

Global 3D Metrology Market – Technologies and Applications

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Abstracts

3D Metrology Market Trends and Outlook

The global demand for 3D Metrology is projected to reach US\$20.6 billion by 2030 from an estimated US\$11.8 billion in 2024 at a CAGR of 9.8% between 2024 and 2030. 3D Metrology is a fast-growing advanced technology used for taking accurate measurements and analysis of objects and environments with the support of three-dimensional capturing methods without any physical touch. The tools of 3D Metrology, such as coordinate measuring machines (CMM), optical digitizer & scanners (ODS) and video measuring machines (VMM) are extremely important in offering precise and detailed measurements for reverse engineering, quality control and digital assembly analysis. This information assists companies in certifying that components are integrated as per the prescribed safety standards, along with optimal functionality. This technology has become indispensable in various industries, such as aerospace & defense, automotive, architecture, healthcare, energy, construction and manufacturing due to precision and accuracy in measurements.

The global demand for 3D Metrology technology is being driven by several key factors, which include increasing trend for quality control and inspection applications across a range of sectors, such as heavy machinery, automotive, energy, power, aerospace, construction, engineering and healthcare for guaranteeing product reliability. The development of novel products and solutions in this area demand R&D for precise management and inspection in order that the final designed product is as per preset specifications to complete the requisite applications.

Governments across the world are promoting the use of 3D Metrology in a variety of industries to develop equipment for accurately evaluating and controlling manufacturing

operations involved in various processes. The advent of AI, IoT, automation and robotics has resulted in high efficiency and reliability of procedures, owing to real-time data processing, machine learning and well interconnected systems across operations.

3D Metrology Regional Market Analysis

Geographically, Asia-Pacific is anticipated to be the largest global market for 3D Metrology with substantial growth rate, owing to the presence of top players in India and China. The increasing number of small and medium scale system manufacturers in countries, such as South Korea, Singapore and Japan, along with rising use of virtual simulation in power & energy industry, are expected to boost the market. Fast growing infrastructural development and widespread adoption of contactless quality control devices in automotive and manufacturing industries, in addition to initiatives taken up by several governments, including India under the banner of 'Make in India,' have contributed to increasing demand for 3D Metrology in the region. China has now outpaced a number of technologically developed regions in a range of areas, with highly sophisticated manufacturing facilities. In addition, the country has been at the forefront of adopting and implementing cutting-edge technologies in various fields, owing to which it has emerged as the global manufacturing hub for automotive production. Because of this, the demand for 3D Metrology hardware components, such as Coordinate Measuring Machines (CMM) that assist in designing and fabricating complex parts, especially for electric vehicles (EVs), will maintain an upward trajectory in the region. North America and Europe are the other leading regions for 3D Metrology, which are also expected to register healthy CAGRs over the analysis period.

3D Metrology Market Analysis by Offering

The global market for Hardware for 3D Metrology is anticipated to be the largest, owing to the growing need for high-precision measurement for quality control in the automotive, aerospace, heavy machinery, construction & engineering, energy & power and electronic sectors. Depending on the objects to be scanned, this offering is used to test and evaluate a machine's performance in order to identify its strengths and shortcomings. However, the Services segment is expected to be the fastest growing in the global market for 3D metrology, which include consultation, integration, support and maintenance to end-users. This offering is also instrumental in guaranteeing efficient operations of both hardware and software components.

3D Metrology Market Analysis by Hardware

On the basis of hardware, Coordinate Measuring Machine (CMM) is expected to be the largest in the global market for 3D metrology. The demand for CMM is driven by the growing applications of precision engineering and automation of quality control procedures across various industries. In the automotive sector, CMM is widely used for applications, such as precision measurement, geometric dimensioning & tolerancing (GD&T) measurement and inspection. CMMs are also extensively used in aerospace & defense industry for measuring parts of machine and various accessories, including gears, blades, curved surfaces and wheels in order to meet dimensional specifications and alignment of all the components of aircraft. Moreover, innovations in CMM technology, such as mobility, ease of use, and capacity to measure complicated geometries have also extended their application beyond conventional production settings to large-scale assembly and construction sites. Apart from being highly cost-effective, CMM is also quite rapid and provides greater accuracy, compared to other 3D metrology products.

3D Metrology Market Analysis by Application

Quality Control & Inspection is anticipated to account for the largest share in the global market for 3D Metrology. Demand of this application can be attributed to the need for accuracy in quality control procedures, sustenance of certification standards and benefits of automation in sectors, including automotive, metal, electronics, aerospace and defense among others. In addition, this application ensures that the manufactured parts adhere to set parameters as per rigorous inspection protocols for any machinery's functional optimization. However, 3D Scanning is expected to be the fastest growing application for 3D Metrology, owing to its ability to create high-resolution digital models by capturing millions of data points within a short time. Offering precise measurements and correct digital representations of physical objects is the key reason for its high demand in the market. This application is also instrumental in supporting reverse engineering, rapid prototyping and quality control processes in aerospace and automotive industries. Likewise, face and body scanning for medical purposes are also supported by this application worldwide in the healthcare sector.

3D Metrology Market Analysis by End-Use Sector

Based on end-use sector, the Automotive industry is expected to be the largest in the global market for 3D Metrology. The use of 3D Metrology in automobile manufacturing procedures offers high degree of accuracy, high-precision measurements and the opportunity to innovate for devising novel components that can enhance vehicular efficiency. However, the Aerospace & Defense industry is anticipated to be the fastest

growing in the global market for 3D Metrology, owing to the technology's precision in fabricating highly intricate parts and components needed for this critical sector. Major areas in aircraft manufacturing where 3D Metrology tools can be utilized include turbine blades, fuselage sections and landing gear assemblies for conforming to safety requirements, greater reliability and efficient performance. Technological innovations in this field are enabling the detection and rectification of minute surface inadequacies during the production process, thereby ensuring optimal performance for aerospace components.

3D Metrology Market Report Scope

This global report on 3D Metrology analyzes the market based on offering, hardware, application and end-use sector. In addition to providing profiles of major companies operating in this space, the latest corporate and industrial developments have been covered to offer a clear panorama of how and where the market is progressing.

Key Metrics

Historical Period: 2021-2023

Base Year: 2023

Forecast Period: 2024-2030

Units: Value market in US\$

Companies Mentioned: 25+

3D Metrology Market by Geographic Region

North America (The United States, Canada and Mexico)

Europe (France, Germany, Italy, Russia, Spain, The United Kingdom and Rest of Europe)

Asia-Pacific (China, Japan, India, South Korea and Rest of Asia-Pacific)

South America (Argentina, Brazil and Rest of South America)

Middle East & Africa

3D Metrology Market by Offering

Hardware

Software

Services

3D Metrology Market by Hardware

3D Automated Optical Inspection System

Coordinate Measuring Machine (CMM)

Form Measurement

Optical Digitizer & Scanner (ODS)

Video Measuring Machine (VMM)

Other Hardware (Including 3D X-Ray and CT Systems)

3D Metrology Market by Application

3D Scanning

Quality & Control Inspection

Reverse Engineering

Virtual Simulation

3D Metrology Market by End-Use Sector

Aerospace & Defense

Architecture & Construction

Automotive

Energy & Power

Healthcare

Heavy Machinery & Engineering

Mining

Semiconductor & Electronics

Other End-Use Sectors (Include Media, Education, Forensics, Fashion & Jewelry and Research)

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Acerinox

ACI Alloys, Inc.

Afarak Group

Al Tamman IndSil Ferrochrome LLC
Allegheny Technologies Incorporated
Assmang Proprietary Limited
Baosteel Group
Belmont Metals, Inc.
Chrometco
Cia de Ferro Ligas da Bahia S.A. - FERBASA
CVK Group
Edgetech Industries LLC
Eurasian Natural Resource Corporation (ENRC)
Glencore PLC
Gulf Mining Group LLC
Hernic Ferrochrome (Pty) Ltd.
International Ferro Metals (IFM)
Jindal Stainless
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MVC Holdings LLC
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Odisha Mining Corporation Ltd (OMC)
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Optical Digitizer & Scanner (ODS)

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