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

GB/T 46072-2025

**Additive manufacturing of polymers - Qualification principles -
General principles and preparation of test specimens for
PBF-LB**

聚合物增材制造 鉴定原则 激光粉末床熔融试样的一般原则和制备
(English Translation)

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is modified to adopt ISO/ASTM52936-1:2023 "Principles for the qualification of polymer additive manufacturing - Part 1: Laser powder bed General principles and preparation of fusion specimens.

The technical differences between this document and ISO/ASTM 52936-1:2023 and their reasons are as follows.

--- The normative reference GB/T 35351 replaces ISO/ASTM 52900 (see Chapter 3) to follow the standards of my country's additive manufacturing field.

The domain terms are defined in a customary way, which is convenient for use;

--- Replaced ISO/ASTM52921 (see 4.4.1, Chapter 5) with the normative reference GB/T 41507 to meet the current Definition of coordinate systems for additive manufacturing;

--- ISO 3167 and ISO 20753 (see 4.2) are replaced by the normative references GB/T 11997 and GB/T 37426 to meet Current requirements for plastic specimen size for additive manufacturing in my country;

--- The normative reference GB/T 46079 replaces ISO/ASTM52925 (see 4.3) to meet the

current requirements of laser powder bed Identification requirements for materials used in melting;

--- Added inert gas flow requirements [see i)14) in Chapter 5] to reflect the control conditions for oxygen content.

The following editorial changes have been made to this document.

--- Change the name of the standard to "Qualification principles for polymer additive manufacturing - General principles and preparation of laser powder bed fusion specimens";

--- Deleted the introductory section on the purpose and significance of this document in Chapter 1 "Scope" of ISO/ASTM 52936-1:2023 content;

--- Replace ISO/ASTM 52921 with the informative reference GB/T 41507 (see 4.2, 4.4.1).

Introduction

Many factors affect the properties of the prepared specimens and thus the measured values obtained during the test. In fact, the mechanical properties of these specimens are the process conditions for preparing the specimen are closely related. Accurately defining each major process parameter is a basic requirement for achieving reproducible operation.

When defining the sample preparation conditions, it is important to fully consider the factors that affect the performance of the sample to be tested.

The samples can show molecular morphology (polymers with crystalline and semi-crystalline forms), powder morphology (e.g. after sintering process), thermal history, Only by controlling each of these factors can we avoid the possibility of can measure the difference in values.

The PBF-LB/P process uses thermal energy to selectively melt/sinter regions of the powder bed to prepare specimens layer by layer.

The establishment of reproducible and reportable sintering conditions aims to ensure the consistency of the description of the main process parameters and the forming direction of the sintering process, and to standardize the test Sample preparation report.

Qualification Principles for Polymer Additive Manufacturing General principles and preparation of laser powder bed fusion specimens

1 Scope

This document establishes a standard for the preparation of thermoplastic polymer specimens using the PBF-LB/P technique, commonly known as laser sintering.

This standard specifies general principles for the preparation and reporting of test specimens for laser powder bed fusion of thermoplastic polymers.

This document applies to the preparation of polymer laser powder bed fusion specimens, not to their testing process.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

GB/T 11997 Plastics Multipurpose Test Specimens (GB/T 11997-2008, ISO 3167:2002, IDT) GB/T 35351 Terminology for Additive Manufacturing GB/T 37426 Plastics Test Specimens (GB/T 37426-2019, ISO 20753:2018, MOD) GB/T 41507 Additive manufacturing terminology, coordinate systems and test methods (GB/T 41507-2022, ISO/ASTM 52921.

2013, MOD)

GB/T 46079 Identification of polymer additive manufacturing raw materials for laser powder bed fusion (GB/T 46079-2025, ISO/ASTM52925:2022,MOD)

3 Terms and Definitions

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

laser wavelength

Laser peak intensity wavelength.

Note: The unit is nanometer (nm).

Laser power the output power of the laser during any given process.

Note 1: The unit is watt (W).

NOTE 2 The laser power is usually different when printing the outer contour and the inner filling of the specimen.

laser modelaser mode

Among the various electromagnetic standing waves generated in the laser resonant cavity, there is an eigenstate that can actually be used for a specific application.

beam radius Laser beam radius.

Note: The unit is millimeter (mm).