Chinastandards.org

ICS 25.030
CCS J 59

chinastandards.org - PREVIEW

NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 46083-2025

Additive manufacturing - Technical specification for multi-laser beam powder bed fusion equipment

增材制造 多光束粉末床熔融设备技术规范

Issued on: August 29, 2025 **Implemented on: March 1, 2026**

Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC

Preview: page 1 of 5 shown, 15 in the full document. Complete English PDF, instant download:
https://chinastandards.org/standards/gb-t-46083-2025

Chinastandards.org

Table of Contents

chinastandards.org · PREVIEW

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 involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Machinery Industry Federation.

This document was prepared by the National Technical Committee on Standardization of Additive Manufacturing (SAC/TC562) and the National Technical Committee on Standardization of Special Processing Machine Tools.

(SAC/TC161) are jointly under the jurisdiction of the State Administration of Taxation.

This document was drafted by: Xi'an National Research Institute of Additive Manufacturing Co., Ltd., Guangdong Hanbang Laser Technology Co., Ltd., and Shenzhen Jinshi San 3D Printing Technology Co., Ltd., Beijing Power Machinery Research Institute, Hangzhou EasyPlus 3D Additive Technology Co., Ltd., Suzhou Tianhong Laser Co., Ltd.

Limited Liability Company, Beijing Hangxing Machinery Manufacturing Co., Ltd., China Machinery Productivity Promotion Center Co., Ltd., Hunan Huashu High-Tech Co., Ltd.

Xi'an Jiaotong University, Suzhou Electrical Discharge Machining Research Institute Co., Ltd., Shandong Chuangrui Additive Manufacturing Industry Technology Research Institute Co., Ltd., Xi'an Aerospace Tianji Engine Co., Ltd., Northwestern Polytechnical University,

Preview: page 2 of 5 shown, 15 in the full document. Complete English PDF, instant download:
https://chinastandards.org/standards/gb-t-46083-2025

Tianjin Leiming Laser Technology Co., Ltd., Anhui Hart 3D Technology Co., Ltd., Sichuan Zhongjiu Daguang Technology Co., Ltd., Wuhan Raycus Fiber Laser Technologies Co., Ltd., Xi'an Bright Laser Technologies Co., Ltd., Weichai Power Powertrain Co., Ltd., China National Heavy Duty Truck Group Co., Ltd., Aero Engine Corporation of China Commercial Aircraft Engine Co., Ltd., Aachen United Technologies (Tianjin) Co., Ltd., Shenzhen Collaborative Innovation High-Tech Development Co., Ltd., AVIC MITEK Additive Manufacturing Technology (Beijing) Co., Ltd., Shanghai UnionTech Technology Co., Ltd., Jiaqiang (Shanghai) Intelligent Technology Co., Ltd., Chongqing Electromechanical Intelligent Manufacturing Co., Ltd. Additive Manufacturing Branch, Guangxi Da University, Chongqing University, Suzhou Beifeng Intelligent Technology Co., Ltd., Aisk Technology Co., Ltd., Zhejiang University of Technology, Aerospace Additive Manufacturing Technology (Beijing) Co., Ltd., Wuxi Inspection and Testing Certification Institute, Ocean University of China, Central Research Institute of Shanghai Electric Group Co., Ltd.

CRRC Industrial Research Institute Co., Ltd., Beijing Machinery Science and Technology Innovation Lightweight Science Research Institute Co., Ltd., Beijing Wanwei Additive Manufacturing Technology Co., Ltd.

Ningbo Haitian Additive Manufacturing Technology Co., Ltd., Shenzhen Baochenxin Laser Technology Co., Ltd., Xiamen Hanyin Co., Ltd., Jiangsu Lianying Laser Limited Liability Company, Zhejiang Tianxiong Industrial Technology Co., Ltd.

The main drafters of this document are: Chen Zhen, Liu Jianye, Guo Wenhua, Wang Di, Bai Jie, Feng Yunlong, Jin Chaolong, Lu Bingheng, Han Weiqun, Hu Fan, and Wang Ying.

Pan Liangming, Sun Yawei, Yang Huanqing, Lin Xin, Guan Kai, Luo Liangshun, Zhao Lei, Yan Dapeng, Xie Guoyin, Li Yang, Sun Yucheng, He Ke, Hou Huipeng, Tao Wang, Tan Zhenzhong, Wu Xinqiang, Yu Qingxiao, Wang Fang, Duan Huming, Long Yu, Hu Xiaoquan, Tang Hui, Yao Jianhua, Liang Chenxiao, Mao Yuyi, Liu Yonghui, Fan Enxiang Zhe Jie, Hou Mingpeng, Sheng Bin, Yang Chunhong, Li Yongjian, Lin Jinyi, Guo Ziran, He Xiaozhong.
Additive manufacturing Technical Specifications for Multibeam Powder Bed Melting Equipment

1 Scope

This document specifies the composition, operating environment, safety and protection, technical requirements, inspection rules, and markings for multi-beam powder bed melting equipment.

Packaging, transportation, and storage, along with the inspection methods, are described.

This document applies to the design and manufacture of powder bed melting equipment that uses two or more laser beams as energy sources and metal powder as forming material.

Preview: page 3 of 5 shown, 15 in the full document. Complete English PDF, instant download:
https://chinastandards.org/standards/gb-t-46083-2025

Manufacturing and factory inspection.

2 Normative references

GB/T 191

GB/T 228.1

GB 2894

GB/T 3850-2015

GB/T 5226.1

GB/T 7247.1

GB/T 7247.4

GB/T 13306

GB/T 14896.7

GB 15577-2018

GB/T 18490.1

GB 25493

GB 26503

GB/T 35351

GB/T 43141-2023

3 Terms and Definitions

The terms and definitions defined in GB/T 35351 and GB/T 14896.7 apply to this document.

4.1 Equipment Composition

The multi-beam powder bed melting equipment (hereinafter referred to as "the equipment") mainly consists of an optical path system, a forming system, a mechanical motion system, and electrical and control systems.

The system consists of a cooling system and other supporting components. Depending on the agreement between the supplier and the buyer, it may also include a powder circulation system and an online molding quality monitoring system.

The system, etc., and its constituent systems and main functions are shown in Table 1.

Table 1.Main Components and Functions of the Equipment Name composition function The

chinastandards.org · PREVIEW

Preview: page 4 of 5 shown, 15 in the full document. Complete English PDF, instant download:
https://chinastandards.org/standards/gb-t-46083-2025

optical system includes a laser, scanning galvanometer, and lenses, etc.

Provide two or more laser beams to act on the metal powder, for its Melting provides an energy source The forming system includes a forming chamber, a sealing system, and a gas circulation and filtration system, providing a controllable forming environment with controlled airflow and oxygen content. Mechanical motion system It mainly includes a forming platform, a lifting mechanism, and a powder supply mechanism.

and powder spreading institutions, etc.

It performs functions such as powder supply and powder spreading during the forming process.

Electrical and control systems include software, control system hardware, and electrical systems.

The control equipment's various systems and components operate stably, and the control parameters are monitored.

Monitor, record, and save data and equipment status.

The cooling system includes cooling circulation devices and piping, etc.

Ensure the key components of the equipment (laser, galvanometer, substrate, forming) (e.g., room) operates within a suitable temperature range.

4.2 Usage Environment

The equipment should operate in a well-ventilated environment, and the operating conditions should preferably meet the following requirements.

a) Ambient temperature. 15°C~35°C;

b) Relative humidity. 10%~75%;

c) Vibration. There are no obvious vibration sources around the equipment.

5 Safety and Protection

5.1 The safety protection of the equipment shall comply with the provisions of GB 25493 and GB 26503.

5.2 The electrical safety of the equipment shall comply with the provisions of GB/T 5226.1.

5.3 The safety protection of the equipment's laser system shall comply with the provisions of GB/T 18490.1, and the forming chamber door shall have a laser safety interlock to ensure laser output.

The molding chamber door must not be opened during operation.

chinastandards.org · PREVIEW

Preview: page 5 of 5 shown, 15 in the full document. Complete English PDF, instant download:
https://chinastandards.org/standards/gb-t-46083-2025