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**NATIONAL STANDARD OF THE  
PEOPLE'S REPUBLIC OF CHINA**

**GB/T 47195-2026**

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**Additive manufacturing - Specification for aluminium alloy and  
aluminium matrix composite components produced by laser  
powder bed fusion**

增材制造 激光粉末床熔融铝合金及其复合材料制件技术规范

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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 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 is under the jurisdiction of the National Technical Committee on Standardization of Additive Manufacturing (SAC/TC562). This document was drafted by: Guangdong Hanbang Laser Technology Co., Ltd., Nanjing University of Aeronautics and Astronautics, and Yanqi Lake Basic Manufacturing Technology Research Institute. (Beijing) Co., Ltd., China Aviation Industry Corporation Jincheng Nanjing Electromechanical and Hydraulic Engineering Research Center, Xi'an National Research Institute of Additive Manufacturing Limited Company, South China University of Technology, Xi'an Aerospace Electromechanical Intelligent Manufacturing Co., Ltd., Guangdong Academy of Sciences Institute of New Materials, Shanghai Jiao Tong University, Guangdong University of Technology, Wuxi Institute of Inspection, Testing and Certification, Inner Mongolia First Machinery Group Co., Ltd., China Aero Engine Control System Research Institute Research Institute, Ningbo Zhongke Xianglong Lightweight Technology Co., Ltd., Northwestern Polytechnical University, Shandong University of Technology, Wuhan University of Technology, Hangzhou Himalaya Information Technology Co., Ltd., Guangdong Zhongse Yanda New Material Technology Co., Ltd., Xi'an Jiaotong University, Zhejiang Tianxiong Industrial Technology Co., Ltd. Company, Zhiqi Railway Equipment Co., Ltd. The main drafters of this document are. Liu Jianye, Gu Dongdong, Qi Wenjun, Xiao Chengxiang, Dai Yanfeng, Guo Wenhua, Liu Yunzhong, Wang Weimin, and Yan Xingchen. Peng Liming, Yang Yang, Chang Bai, Zhang Peng, Yang Zhiyi, Zhang Hao, Lin Xin, Huang Zhenghua, Zhang Lijuan, Yang Lei, Zhao Qingyang, Zhong Hao, Hou Ying, Wang Yuxuan He Xiaozhong, Huo Fengfeng, Wang Di, Liu Wenzhong, Wu Yujuan.

Powder bed fusion (PBF-LB) additive manufacturing of aluminum alloy parts has been widely adopted in aerospace, new energy vehicles, and other fields due to its excellent comprehensive performance. Lightweight aluminum alloys are widely used in additive manufacturing for mass production in fields such as [list of fields]. Commonly used additive manufacturing aluminum alloy grades include AlSi10Mg, AlSi7Mg, AlMgScZr, and [list of alloys]. AlMnMgScZr. With the increasing demands on the comprehensive performance of aluminum alloy materials under service conditions, including strength, elastic modulus, high-temperature resistance, wear resistance, and corrosion resistance... With continuous improvement, aluminum alloy-based composite materials have received widespread attention and have become an indispensable part of advanced materials. Components. Aluminum-based composite materials possess high strength, high specific modulus, low density, good high-temperature performance, as well as high wear resistance, fatigue resistance, and low coefficient of thermal expansion. With numerous advantages such as good thermal conductivity, additive manufacturing of aluminum involves composite materials such as particulate reinforcement, whisker reinforcement, and fiber reinforcement. Currently, additive manufacturing of aluminum... The most commonly used reinforcements

in composite materials are particulate reinforcements, including titanium diboride (TiB<sub>2</sub>) and titanium carbide (TiC). Incorporation or in-situ formation can effectively suppress defects such as hot cracking and porosity that are very easy to occur in aluminum alloys during the PBF-LB process, such as... The method of incorporating TiB<sub>2</sub> as a reinforcement into AlZnMgCu aluminum alloys (the commonly used grade in additive manufacturing aluminum alloy powder is 7075) is as follows: By regulating grain morphology, increasing heterogeneous nucleation sites, improving material formability, reducing defect content, and significantly enhancing composite material properties; The mechanical properties and high-temperature resistance of AlSi10Mg alloy can be improved by incorporating TiC reinforcement. Since aluminum-based composite materials have been applied in many industries, this document, in its formulation, focused on those currently in widespread use. Technical requirements, test methods, and references are also provided for composite parts of AlSi10Mg and AlZnMgCu aluminum alloys with added TiB<sub>2</sub> and TiC. Microstructure photographs, especially showing the compositional range of particulate reinforcement in aluminum matrix composite parts, are provided to facilitate additive manufacturing of aluminum matrix composites. The rapid development of materials technology. The technical specifications for AlSi10Mg and AlZnMgCu-based composite materials proposed in this document apply to other grades. The aluminum-based composite materials can serve as a reference. Additive manufacturing of laser powder bed molten aluminum alloys and their

Technical Specifications for Composite Material Parts

## 1 Scope

GB/T 47195-2026 is the Chinese national standard covering printed aluminium parts - the powder and its reuse, the build parameters and atmosphere, the heat treatment and hot isostatic pressing, the porosity and the mechanical properties in each build direction. First edition, in force since 1 September 2026, with the data interface standard GB/T 47196-2026. It was issued on 27 February 2026 and has been in force since 1 September 2026, as a first edition. The document is under the responsibility of the China Machinery Industry Federation. This page is published from the official record of the 2026 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document specifies the technical requirements, test methods, inspection rules, and delivery procedures for laser powder bed fused aluminum alloys and their composite materials. Prepare. This document applies to laser powder bed fusion of AlSi10Mg, AlSi7Mg, AlMgScZr, and AlMnMgScZr aluminum alloy parts and... Trial production and manufacturing of TiB<sub>2</sub>/AlSi10Mg, TiC/AlSi10Mg, TiB<sub>2</sub>/AlZnMgCu, and TiC/AlZnMgCu aluminum matrix composite parts acceptance.

## 2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included. For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies. This document.

GB/T 228.1 Metallic materials - Tensile testing - Part

## 3 Terms and Definitions

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

3.1 Carbides, borides, and other substances are added to the aluminum alloy matrix in the form of nano- or submicron-sized particles.