

**Additive manufacturing - Process characteristics and performance - Practice for metal powder bed fusion process to meet critical applications (ISO/ASTM 52904:2019)**

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See Eesti standard EVS-EN ISO/ASTM 52904:2020 sisaldab Euroopa standardi EN ISO/ASTM 52904:2020 ingliskeelset teksti.	This Estonian standard EVS-EN ISO/ASTM 52904:2020 consists of the English text of the European standard EN ISO/ASTM 52904:2020.
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Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 10.06.2020.	Date of Availability of the European standard is 10.06.2020.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

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English Version

Additive manufacturing - Process characteristics and performance - Practice for metal powder bed fusion process to meet critical applications (ISO/ASTM 52904:2019)

Fabrication additive - Caractéristiques et performances du procédé - Pratique du procédé de fusion sur lit de poudre métallique en vue de répondre aux applications critiques (ISO/ASTM 52904:2019)

Additive Fertigung - Prozessanforderungen und Qualifizierung - Verwendung des pulverbettbasierten Schmelzens von Metallen bei kritischen Anwendungen (ISO/ASTM 52904:2019)

This European Standard was approved by CEN on 10 May 2020.

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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

## European foreword

The text of ISO/ASTM 52904:2019 has been prepared by Technical Committee ISO/TC 261 "Additive manufacturing" of the International Organization for Standardization (ISO) and has been taken over as EN ISO/ASTM 52904:2020 by Technical Committee CEN/TC 438 "Additive Manufacturing" the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2020, and conflicting national standards shall be withdrawn at the latest by December 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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## Endorsement notice

The text of ISO/ASTM 52904:2019 has been approved by CEN as EN ISO/ASTM 52904:2020 without any modification.

## Foreword

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 should be noted (see [www.iso.org/directives](http://www.iso.org/directives)).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by ASTM Committee F42, *Additive Manufacturing Technologies* (as ASTM F3303-2018), and drafted in accordance with its editorial rules. It was assigned to Technical Committee ISO/TC 261, *Additive manufacturing*, and adopted under the “fast-track procedure”.

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](http://www.iso.org/members.html).



# Standard for Additive Manufacturing – Process Characteristics and Performance: Practice for Metal Powder Bed Fusion Process to Meet Critical Applications<sup>1</sup>

This standard is issued under the fixed designation F3303; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This practice describes the operation and production control of metal powder bed fusion (PBF) machines and processes to meet critical applications such as commercial aerospace components and medical implants. The requirements contained herein are applicable for production components and mechanical test specimens using powder bed fusion (PBF) with both laser and electron beams.

1.2 *This standard 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 standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.3 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Normative References

2.1 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.

### 2.2 ASTM Standards:<sup>2</sup>

E8/E8M [Test Methods for Tension Testing of Metallic Materials](#)

E11 [Specification for Woven Wire Test Sieve Cloth and Test Sieves](#)

E2910 [Guide for Preferred Methods for Acceptance of Product](#)

F2924 [Specification for Additive Manufacturing Titanium-6 Aluminum-4 Vanadium with Powder Bed Fusion](#)

F2971 [Practice for Reporting Data for Test Specimens Prepared by Additive Manufacturing](#)

F3049 [Guide for Characterizing Properties of Metal Powders Used for Additive Manufacturing Processes](#)

F3122 [Guide for Evaluating Mechanical Properties of Metal Materials Made via Additive Manufacturing Processes](#)

### 2.3 ISO/ASTM Standards:<sup>2</sup>

52900 [Standard Terminology for Additive Manufacturing – General Principles – Terminology](#)

52921 [Terminology for Additive Manufacturing – Coordinate Systems and Test Methodologies](#)

### 2.4 ISO Standards:<sup>3</sup>

4497 [Metallic powders – Determination of particle size by dry sieving](#)

D6892–1 [Metallic materials – Tensile testing at ambient temperature](#)

D6892–2 [Metallic materials – Tensile testing – Part 2: Method of test at elevated temperature](#)

8573-1 [Compressed air – Part 1: Contaminants and purity classes](#)

9001 [Quality management systems – Requirements](#)

9044 [Industrial Woven Wire Cloth – Technical Requirements and Testing](#)

13320 [Particle size analysis – Laser diffraction methods](#)

13485 [Medical devices – Quality management systems – Requirements for regulatory purposes](#)

### 2.5 Other Standards:

ANSI/ASQC C1-1996 [Specification of General Requirements for a Quality Program](#)<sup>4</sup>

AS9100 [Quality Management Systems - Requirements for](#)

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee F42 on Additive Manufacturing Technologies and is the direct responsibility of Subcommittee F42.05 on Materials and Processes, and is also under the jurisdiction of ISO/TC 261. Current edition approved Feb. 1, 2018. Published June 2018. DOI: 10.1520/F3303-18.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from International Organization for Standardization (ISO), ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, <http://www.iso.org>.

<sup>4</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.