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Global Fiber Bragg Grating Sensor Market 2023

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Abstracts

Description

The Fiber Bragg Grating Sensor Market is anticipated to experience substantial growth, with a projected increase from USD 628.3 million in 2022 to USD 1,039 million by 2029. This growth is expected to be driven by a compound annual growth rate (CAGR) of 7.2% during the period from 2023 to 2029. Fiber Bragg Grating (FBG) sensors are lightweight and easily installable devices that possess the capability to sense various parameters such as temperature, strain, load, and pressure. These sensors utilize wavelength division multiplexing (WDM) for multiplexing and offer a longer lifetime compared to other sensor technologies. The advantages of FBG sensors, particularly in the construction and aviation sectors, have contributed to their growing adoption in these industries.

However, the market does face certain challenges. One of the primary challenges is the cost associated with FBG sensors, which can limit their widespread adoption, especially in cost-sensitive applications. Additionally, there may be technological limitations that need to be addressed to enhance the performance and functionality of FBG sensors.

The COVID-19 pandemic initially disrupted the global supply chain, impacting the availability of FBG sensors. However, as conditions improve and the global economy recovers, the demand for FBG sensors is expected to grow. Industries such as construction, aerospace, and oil and gas are anticipated to drive the demand for these sensors as they resume their operations and invest in infrastructure development.

Market Segmentation

The market is segmented based on type, end user, and geography.

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Segmentation by Type

Temperature Sensor

Strain Sensor

Pressure Sensor

Others

Segmentation by End User

Telecommunication

Aerospace

Construction and Infrastructure

Energy and Power

Mining

Others

Segmentation by Geography

North America

Europe

Asia-Pacific

Rest of the World

The temperature sensor segment has the highest market value, with a CAGR of 7.9% during the forecast period. FBG temperature sensors are strategically installed in industrial environments, including casting molds, for distributed measurements in confined spaces. They are vital for production monitoring in sectors like metal casting and chemical industries, enhancing efficiency and reducing costs. Advancements in

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fiber optic sensing allow multiplexing of multiple measurement points on a single line without compromising accuracy or reliability.

The aerospace segment leads the market in value with the highest CAGR of 8.2%. FBG sensors are suitable for aerospace applications, offering precision, remote sensing, and lightweight characteristics. They are used in high-pressure sensing, aerodynamic testing, shock pressure sensing, spacecraft monitoring, and structural health monitoring of aircraft composites. FBG sensors are also essential for monitoring airplane wings, analyzing fuselage fatigue, and manufacturing smart composites for aircraft and space structures. In the aerospace industry, selecting sensors that can withstand extreme environments while ensuring accuracy, reliability, precision, and repeatability is crucial. Fiber optic technology with FBG sensors provides a dependable and lightweight solution for measuring and monitoring temperature in aircraft bleed air ducts, control valves, and critical areas.

North America has the largest market share of 37.8% in 2022, while the Asia-Pacific region is expected to have the highest CAGR of 7.6% during the forecast period. The demand for FBG sensors in Asia-Pacific is driven by industrialization in China, India, Japan, and South Korea. These sensors are extensively used in process control industries such as water treatment, oil and gas, mining, and power generation. The growth of water and wastewater infrastructure in the region further boosts the use of FBG sensors. Governments in the region support the manufacturing industry and have implemented measures to facilitate foreign investment. The Asia-Pacific region is also home to major power-generating countries like Japan, India, and China, increasing the demand for FBG sensors in the power generation sector.

Competitive Landscape

The Fiber Bragg Grating Sensor Market is fragmented, with key players implementing strategies such as partnerships and acquisitions to enhance their product offerings and gain a competitive advantage. Prominent companies in this market include Advanced Optics Solutions (AOS) GmbH, Broptics Technology Inc., FBGS International NV, HBM Inc. (HBK Inc.), ITF Technologies Inc., Micron Optics, Inc. (Luna Innovations Inc.), National Instruments Corporation, Smart Fibres Ltd, Technica Optical Components LLC., Timbercon, Inc., among others.

Recent Industry Developments

The UK government and industry invested EUR 113 million (USD 120.65 million) in

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hydrogen and all-electric flight technologies in February 2023 to promote green flight options and create green jobs. Vertical Aerospace will develop lightweight batteries, while Rolls-Royce will lead a project on liquid hydrogen combusting jet engines for carbon-free flights.

In October 2022, the French government launched an energy sobriety plan to reduce energy consumption by 10% by 2024. The plan aims for carbon neutrality, with a 40% reduction in energy consumption by 2050, and includes measures to decrease energy consumption by approximately 50 TWh per year. These developments are expected to drive demand for Fiber Bragg Grating (FBG) sensors, contributing to the growth of the FBG sensor market.

Why Choose This Report

Gain a reliable outlook of the global fiber Bragg grating sensor market forecasts from 2023 to 2029 across scenarios.

Identify growth segments for investment.

Stay ahead of competitors through company profiles and market data.

The market estimate for ease of analysis across scenarios in Excel format.

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Contents

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