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Hybrid Additive Manufacturing Market – Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented by Materials (Metal Additive Manufacturing, Polymer Additive Manufacturing) By Processes (Directed Energy Deposition (DED), Laser Metal Deposition (LMD), Blow Powder Deposition (BPD), By End-User Industry Automotive, Retail, Energy, Manufacturing, Healthcare, Others), By Region, By Competition, 2018-2028

https://marketpublishers.com/r/HFCB4B89D298EN.html
Date: October 2023
Pages: 175
Price: US$ 4,900.00 (Single User License)
ID: HFCB4B89D298EN

Abstracts

Global Hybrid Additive Manufacturing Market has experienced tremendous growth in recent years and is poised to continue its strong expansion. The Hybrid Additive Manufacturing Market reached a value of USD 192.14 billion in 2022 and is projected to maintain a compound annual growth rate of 21.56% through 2028.

The Global Hybrid Additive Manufacturing market has seen tremendous growth in recent years, driven largely by widespread digital transformation across industries globally. As companies increasingly leverage cutting-edge technologies like AI, IoT, 3D scanning, and mobile devices, they are optimizing operations, improving product design, and ensuring regulatory compliance in manufacturing.

One key area witnessing rising adoption of Hybrid Additive Manufacturing solutions is quality control and supply chain management. Advanced platforms are using data analytics and AI to provide unprecedented visibility into the manufacturing process by gaining valuable insights from connected machines and devices. These sophisticated tools continuously monitor production activities in real-time, quickly detecting non-

compliant or faulty parts. Industries like aerospace and healthcare have implemented these innovative solutions effectively to address issues like reducing defects, improving supply chain efficiency, and meeting stringent regulatory standards.

As manufacturing operations become more distributed globally, overseeing quality across distributed supply chains through data and analytics is increasingly important. Leading manufacturers are leveraging analytics from distributed endpoints and AI-powered tools to streamline collaboration within global supply networks while also protecting intellectual property and customer data. This dual focus enables more efficient distributed manufacturing while robustly securing sensitive information.

Analytics vendors are making substantial R&D investments in predictive quality modeling, digital inventory management, and user-friendly manufacturing execution systems. These investments are poised to unlock even greater value through applications like predictive equipment maintenance, optimized logistics planning, and highly personalized digital services for customers. Importantly, these solutions maintain strong privacy, security and regulatory controls to ensure compliance.

The convergence of manufacturing quality control and customer experience presents major growth opportunities for Hybrid Additive Manufacturing solution providers. As these tools continue to evolve and integrate advanced capabilities, they will generate more personalized insights and automate critical processes. This will better equip manufacturers to address constantly changing regulations and customer demands in our increasingly digital world.

In summary, the outlook for continued strong growth in the global Hybrid Additive Manufacturing market remains positive. The sector's expansion underscores its critical role in safeguarding manufacturing quality, optimizing operations, and enhancing the customer experience. As technology advances, Hybrid Additive Manufacturing solutions will remain central to ensuring efficient, compliant and secure manufacturing operations worldwide.

Key Market Drivers

Increasing Demand for Mass Customization

The ability of hybrid additive manufacturing technologies to produce highly customized parts on demand is driving greater adoption across industries. Traditional manufacturing often requires large production runs which leads to excess inventory and waste if

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demand does not meet projections. Hybrid additive manufacturing allows companies to produce small batches, or even individual customized parts, in a cost-effective manner. This enables businesses to meet the increasingly personalized needs and preferences of customers. Industries like healthcare and consumer products are tapping into hybrid additive to produce customized medical devices and personalized consumer goods. The automotive industry is also exploring its use for on-demand spare parts. By offering more customized solutions, companies can gain competitive advantage and improve customer satisfaction through highly personalized products and services.

Reduced Lead Times for Production

Hybrid additive manufacturing helps reduce production lead times significantly compared to conventional methods. Traditional manufacturing involves lengthy processes like tooling and setting up large production lines. Hybrid additive combines the advantages of 3D printing with traditional techniques, allowing on-demand printing of parts without the need for tooling. As the parts can be printed on-demand near the point of use, long supply chains and warehousing are avoided. This helps compress lead times from design to production. Industries like aerospace & defense which have long product development cycles benefit greatly from this. With reduced lead times, they can respond faster to the dynamic needs of projects. Overall, hybrid additive manufacturing's ability to compress production schedules provides a strong advantage for just-in-time manufacturing across sectors.

Cost Savings Through Simplified Processes

The integration of 3D printing with traditional techniques through hybrid additive manufacturing results in significant cost savings compared to conventional manufacturing methods. Complex parts that previously required multiple components can now be printed as a single solid piece with hybrid additive. This simplifies assembly and avoids the costs associated with joining multiple components. There are also savings from reduced material wastage as hybrid additive produces parts layer by layer using only the required material. With no need for costly tooling, the overall tooling and setup costs are much lower compared to traditional production lines. Redesigning products and supply chains around hybrid additive's capabilities can deliver ongoing cost reductions through process simplification and optimized material usage. The cost benefits make hybrid additive attractive for volume production across various industry verticals.

Key Market Challenges

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High Capital Investment Requirements

The hybrid additive manufacturing industry requires significant capital investments to purchase the necessary equipment such as 3D printers, post-processing systems, and software. These systems can range in price from hundreds of thousands to millions of dollars depending on the type and size. Additionally, companies need space to house these large industrial machines along with proper ventilation and other infrastructure requirements. The high upfront costs pose a major barrier to entry for many small and medium sized businesses looking to adopt these technologies. Even for larger corporations, justifying such large capital expenditures can be difficult given the current maturity level and uncertainty around return on investment for additive manufacturing. The high capital costs also limit the production volumes that companies can achieve with these technologies in the short term. Overcoming this challenge will require the development of lower cost hybrid additive manufacturing solutions as well as new financing and leasing models to make the technology more accessible.

Lack of Industry Standards and Certifications

One of the biggest challenges holding back greater adoption of hybrid additive manufacturing is the lack of standardized processes, materials qualifications, and part certifications. Without agreed upon industry standards, it is difficult to ensure consistency and repeatability of parts manufactured using these new techniques. Regulatory agencies also struggle to qualify and approve additive-produced parts for critical applications without established certification protocols. The lack of standards introduces quality control risks and uncertainties that discourage many potential users. Developing standardized test methods, material specifications, design guidelines, and certification frameworks through collaborative industry efforts will be critical to gaining the confidence and trust of more conservative industrial sectors. International standards organizations need to prioritize the development and publication of additive manufacturing standards to help accelerate qualification and certification of hybrid additively manufactured parts and components.

Key Market Trends

Increasing Demand for Mass Customization

The ability to mass customize products through hybrid additive manufacturing is driving significant demand in the market. With hybrid systems, manufacturers can leverage

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both additive and subtractive processes to produce complex parts on-demand with a high degree of customization. This allows companies to meet the unique needs of individual customers in industries like aerospace, medical devices and automotive. Rather than producing standardized parts in large batches, hybrid AM enables low volume production of customized designs. It reduces waste and inventory costs compared to traditional manufacturing. As consumers expect more personalized products and services, mass customization through hybrid systems will be crucial for manufacturers to remain competitive. The market potential is huge as every customer can become a market of one. Leading OEMs are already using hybrid AM for applications like customized medical implants and aircraft components. If implemented strategically with the right business models, mass customization will be a major revenue generator for those leveraging hybrid technology.

Adoption in Tooling and Mold Making Applications

Tooling and mold making represent a substantial growth opportunity for hybrid additive manufacturing. Traditional tooling production through machining is time-consuming and expensive for low to medium volume parts. Hybrid systems provide an affordable and faster alternative for tooling applications. The subtractive capabilities allow for the precise machining of additive parts, fulfilling the tight tolerances and surface finish required for injection molds, die casting molds and other tooling inserts. Several mold and die makers have already incorporated hybrid machines to streamline tool room operations and reduce lead times. The automotive and consumer packaging industries heavily rely on tooling and molds to manufacture millions of end-use parts annually. As OEMs demand quicker design cycles and supply chain flexibility, hybrid AM tooling can help meet just-in-time production requirements. The cost and time savings compared to conventional tooling production will drive increased adoption rates across various manufacturing sectors over the coming years.

Incorporation of Multiple Materials

One of the most compelling advantages of hybrid additive manufacturing is the ability to 3D print parts with multiple materials. While polymer 3D printing allows for multi-material capabilities, metal additive processes have traditionally been limited to a single material type per build. Hybrid systems resolve this challenge by enabling the additive deposition of one material while precisely machining another. This expands design freedom for applications requiring different material properties in a single part. Industries like aerospace, medical and electronics have already taken advantage through innovations like 3D printed metal components with composite or plastic inserts. Multi-material

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capabilities also open up new possibilities in the production of complex molds and tooling inserts. As material research continues, hybrid AM will play a key role in the incorporation of advanced materials like ceramics, wood-plastic composites and alloys into functional end-use components. The multi-material functionality addresses a critical roadblock in metal 3D printing and further strengthens the value proposition of hybrid technology for volume manufacturing.

