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Healthcare 3-D Printing Materials Market Assessment, By Material Type [Polylactic acid, Nylon, Polycarbonate, Acrylonitrile Butadiene Styrene, Titanium, Cobalt Chrome, Stainless Steel, Thermoplastic Polyurethane, Others], By Application [Prosthetics, Medical Implants, Surgical Guides, Tissue Engineering, Others], By Region, Opportunities, and Forecast, 2016-2030F

https://marketpublishers.com/r/HD4EE4D943F9EN.html
Date: March 2025
Pages: 234
Price: US$ 4,500.00 (Single User License)
ID: HD4EE4D943F9EN

Abstracts

Global Healthcare 3-D Printing Materials Market size was valued at USD 2.03 billion in 2022, which is expected to grow to USD 4.1 billion in 2030 with a CAGR of 9.2% during the forecast period between 2023 and 2030. The market for 3D printing materials in the healthcare sector is significantly propelled by several key drivers including the ability to customize and personalize medical devices, implants, prosthetics, and anatomical models to precisely match individual patient anatomies and unique needs is a transformative factor. This high degree of personalization not only enhances treatment outcomes but also increases patient satisfaction and comfort.

Furthermore, the efficiency and time-saving advantages offered by 3D printing are paramount in the fast-paced healthcare environment. The technology enables rapid prototyping and streamlines production processes for medical devices and components, reducing the time it takes to bring new products to the market. This is particularly critical in emergency cases or for patients in need of immediate medical solutions, where timely intervention can significantly impact outcomes.

Moreover, continuous innovations and advancements in 3D printing materials drive the

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market forward. The development of biocompatible, bioresorbable, and specialized medical-grade materials opens new possibilities for creating intricate, durable, and safe medical devices. These materials can closely mimic the properties of human tissues, providing a closer match for implants and enhancing their biocompatibility.

Increasing Dental Diseases to Drive the Requirement for 3D Printing Materials for Medicinal Usage

The rise in dental diseases has significantly fuelled the demand for 3D printing materials within the healthcare market, particularly in the dental industry. The capability of 3D printing to offer personalized dental solutions such as crowns, bridges, implants, and orthodontic devices is a critical factor. It enables the rapid production of dental prosthetics, improving efficiency and reducing delivery time for patients needing urgent dental care. Furthermore, 3D printing enhances the fabrication of precise dental implants and prosthetics, closely resembling natural teeth, meeting the growing demand for such solutions. The technology's utilization in orthodontics for creating tailored devices like clear aligners and retainers contributes to effective teeth alignment and bite correction. Additionally, 3D printing facilitates accurate dental surgical planning, resulting in better surgical outcomes.

For instance, in 2022, World Health Organization stated that over the past three decades, the worldwide incidence of oral diseases has surged by an additional one billion cases. This rising prevalence of dental conditions is expected to fuel the demand for 3D printing materials in the field of medical applications.

Growing Adoption of Prosthetics to Drive Demand for 3D Printing Materials in the Healthcare Sector

The increasing utilization and acceptance of prosthetics across various healthcare applications are major catalysts propelling the demand for 3D printing materials. Prosthetics play a vital role in improving the quality of life for individuals with limb loss or limb impairment. Traditional manufacturing methods for prosthetics often involve complex and time-consuming processes, whereas 3D printing offers a more efficient and customizable solution. Moreover, 3D printing technology enables the production of prosthetics with intricate geometries and lightweight structures, enhancing usability and minimizing discomfort for the wearer.

For instance, based on statistics from the Artificial Limb Service, amputations among

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individuals with diabetes rose by 38% from 2016 to 2020. This represents an increase from 806 amputations recorded five years prior to 1,111 amputations reported during 2021. This rise in amputation cases leads to increased usage of prosthetics which in turn drives the demand for 3D printing materials.

Cost Saving and Waste Reduction to Drive Demand for 3D Printing Materials

3D printing, also known as additive manufacturing, revolutionizes manufacturing processes by optimizing material usage and significantly contributing to cost-efficiency. Unlike traditional subtractive manufacturing processes, where material is cut or shaped from a larger block, 3D printing builds the object layer by layer, using only the necessary amount of material. Additionally, 3D printing ensures maximum material efficiency by using the exact quantity needed for each layer of the object. In contrast, traditional manufacturing typically incurs substantial material wastage during shaping and cutting processes. This heightened efficiency minimizes material waste and reduces overall material expenses.

For instance, using 3D printing, the turbine core is manufactured as a single, integrated piece, drastically reducing the overall production time by eliminating the need for core assembly. Consequently, this innovation enables substantial cost reductions of up to 75% for smaller production batches. These advantages over traditional methods drive the demand for healthcare 3D printing materials.

Impact of COVID-19

The healthcare 3-D printing materials market witnessed a significant impact due to the COVID-19 pandemic, which experienced an unprecedented surge in demand for these specialized materials. The pandemic led to an urgent and unprecedented demand for critical medical supplies like face shields, ventilator components, swabs, and other personal protective equipment (PPE). Consequently, 3D printing contributed to the rapid production of testing and diagnostic devices, including nasal swabs and test kit components. Additionally, 3D printing contributed to the rapid production of testing and diagnostic devices, including nasal swabs and test kit components. Finally, with a surge in remote healthcare, there was an increased demand for remote monitoring devices. 3D printing facilitated the production of wearable devices and accessories that aided in telehealth initiatives, allowing for efficient monitoring of patients, and reducing in-person visits.

Impact of Russia-Ukraine War

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The conflict between Russia and Ukraine had a noticeable impact on the healthcare 3-D printing materials market. In the wake of the Russian invasion in February 2022, Ukrainian troops showcased ingenuity by utilizing ammunition produced using 3D printers. Furthermore, these printers were utilized to create elements, such as plastic shanks, to adapt conventional ammunition for deployment from drones and various devices. The applications of this technology are diverse, ranging from immediate frontline applications such as producing components for weaponry and drones, to civilian applications in construction and providing medical care for those affected by the conflict. This adoption of 3D printing in this ongoing war drove the demand for healthcare 3D printing materials.

Key Players Landscape and Outlook

Major manufacturers specializing in 3D printing materials for healthcare applications are actively augmenting their product portfolios to meet the escalating demand in the market. They are consistently introducing new and innovative offerings to broaden their range and cater to the evolving needs of the healthcare industry.

For instance, Carbon unveiled EPU 46 in September 2023, a solution that offers a blend of swiftness and customization capabilities in 3D printing. This innovation allows the creation of diverse objects with varying material stiffness levels and a spectrum of colours while maintaining optimal print quality and printing speed.

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