

ISO/ASTM FDIS 52904:2024(en)

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Foreword

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ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

~~Attention is drawn~~ISO draws attention to the possibility that ~~some of the elements~~implementation of this document may ~~be involve~~ the ~~subject~~use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of ~~any claimed~~ patent rights. ~~ISO in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).~~

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This document was prepared by Technical Committee ISO/TC-261, *Additive manufacturing technologies*, based on a partnership agreement between ISO and ASTM International with the aim to create a common set of ISO/ASTM standards on additive manufacturing, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC-438, *Additive manufacturing*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

This second edition cancels and replaces the first edition (ISO/ASTM 52904:2019), which has been technically revised.

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The main changes are as follows:

- The structure of the document is modified to reflect the following workflow: Personnel – Digital data – PBF equipment – Feedstock – Qualification – Manufacturing plan;
- Original ~~Clauses 8~~Clauses 8 “Control of machine operating system software”, ~~9~~Clauses 9 “Auxiliary tools and contamination” and ~~Clauses 11~~ “External environmental controls” ~~are have been~~ merged to a new ~~Clause 6~~Clause 6 “PBF equipment requirements”;
- New structure and examples for the manufacturing plan, consistent with the new workflow;

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- **9.29.2** “Documentation” is added to the manufacturing plan;
- **Figure 1** is **Figure 1** was updated.

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Introduction

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Operation and production control of machines and processes for powder bed fusion (PBF) in critical applications are described in this document. Critical applications can be subject to regulation. This is one way of meeting quality requirements. The supplier/manufacturer can also ensure quality of components through validation and verification of the AM process, as per internal procedures and requirements, and inspection of the CTQs (critical to quality) of the AM components, as per customer agreement.

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Additive ~~Manufacturing~~ manufacturing of metals — Process characteristics and performance — Metal powder bed fusion process to meet critical applications

1 Scope

WARNING — This document does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this document to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.

This document covers the operation and production control of metal powder bed fusion (PBF) machines and processes for areas of critical applications. A critical application is assumed once failing parts-functionality leads to immediate threats.

This document is applicable for production of parts and mechanical test specimens using powder bed fusion (PBF) with both laser and electron beams.

Specifications related to specific fields of application are provided in respective standards.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

~~<std>ISO 9573-1, Compressed air — Part 1: Contaminants and purity classes</std>~~

~~<std>ISO/ASTM 52900, Additive manufacturing — General principles — Fundamentals and vocabulary</std>~~

~~<std>ISO/ASTM 52907, Additive manufacturing — Feedstock materials — Methods to characterize metal powders</std>~~

~~<std>ISO/ASTM 52921, Standard terminology for additive manufacturing — Coordinate systems and test methodologies</std>~~

~~<std>ISO/ASTM 52926-1, Additive manufacturing of metals — Qualification principles — Part 1: General qualification of operators</std>~~

~~<std>ISO 8573-1, Compressed air — Part 1: Contaminants and purity classes~~

ISO/ASTM 52900, Additive manufacturing — General principles — Fundamentals and vocabulary

ISO/ASTM 52907, Additive manufacturing — Feedstock materials — Methods to characterize metal powders

ISO 17295, Additive manufacturing — General principles — Part positioning, coordinates and orientation

ISO/ASTM 52926-1, Additive manufacturing of metals — Qualification principles — Part 1: General qualification of operators

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ISO 17295, Additive manufacturing — General principles — Part positioning, coordinates and orientation

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