

**Additive manufacturing for
aerospace — System performance
and reliability tests for laser metal
powder-bed fusion machines for
metallic materials**

*Fabrication additive pour l'aérospatiale — Essais de performance
et de fiabilité du système pour machines de fusion laser sur lit de
poudre pour les matériaux métalliques*

**Second edition
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Sample Document

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11

Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

ASTM International
100 Barr Harbor Drive, PO Box C700
West Conshohocken, PA 19428-2959, USA
Phone: +610 832 9634
Fax: +610 832 9635
Email: khooper@astm.org
Website: www.astm.org

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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.

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This document was prepared by ISO/TC 261, *Additive manufacturing*, in cooperation with ASTM F 42, *Additive Manufacturing Technologies*, on the basis of 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).

This second edition cancels and replaces the first edition (ISO/ASTM 52941:2020), which has been technically revised.

The main changes are as follows:

- title changed from “*Additive manufacturing — System performance and reliability — Acceptance tests for laser metal powder-bed fusion machines for metallic materials for aerospace application*” to “*Additive manufacturing for aerospace — System performance and reliability tests for laser metal powder-bed fusion machines for metallic materials*”;
- extension of the scope of application to non-aerospace applications if this is part of a contract;
- normative references has been updated;
- [6.2](#) has been revised;
- test report has been revised;
- example of a test report in [Annex A](#) slightly revised;
- editorial changes.

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.

Additive manufacturing for aerospace — System performance and reliability tests for laser metal powder-bed fusion machines for metallic materials

1 Scope

This document specifies requirements and test methods for the qualification and re-qualification of laser beam machines for metal powder bed fusion additive manufacturing for aerospace applications.

This document can also be applied to non-aerospace applications if this is part of a contract.

It can also be used to verify machine features during periodic inspections or following maintenance and repair activities.

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.

ISO 11146 (all parts), *Lasers and laser-related equipment — Test methods for laser beam widths, divergence angles and beam propagation ratios*

ISO 11554, *Optics and photonics — Lasers and laser-related equipment — Test methods for laser beam radiant power, radiant energy and temporal characteristics*

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

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/ASTM 52900, ISO 17295 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

scanning speed

relative linear speed of the laser beam movement in the plane of the build surface

Note 1 to entry: For powder bed fusion processes, unless otherwise designated by the machine manufacturer the plane of the build surface is identical to the XY plane.

3.2

warm-up time

time from switching on the machine until the required temperature has been reached such that the build cycle can be started