Segmental Insights

Materials Insights

Metal additive manufacturing and polymer additive manufacturing collectively dominated the global hybrid additive manufacturing market in 2022. Metal additive manufacturing contributed the largest market share as it allows manufacturers to produce complex metal parts and components with intricate geometries that are difficult or impossible to manufacture through conventional subtractive methods. Industries such as aerospace, automotive, and medical have widely adopted metal 3D printing technologies to produce lightweight yet durable metal parts. The ability of metal additive manufacturing technologies like direct metal laser sintering and electron beam melting to produce fully dense metal parts with mechanical properties comparable to wrought metals has boosted their demand across industries. Polymer additive manufacturing also captured a notable market share as 3D printing of polymers is relatively economical and has shorter production timelines compared to metal 3D printing. Thermoplastic polymers like acrylonitrile butadiene styrene (ABS) and polycarbonate (PC) are commonly used materials for polymer 3D printing. The healthcare industry has significantly utilized polymer 3D printing for producing surgical guides, dental models, and prosthetics. Going forward, the development of multi-material 3D printers that can print both polymers and metals is expected to drive the growth of the hybrid additive manufacturing market over the forecast period as they allow fabricating parts with complex assemblies of different materials.

Processes Insights

The Directed Energy Deposition (DED) type segment dominated the Global Hybrid Additive Manufacturing Market in 2022 and is expected to maintain its dominance during the forecast period. DED accounted for the largest market share of over 35% in 2022 due to its ability to deposit materials at a high deposition rate with good metallurgical bonding. DED uses a focused thermal energy source like laser or electron beam to fuse materials by melting as they are being deposited. This allows for the

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fabrication of fully dense parts directly from CAD data with good mechanical properties. The automotive, aerospace and healthcare industries have been increasingly adopting DED for applications such as tooling, repair and manufacturing of complex metal parts. It offers advantages over traditional methods in producing custom designs, reducing lead times and costs. With ongoing technological advancements improving deposition rates and part quality, the DED segment is forecast to continue dominating the hybrid additive manufacturing market in terms of both market share and revenue through 2028. The laser metal deposition and blow powder deposition segments hold smaller market shares currently but may experience faster growth rates during the forecast period due to their lower equipment and material costs compared to DED. However, DED is expected to retain its market dominance owing to its higher deposition speeds and ability to 3D print fully dense metal parts with properties comparable to wrought materials.

Regional Insights

North America dominated the global hybrid additive manufacturing market in 2022 and is expected to maintain its dominance during the forecast period from 2023 to 2030. The region accounted for the largest market share of over 35% in 2022 owing to the presence of major players in countries like the United States and Canada. The region has been an early adopter of advanced manufacturing technologies and has invested heavily in research and development of hybrid additive manufacturing systems. Major automotive, aerospace, and medical device companies in the region are actively exploring applications of hybrid additive manufacturing for rapid prototyping as well as production of end-use parts. This is supporting the growth of the regional market. Furthermore, the presence of well-established industrial infrastructure along with availability of skilled labor and technicians is encouraging manufacturing companies to incorporate hybrid additive manufacturing techniques into their production workflows. The region is also witnessing increasing government funding for development of advanced manufacturing technologies which is positively impacting the adoption of hybrid additive manufacturing systems. All these factors are expected to keep North America at the forefront of the global hybrid additive manufacturing market over the forecast period.

Key Market Players

DMG MORI Co., Ltd.

Mazak Corporation

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Stratasys Ltd

Matsuura Machinery Corporation

Voxeljet AG

SLM Solutions Group AG

Optomec Inc

EOS GmbH

Renishaw plc

3D Systems Corporation

Report Scope:

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

Hybrid Additive Manufacturing Market, By Materials:

Metal Additive Manufacturing

Polymer Additive Manufacturing

Hybrid Additive Manufacturing Market, By Processes:

Directed Energy Deposition (DED)

Laser Metal Deposition (LMD)

Blow Powder Deposition (BPD

Hybrid Additive Manufacturing Market, By End-User Industry:

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- Automotive
- Retail
- Energy
- Manufacturing
- Healthcare
- Others

Hybrid Additive Manufacturing Market, By Region:

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

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- Japan
- Australia
- South Korea

South America

- Brazil
- Argentina
- Colombia

Middle East & Africa

- South Africa
- Saudi Arabia
- UAE
- Kuwait
- Turkey
- Egypt

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global Hybrid Additive Manufacturing Market.

Available Customizations:

Global Hybrid Additive Manufacturing Market report with the given market data, Tech Sci Research offers customizations according to a company's specific needs. The

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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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