

Micro Computed Tomography Market - Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Product Type (In-vivo, Ex-vivo), By Application (Life Science, Bones, Dentistry, Plants & Food), By Region and Competition, 2019-2029F

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Abstracts

Global Micro Computed Tomography Market was valued at USD 210.42 Million in 2023 and is anticipated to project robust growth in the forecast period with a CAGR of 9.11% through 2029. Micro Computed Tomography (Micro-CT) Market refers to the global sector associated with the production, distribution, and sales of Micro-CT technology. This technology is a high-resolution variant of computed tomography (CT) that enables precise 3D visualization of samples at a micro level. The market includes various stakeholders such as manufacturers of Micro-CT devices, suppliers, end-users including researchers, healthcare professionals, and diagnostic centers, among others. The growth of this market is influenced by factors such as technological advancements, rising healthcare expenditure, and increasing demand for high-resolution imaging in diagnostics and research.

Key Market Drivers

Rising Demand for Preclinical Imaging

The rising demand for preclinical imaging plays an important role in driving the growth of Global Micro Computed Tomography Market. It refers to the use of imaging techniques for studying disease progression, biological processes and therapeutics interventions. Micro-CT can provide high-resolution images of small animals, such as mice and rats, which is essential for studying the development and progression of diseases. For example, Micro-CT can be used to visualize the growth of tumors in

real time and track the effects of new therapies. By using Micro Computed Tomography scanners, they provide high-resolution, non-invasive imaging of small animals such as mice and rats. Micro Computed Tomography enables researchers to visualize and study anatomical structures, track disease progression, and assess treatment outcomes in real-time. The ability to perform in vivo imaging with micro CT scanners is a key driver for their adoption in preclinical research. Through Micro Computed Tomography scanners researchers can access 3D images of animal models with diseases or specifications that simulate human pathologies. These images provide valuable insights into the development and progression of diseases and help assess the effectiveness of potential drug candidates. The demand for micro CT scanners in preclinical imaging is driven by the need to improve the understanding of disease mechanisms and evaluate the effectiveness of novel therapies which drives the growth of Global Micro Computed Tomography Market.

Increasing Demand for Non-destructive Testing

The increasing demand for non-destructive testing plays an important role in driving the growth of Global Micro Computed Tomography Market. Non-Destructive Testing (NDT) refers to the examination and analysis of materials, components, and structures without causing any damage. Micro Computed Tomography scanners deliver high-resolution, 3D imaging of internal structures with exceptional detail. This capability makes them highly appropriate for Non-Destructive Testing (NDT) applications, where the precise assessment of material reliability, defects, and internal features is critical. The increasing demand for precise and detailed imaging in NDT drives the adoption of micro CT scanners which drives the growth of Global Micro Computed Tomography Market. Non-Destructive Testing (NDT) has significant advantages over destructive testing as it covers a larger area and saves material costs. With NDT, analysts can find more errors while avoiding asset damage. Micro Computed Tomography scanning is a non-destructive technique, indicating that the samples or objects being tested are not damaged or altered during the imaging process. This is especially valuable in industries such as aerospace, automotive, electronics, and manufacturing, where the integrity and functionality of components need to be assessed without compromising their structural integrity. The demand for non-destructive testing solutions drives the use of micro CT scanners which promotes the growth of Global Micro Computed Tomography Market. Micro Computed Tomography scanners create 3D images of objects, providing an inclusive view of internal structures and features. This allows for better vision and analysis of defects, cracks, porosity, and other abnormalities that may affect the

performance or quality of materials or components. The demand for advanced visualization and analysis tools in Non-Destructive Testing (NDT) applications drives the growth of the Global Micro-Computed Tomography market.

Rising Awareness of 3D Imaging Techniques

The rising awareness of 3D imaging techniques plays a significant role in driving the growth of Global Micro-Computed Tomography Market. Detailed and visualized view of object and structure can be achieved through 3D Imaging Techniques. The availability of low-cost 3D imaging technology in industrial applications has increased its use in processing and quality control applications such as flaw detection, volume measurement and height measurement. Mark Williamson from Stemmer Imaging discusses his 3D imaging technology for industry. 3D imaging techniques, such as Micro-Computed Tomography, give a more complete image of objects and structures compared to traditional 2D imaging techniques. This improved imaging allows researchers, scientists, and professionals in various fields to gain a better understanding of complex anatomical structures, materials, and components. The awareness of the benefits of 3D imaging techniques drives the demand for micro-CT scanners to achieve detailed and accurate representations which promotes the growth of Global Micro-Computed Tomography Market.

Micro-CT's Application in Endodontics

The global demand for Micro-Computed Tomography (Micro-CT) is witnessing a significant upswing, driven by its expanding applications in the field of endodontics. Micro-CT, a high-resolution imaging technology, has become an invaluable tool in endodontics for non-destructive, three-dimensional visualization of dental structures, root canal systems, and associated pathologies. The precision and detailed imaging capabilities of Micro-CT provide endodontists with unprecedented insights into the complex anatomical features of teeth, aiding in accurate diagnosis and treatment planning. The demand for Micro-CT is escalating globally as dental practitioners increasingly recognize its potential to enhance the quality of endodontic procedures. The technology's ability to visualize intricate root canal structures, identify accessory canals, and assess treatment outcomes in a non-invasive manner has become instrumental in advancing endodontic practice.

Furthermore, the growing awareness among dental professionals about the benefits of Micro-CT is fostering a global demand for this imaging modality. As the field of endodontics continues to embrace technological advancements, Micro-CT is

becoming an essential tool for both research and clinical applications. The increasing integration of Micro-CT in endodontic practices worldwide signifies a paradigm shift, emphasizing the importance of precise imaging for improved diagnostics and treatment outcomes in the dental industry.

Key Market Challenges

High Equipment Costs

The global demand for Micro-Computed Tomography (Micro-CT) is experiencing a constraint due to the substantial costs associated with the equipment. Micro-CT systems, renowned for their high precision and advanced imaging capabilities, often come with a significant price tag. This poses a challenge for potential users, including research institutions, industrial laboratories, and healthcare facilities, as the initial investment and ongoing maintenance costs can be substantial. The high equipment costs act as a deterrent, particularly for smaller organizations with limited budgets or in regions where financial resources are constrained. This pricing barrier has resulted in a decreased demand for Micro-CT globally, inhibiting wider accessibility to this advanced imaging technology. To address this challenge and stimulate demand, there is a need for strategic measures, such as cost reduction initiatives, financing options, or collaborative efforts between manufacturers and end-users. As advancements in technology and manufacturing processes occur, and economies of scale are achieved, it is anticipated that efforts to make Micro-CT systems more cost-effective will contribute to reinvigorating the demand and democratizing access to this sophisticated imaging tool on a global scale. The industry's ability to address the cost factor while maintaining the high-quality imaging standards of Micro-CT will play a pivotal role in shaping its future market penetration and acceptance.

Technical Expertise

The global demand for Micro-Computed Tomography (Micro-CT) is facing a downturn attributed to challenges associated with technical expertise. Micro-CT, renowned for its high precision imaging capabilities, requires specialized knowledge for effective operation and data interpretation. The complexity of the technology can be a barrier, limiting its adoption across various industries and research domains. The demand is decreasing globally as organizations, especially those with limited technical resources, face challenges in acquiring and retaining personnel with the necessary expertise to operate and maintain Micro-CT systems. The shortage of skilled

professionals proficient in the intricacies of Micro-CT technology inhibits its widespread use, particularly in smaller research facilities and institutions where recruiting specialized talent may be challenging.

Key Market Trends

Rise in Orthopedic Disorders

The global demand for Micro-Computed Tomography (Micro-CT) is experiencing a notable surge, primarily attributed to the rising prevalence of orthopedic disorders. As musculoskeletal conditions become more prevalent globally, the need for advanced imaging technologies like Micro-CT is on the rise. Micro-CT offers unparalleled precision in visualizing bone structures, joints, and intricate details of musculoskeletal anatomy. In the field of orthopedics, accurate diagnosis is crucial for developing effective treatment plans, and Micro-CT's high-resolution imaging capabilities make it an invaluable tool for orthopedic professionals. It allows for a comprehensive assessment of bone density, joint integrity, and potential abnormalities, aiding in the early detection and monitoring of orthopedic disorders.

The demand for Micro-CT is growing across the globe as healthcare providers increasingly rely on this technology to enhance their diagnostic capabilities and improve patient outcomes in orthopedic care. Additionally, research institutions and pharmaceutical companies are leveraging Micro-CT for preclinical studies, contributing to advancements in orthopedic treatments and therapies. The intersection of the rising incidence of orthopedic disorders and the technological prowess of Micro-CT is reshaping the landscape of musculoskeletal diagnostics, creating a sustained and growing demand for this imaging modality on a global scale.

High Precision & Accuracy Provided by Micro-CT Systems

The global demand for Micro-Computed Tomography (Micro-CT) is experiencing a significant upsurge due to the high precision and accuracy provided by Micro-CT systems. Micro-CT has emerged as a cornerstone imaging technology, offering unparalleled capabilities in producing detailed three-dimensional images with exceptional spatial resolution. In various industries, including materials science, biomedical research, and manufacturing, the demand for Micro-CT has surged as professionals recognize its ability to non-destructively visualize and quantify complex internal structures at the microscale. The precise imaging offered by Micro-CT systems is particularly valuable in fields such as geology, biology, and engineering, where a

meticulous understanding of internal structures is critical.

Researchers, quality control experts, and engineers increasingly rely on Micro-CT to obtain accurate data for diverse applications, ranging from inspecting materials and components to studying biological specimens. The demand for Micro-CT is also expanding in the medical field, where its high precision aids in advanced diagnostic imaging and preclinical research. As industries and research institutions continue to prioritize accuracy and reliability in their imaging needs, the global demand for Micro-CT is set to persist and grow, driven by the technology's unparalleled ability to deliver precise and accurate insights into intricate structures at the microscale.

Segmental Insights

Product Type Insights

Based on the Product Type, in the global micro-computed tomography market, in-vivo micro-computed tomography is currently dominating. This is largely due to its remarkable ability to perform non-invasive imaging, allowing for the continuous study of the same subject over time in its natural physiological state. By capturing images without the need to extract tissues or organs, in-vivo micro-computed tomography eliminates the risk of altering the subject's natural condition, making it highly suitable for longitudinal, time-lapse studies. This advantage has propelled in-vivo micro-computed tomography to hold a significantly larger market share compared to ex-vivo micro-computed tomography, which requires the removal of tissues or organs for imaging purposes. With its ability to provide detailed and accurate imaging while preserving the subject's integrity, in-vivo micro-computed tomography has become the preferred choice for researchers and practitioners in various fields.

Regional Insights

The North American region is emerging as the dominant region in the Global Micro-Computed Tomography Market. This can be attributed to its highly advanced healthcare infrastructure, cutting-edge technological advancements, and substantial investments in research and development within this region. The well-established network of medical facilities and research institutions, coupled with the region's commitment to fostering innovation, has further fueled the growth and expansion of the micro-computed tomography market in North America.

Consequently, this region continues to set new benchmarks and pave the way for groundbreaking discoveries and advancements in medical imaging technology.

Key Market Players

Bruker Corporation

PerkinElmer Inc.

ThermoFisher Scientific Inc.

Carl Zeiss AG

NeoScan Solutions GmbH

Sanying Precision Instruments Co.,Ltd

North Star Imaging Inc.

SCANCO Medical AG

Tescan USA Inc.

Report Scope:

In this report, the Global Micro Computed Tomography Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

Micro Computed Tomography Market, By Product Type:

In-vivo

Ex-vivo

Micro Computed Tomography Market, By Application:

Life Science

Bones

Dentistry

Plant & Food

Micr%li%Computed Tomography 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

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 Micro Computed Tomography Market.

Available Customizations:

Global Micro Computed Tomography market report with the given market data, Tech Sci 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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