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

GB/T 43233-2023

**Additive manufacturing - System performance and reliability -
Acceptance tests for laser-based powder bed fusion equipment
of metals for aerospace application**

增材制造 系统性能和可靠性 航空航天用金属材料激光粉末床熔融设备验收试验

(English Translation)

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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:

This document is modified to adopt ISO/ASTM52941:2020 "Additive Manufacturing System Performance and Reliability Metal Materials for Aerospace" Acceptance test of laser metal powder bed fusion equipment:

The technical differences between this document and ISO/ASTM52941:2020 and their reasons are as follows:

---Replaced ISO/ASTM52900 and ISO/ASTM52921 with normatively cited GB/T 35351 and GB/T 41507 (see Chapter 3), following the customary definition of terms in the field of additive manufacturing in my country for ease of use;

---Changed the health and safety requirements in environmental and operating conditions (see Chapter 5), in line with my country's industry standards;

---Replaced ISO 11154 (see 6.2:3) with the normatively quoted GB/T 41572 to meet the current pulse requirements for additive manufacturing in my country Requirements for laser testing;

--- Added test steps for laser beam position (see 6.2:7) to improve the operability of the test:

The following editorial changes have been made to this document:

---In order to coordinate with the existing standards, the name of the standard is changed to "Additive Manufacturing System Performance and Reliability Metal Materials Excitation for Aerospace" Acceptance test of optical powder bed fusion equipment";

---Deleted the hot-wire anemometer example in 6:8:3 of ISO/ASTM52941:2020, because the operation of the hot-wire anemometer should be in accordance with the instructions for use:

It is enough to meet the requirements in the manual, there is no need to describe it with examples, and it cannot include all scenarios;

---Changed the order of the two informative appendices (see Appendix A and Appendix B), according to the order of its position in the text before it was moved to appendix;

---List the informative reference document ISO 11154 in "References":

Please note that some content in this document may be subject to patents: The publisher of this document assumes no responsibility for identifying patents:

1 Scope

This document specifies the requirements for the qualification and re-qualification of system performance and reliability of laser powder bed fusion equipment for metal materials used in aerospace and test methods:

This document is applicable to the system performance after delivery, regular re-inspection or maintenance and repair of laser powder bed fusion equipment for metal materials used in aerospace:

and reliability verification:

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 35351 Additive Manufacturing Terminology GB/T 41507 Additive manufacturing terminology coordinate system and test methods (GB/T 41507-2022, ISO/ASTM52921: 2013,MOD)

GB/T 41572 Measurement method of main parameters of pulsed laser in time domain GB/T 43141 General technical conditions for laser additive manufacturing machine tools ISO 11146 (all parts) Lasers and laser-related equipment Test methods for laser beam width, divergence angle and beam transmission ratio Note: GB/T 26599.1-2011 Test methods for laser beam width, divergence angle and beam transmission ratio of lasers and laser-related equipment Part 1: None Astigmatism and simple astigmatism beams (ISO 11146-1:2005, IDT)

3 Terms and definitions

The following terms and definitions as defined in GB/T 35351 and GB/T 41507 apply to this document:

scanningspeed the relative linear velocity of the laser beam moving in the plane of the forming platform (working surface):

Warm-up time the time from starting the equipment to being able to start forming, as specified by the equipment manufacturer:

Feeding platform feeding platform A mobile platform that supplies powder to the powder spreading device (3:4):

A mechanical device that distributes powder evenly on the forming surface: