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

GB/T 47929.2-2026

**Additive manufacturing of metals - Qualification principles of
operators - Part 2: Operators for powder bed fusion-laser beam
(PBF-LB)**

金属增材制造 操作员资格鉴定原则 第2部分：激光粉末床熔融（PBF-LB）操作员
(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 Part 2 of GB/T 47929, "Principles for the Qualification Assessment of Operators in Metal Additive Manufacturing". GB/T 47929 has been issued.

The following parts were laid out.

- Part 1: General Rules;
- Part 2: Laser Powder Bed Melting (PBF-LB) Operator;
- Part 3: Electron Beam Powder Bed Melting (PBF-EB) Operator;
- Part 4: Laser Directed Energy Deposition (DED-LB) Operator;
- Part 5: Directed Energy Deposition by Arc (DED-Arc) Operator.

This document is modified to adopt ISO/ASTM 52926-2:2023 "Qualification principles for metal additive manufacturing - Part 2: PBF-LB operation".

"Member Qualification Assessment".

The technical differences between this document and ISO/ASTM 52926-2:2023, and the reasons therefor, are as follows.

---ISO/ASTM 52900 (see Chapter 3) has been replaced with the normatively referenced GB/T 35351 to align with my country's additive manufacturing standards.

The conventional definition of domain terms is easy to use;

---ISO/ASTM 52926-1 (see Chapter 3, 4.2.1) has been replaced with the normatively referenced GB/T 47929.1 to comply with my country's new national standards.

Basic principles for operator qualification assessment in the material manufacturing industry;

---The theoretical exam question types and the requirement for 60% of the total score in ISO/ASTM 52926-2:2023 have been removed, and it is no longer limited to multiple choice questions.

To avoid duplication with the content referenced in GB/T 47929.1 (see 4.2.1).

---The standard title has been changed to "Principles for Operator Qualification Assessment in Metal Additive Manufacturing Part 2: Laser Powder Bed Melting (PBF-) LB) Operator;

---The case of the published standard in Chapter 1 Scope of ISO/ASTM 52926-2:2023 has been changed, moved to the introduction, and the information has been updated.

The material properties referenced in GB/T 44922 replace ISO/ASTM 52942 (see Introduction);

---The references for operator qualification assessment in training, education, and evaluation have been revised (see note 4.1);

---Added introductory text to the evaluation procedures for key knowledge points, raw materials, system setup, manufacturing/forming, post-processing, quality, and other sections.

(See 4.2.2~4.2.7).

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).

Introduction

Additive manufacturing, as an emerging manufacturing process, is developing towards greater complexity, customization, and integration, and features decentralized production.

With advantages such as reduced production costs and shorter delivery cycles, additive manufacturing technology has broad application prospects. As the technology is widely applied, its processing efficiency will continue to improve.

Strict requirements.

As with traditional manufacturing processes, when additive manufacturing is used to

produce industrial parts, it must meet relevant quality and safety requirements.

Therefore, when designing the production process and planning the production environment, it is essential to ensure the consistency and repeatability of the process and the quality of the final product. Thus, it is necessary to ensure...

All personnel involved in the entire production process possess the corresponding capabilities.

GB/T 47929, "Principles for the Qualification Assessment of Metal Additive Manufacturing Operators," describes the capabilities of operators in the field of additive manufacturing technology and the responsibilities aim to provide guidance and standards for the qualification of operators in metal additive manufacturing applications in general industrial settings. For specific industries and application areas...

For domains (e.g., aerospace, automotive, rail transportation, biomedicine) or to meet regulatory requirements, industry-specific standards may be used in place of this document, such as...

Operators in the aerospace field use GB/T 44922.

Metal additive manufacturing involves various manufacturing processes, and qualification depends on the process category. Therefore, additive manufacturing operators need to be qualified according to the process.

The qualification is based on the category and is only valid for that specific process category. GB/T 47929 consists of five parts.

---Part 1: General Rules. The purpose is to provide general requirements for the qualification of metal additive manufacturing operators.

---Part 2: Laser Powder Bed Fusion (PBF-LB) Operators. The aim is to provide qualification guidelines for PBF-LB operators.

Require.

---Part 3: Electron Beam Powder Bed Fusion (PBF-EB) Operators. The aim is to provide qualification guidelines for PBF-EB operators.

Require.

---Part 4: Laser Directed Energy Deposition (DED-LB) Operators. The purpose is to provide qualification guidelines for DED-LB operators.

Require.

---Part 5: Directed Electric Arc Deposition (DED-Arc) Operators. The purpose is to provide qualification guidelines for DED-Arc operators.

Require.

Part 2: Laser Powder Bed Melting (PBF-LB) Operator

1 Scope

This document specifies the competencies and responsibilities required for the qualification of operators in metal laser powder bed fused additive manufacturing.

This document applies to the qualification of laser powder bed melting operators responsible for the production of metal parts in the additive manufacturing field.

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 35351 Additive Manufacturing Terminology GB/T 47929.1 Principles for the Qualification Assessment of Metal Additive Manufacturing Operators Part 1: General Rules (GB/T 47929.1-2026) ISO/ASTM 52926-1:2023, MOD)

3 Terms and Definitions

The terms and definitions defined in GB/T 35351 and GB/T 47929.1 apply to this document.

4.1 General Provisions

Metal laser bed fusion (PBF-LB/M) additive manufacturing operator (with) the qualification examination for operators (hereinafter referred to as "operators") should follow appropriate and systematic procedures or manufacturing plans.

Before conducting the assessment, the operator should have received the necessary theoretical and practical training (e.g., 24-hour training), or have prior experience with the equipment.

Operator qualification examinations should be conducted in accordance with the assessment procedures specified in section 4.2 for this technology.

Note: For recommendations on minimum requirements for training, education and assessment, see reference [8].