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Additive manufacturing — Test artefacts — Geometric capability assessment of additive manufacturing systems

Fabrication additive — Pièces types d'essai — Évaluation de la capacité géométrique des systèmes de fabrication additive

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Foreword

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This document was prepared by ISO/TC 261, *Additive manufacturing*, in cooperation with ASTM Committee F42, *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*, and 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 52902:2019), which has been technically revised.

The main changes are as follows:

— addition of a test artefact for testing the performance of the Z-axis in an AM system.

— changed dimensions in text and in drawing (see Figure 3) of medium circular artefact such that the description in the text matches the dimensions in the downloadable STEP file; Figure 3 was also re-drawn to better depict the circular artefact geometry.

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Additive manufacturing — Test artefacts — Geometric capability assessment of additive manufacturing systems

1 Scope

This document covers the general description of benchmarking test piece geometries, i.e. artefacts, along with quantitative and qualitative measurements to be taken on the benchmarking test piece(s) to assess the performance of additive manufacturing (AM) systems.

This performance assessment can serve the following two purposes:

— AM system capability evaluation;

— AM system calibration.

The benchmarking test piece(s) is (are) primarily used to quantitatively assess the geometric performance of an AM system. This document describes a suite of test geometries, each designed to investigate one or more specific performance metrics and several example configurations of these geometries into test build(s). It prescribes quantities and qualities of the test geometries to be measured but does not dictate specific measurement methods. Various user applications can require various grades of performance. This document discusses examples of feature configurations, as well as measurement uncertainty requirements, to demonstrate low- and high-grade examination and performance. This document does not discuss a specific procedure or machine settings for manufacturing a test piece.

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

ASME B46.1, *Surface Texture (Surface Roughness, Waviness and Lay)*

3 Terms and definitions

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

4 Significance and use

4.1 General

Measurements and observations described in this document are used to assess the performance of an AM system with a given system set-up and process parameters, in combination with a specific feedstock material.

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