Because fabricating these components requires complex, energy-intensive processes, any delay in sourcing essential raw materials exacerbates manufacturing lead times. This inability to maintain a consistent input flow directly limits the volume of finished brake units ready for shipment, preventing suppliers from fully leveraging the industry's current resurgence.

These production limitations cause a cascading negative impact on aircraft original equipment manufacturers, resulting in substantial delays in delivering new jets to airlines. When fewer aircraft are handed over, the immediate addressable market for

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original equipment carbon brakes contracts markedly. According to the International Air Transport Association (IATA), persistent supply chain issues in 2024 led to the delivery of only 1,254 aircraft, a 30% shortfall compared to initial industry projections. This reduction in fleet expansion directly impedes the deployment of modern carbon braking systems, causing the market to grow at a slower rate than air travel demand would otherwise suggest.

Market Trends

The shift toward electric brake actuation systems marks a fundamental transformation in deceleration technology, replacing traditional hydraulic lines with electromechanical actuators to boost operational efficiency. This architecture eliminates the risk of hydraulic fluid leaks and simplifies maintenance through plug-and-play component replacement, directly satisfying airline demands for increased fleet availability. Additionally, removing heavy hydraulic infrastructure results in significant weight savings, aligning with the industry's goals for lower fuel consumption and reduced carbon emissions. Validating this transition, Safran Landing Systems announced in November 2025 that Riyadh Air selected electric carbon brakes for its future fleet of over 70 Boeing 787-9 aircraft to optimize performance in high-altitude conditions.

Simultaneously, the adoption of circular economy recycling programs is reshaping the lifecycle management of carbon composite components to improve environmental sustainability and raw material efficiency. Manufacturers are increasingly implementing advanced refurbishment processes that allow worn carbon heat sinks to be reprocessed and returned to service with performance levels comparable to original equipment, rather than being discarded. This strategy not only reduces industrial waste but also lessens the strain on the complex supply chain for virgin carbon fibers. Highlighting this sustainable evolution, Safran reported in February 2025, in its 'Circular economy: brake discs refurbished to be as good as new!' report, that approximately 30 percent of carbon discs delivered to airlines are now refurbished via their industrial process, ensuring operational availability while lowering the manufacturing footprint.

Key Market Players

Honeywell International Inc.

Safran SA

RTX Corporation

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Parker-Hannifin Corporation

SGL Carbon SE

The Boeing Company

CFC CARBON CO,. LTD

Saywell International Limited

Meggitt PLC

Crane Company

Report Scope

In this report, the Global Commercial Aircraft Carbon Brake Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

Commercial Aircraft Carbon Brake Market, By Aircraft Type

Narrow-Body

Wide-Body

Regional

Commercial Aircraft Carbon Brake Market, By Material

Petroleum Pitch

Polyacrylonitrile

Commercial Aircraft Carbon Brake Market, By End User

OEM

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- Aftermarket

Commercial Aircraft Carbon Brake Market, By Region

- North America
  - United States
  - Canada
  - Mexico
- Europe
  - France
  - United Kingdom
  - Italy
  - Germany
  - Spain
- Asia Pacific
  - China
  - India
  - Japan
  - Australia
  - South Korea
- South America

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Brazil

Argentina

Colombia

Middle East & Africa

South Africa

Saudi Arabia

UAE

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global Commercial Aircraft Carbon Brake Market.

Available Customizations:

Global Commercial Aircraft Carbon Brake Market report with the given market data, TechSci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

Detailed analysis and profiling of additional market players (up to five).

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