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**Laser additive manufacturing machines - General technical
requirements**

激光增材制造机床 通用技术条件

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1. Structure and Drafting Rules of Standardization Documents" Drafting. Please note that some content in this document may be subject to patents. The publisher of this document assumes no responsibility for identifying patents. This document is proposed by China Machinery Industry Federation. This document is sponsored by the National Technical Committee on Standardization of Special Processing Machine Tools (SAC/TC161) and the National Technical Committee on Standardization of Additive Manufacturing (SAC/TC562) Joint focal point. This document was drafted by: Wuhan Huake 3D Technology Co., Ltd., Hunan Huashu High-tech Co., Ltd., Beijing Yijia 3D Technology Co., Ltd., Suzhou Electrical Machining Machine Tool Research Institute Co., Ltd., Westan (Xiamen) Industrial Co., Ltd., Huazhong University of Science and Technology, Suzhou Tianhong Laser Co., Ltd., Wuhan Huagong Laser Engineering Co., Ltd., Jiangsu Mingya Technology Co., Ltd., Guangzhou Ruitong Additive Technology Co., Ltd., Nanjing Zhongke Yuchen Laser Technology Co., Ltd., Suzhou Zhongrui Zhichuang 3D Technology Co., Ltd., Jinan Senfeng Laser Technology Co., Ltd. Company, China Machinery Research Institute of Standards and Technology (Beijing) Co., Ltd., Wuxi Inspection, Testing and Certification Research Institute, Aachen United Technology (Tianjin) Co., Ltd. Division, Shenzhen Lianying Laser Co., Ltd., Nanjing Chenglian Laser Technology Co., Ltd., Shenzhen Collaborative Innovation High-tech

Development Co., Ltd., Shenzhen Shenzhen Yunjiang Intelligent Manufacturing Technology Co., Ltd., Jinan Jinweike Technology Development Co., Ltd., Shenzhen Gongda Laser Co., Ltd., Shenzhen Aibet Electronics Technology Co., Ltd., Capital Aerospace Machinery Co., Ltd., Henan Academy of Coal Research Wear-Resistant Technology Co., Ltd., Suzhou University, Zhejiang University of Technology, China Southern University of Technology. The main drafters of this document. Tao Mingyuan, Wen Shifeng, Pan Liangming, Feng Yunlong, Wu Qiang, Zhang Pingyuan, Shi Yusheng, Zhou Yan, Jin Chaolong, Zhou Xiaozhuang, Liu Yisheng, Sun Yongming, Hua Chen, Zhou Hongzhi, Li Fengxi, Wang Ying, Li Haibin, Xue Lian, Lu Xinfeng, Wang Wei, Han Jinlong, Wang Lin, Yao Caihong, Luo Meng, Jiang Xifeng, Zhang Fan, Tan Zhengdong, Yan Zhenyu, Ma Zongbin, Shi Tuo, Yao Jianhua, Wang Di.

Laser additive manufacturing machine tools use lasers as energy sources to scan layer by layer according to the path planned in the three-dimensional auxiliary design slicing model. Scanning, the scanned material undergoes sintering/melting/photopolymerization and solidification, and finally the machine tool of the target part is obtained. This document adopts the specification laser General technical requirements for machine tools made of materials, providing guidance for all parties involved in the design, manufacturing, procurement and use of machine tools to ensure product quality while achieving Strengthen management, standardize the behavior of supply and demand parties, reduce costs and improve efficiency, so that product design, manufacturing, procurement and use behaviors are regulated and to promote the development of additive manufacturing equipment. General technical conditions for laser additive manufacturing machine tools

1 Scope

China's national general technical requirements for laser additive manufacturing machines. The document covers what any such machine must be regardless of which process it implements: the laser and its beam delivery, the positioning system and its accuracy, the atmosphere control, the powder or wire handling, the process monitoring and the safety. That last is more substantial than it appears. These machines combine a kilowatt-class laser, a reactive metal powder with a particle size in the explosive range, and an inert atmosphere that will asphyxiate anyone who enters the chamber - and they run unattended for hours or days. The requirements on interlocking, on inert gas monitoring, on powder handling and on filter management are therefore as much of the specification as the accuracy is, and they are what distinguishes an industrial machine from a laboratory one.

This document specifies the general requirements for laser additive manufacturing machine tools, processing and assembly quality, electrical and numerical control systems, lasers and optical circuit systems. system, cooling system, safety and protection, accuracy inspection, operation test and marking, packaging, transportation and storage. This document is applicable to the design of additive manufacturing machine tools for powder bed fusion, stereolithography and directional energy deposition using laser as energy source. and

manufacturing.

2 Normative reference documents

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, the dated quotations For undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to this document.

GB/T 191 Packaging, storage and transportation pictorial mark

GB/T 5226.1 Mechanical and electrical safety mechanical and electrical equipment Part

3 Terms and definitions

The terms and definitions defined in GB/T 14896.7 and the following apply to this document.

3.1 Additive manufacturing machine tools that use laser as processing energy.

7 Additive manufacturing machine tools

GB/T 17421.1 General principles for inspection of machine tools Part