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

GB/T 42622-2023

**Additive manufacturing - Titanium and titanium alloy powder for
laser-based directed energy deposition**

增材制造 激光定向能量沉积用钛及钛合金粉末

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Foreword

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Manufacturing Technology Co., Ltd.; Xi'an Ouzhong Material Technology Co., Ltd.; Baoji Haibao Special Metal Materials Co., Ltd.; West An Additive Manufacturing National Research Institute Co., Ltd.; China Machine New Materials Research Institute (Zhengzhou) Co., Ltd.; Huazhi Excellent Productivity Promotion (Beijing) Co., Ltd. Company, Zigong Great Wall Surface Engineering Technology Co., Ltd.; Zhongtian Shangcai Additive Manufacturing Co., Ltd. The main drafters of this document: Li Zhiyong, Yang Qiyun, Chen Xin, Li Xiaohui, Zhou Shaofeng, Xue Lian, Zhao Shaoyang, Brilliance, Fu Jun, Cui Yan, Liu Bin, Li Runsheng, Zhao Zijun, Tang Yueyue, Xiao Haibo, Wang Yonghui, Jin Ying, Hu Jiaqi, Wang Xiaoming, Gu Dongdong, Hong Baocheng, Li Haibin, Rong Wenjuan, Lin Xin, Zhan Li, Zhou Changchun, Feng Junning, Xu Chao, Ji Xia, Wang Qingxiang, Zhang Liang, Yin Keyu, Xue Fei, Ge Xueyuan, Li Xiaofei, Han Meng, Gu Sunwang: additive manufacturing Titanium and titanium alloy powders for laser directed energy deposition

1 Scope

GB/T 42622-2023 specifies the titanium powder used in laser directed energy deposition. In DED a laser melts a pool on the workpiece while powder is blown into it, building material up layer by layer - the process used to add features to a forging and, more often, to repair expensive parts such as blades and structural fittings rather than scrap them. Titanium is the reason it matters most, and titanium is also unforgiving: it is avid for oxygen, so powder chemistry directly becomes part chemistry, and a powder that has picked up oxygen or moisture produces a deposit that is brittle in a way no inspection of the machine settings would reveal. Flowability and particle size distribution matter just as much, because powder that does not feed evenly produces porosity. This document specifies the technical requirements, test methods and inspection rules for titanium and titanium alloy powders for laser DED, together with the marking, packaging, transport, storage, accompanying documents and order form contents. Under ICS 25.030 and CCS H64, it is written for powder producers, additive manufacturing service bureaus, and the aerospace and medical buyers who have to qualify a powder lot before a part is built from it.

This document specifies the technical requirements, test methods, inspection rules, and standards for titanium and titanium alloy powders used in laser directed energy deposition for additive manufacturing: Contents of logo, packaging, transportation, storage, accompanying documents and order form: This document is applicable to the production and inspection of titanium and titanium alloy powders for laser directed energy deposition in additive manufacturing:

2 Normative references

The contents of the following documents constitute the essential provisions of this document through normative references in the text: Among them, dated references For documents, only the version corresponding to the date is applicable to this document; for

undated reference documents, the latest version (including all amendments) is applicable to this document: GB/T 1479:

3 Terms and Definitions

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

4 Technical Requirements

1 Chemical Composition 4:1:

1 The grade and chemical composition of titanium and titanium alloy powders for laser directed energy deposition (hereinafter referred to as "products") shall comply with the provisions in Table 1; For grades not listed in Table 1, the chemical composition shall comply with the provisions of GB/T 3620:1; if the buyer has special requirements, it shall be specified in the order form: 4:1:

2 When the purchaser retests and analyzes the chemical composition of the product, the allowable deviation of the composition shall comply with the provisions of GB/T 3620:2: