SLOVENSKI STANDARD
SIST EN ISO/ASTM 52902:2023

01-november-2023

Nadomešča:
SIST EN ISO/ASTM 52902:2019

Dodajalna izdelava - Preskusna telesa - Ocenjevanje geometrijske zmogljivosti sistemov dodajalne izdelave (ISO/ASTM 52902:2023)

Additive manufacturing - Test artefacts - Geometric capability assessment of additive manufacturing systems (ISO/ASTM 52902:2023)

Additive Fertigung - Testkörper - Geometrische Leistungsbewertung additiver Fertigungssysteme (ISO/ASTM 52902:2023)

Fabrication additive - Pièces types d'essais - Évaluation de la capacité géométrique des systèmes de fabrication additive (ISO/ASTM 52902:2023)

Ta slovenski standard je istoveten z: **EN ISO/ASTM 52902:2023**

ICS:

25.030	3D-tiskanje	Additive manufacturing

SIST EN ISO/ASTM 52902:2023 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO/ASTM 52902

August 2023

ICS 25.030

Supersedes EN ISO/ASTM 52902:2019

English Version

Additive manufacturing - Test artefacts - Geometric capability assessment of additive manufacturing systems (ISO/ASTM 52902:2023)

Fabrication additive - Pièces types d'essais - Évaluation de la capacité géométrique des systèmes de fabrication additive (ISO/ASTM 52902:2023)

Additive Fertigung - Testkörper - Geometrische Leistungsbewertung additiver Fertigungssysteme (ISO/ASTM 52902:2023)

This European Standard was approved by CEN on 12 August 2023.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

Contents

Page

European foreword

This document (EN ISO/ASTM 52902:2023) has been prepared by Technical Committee ISO/TC 261 "Additive manufacturing" in collaboration with 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 February 2024, and conflicting national standards shall be withdrawn at the latest by February 2024.

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.

This document supersedes EN ISO/ASTM 52902:2019.

Any feedback and questions on this document should be directed to the users’ national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Endorsement notice

The text of ISO/ASTM 52902:2023 has been approved by CEN as EN ISO/ASTM 52902:2023 without any modification.

INTERNATIONAL STANDARD

ISO/ASTM 52902

Second edition
2023-08

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

Reference number
ISO/ASTM 52902:2023(E)

COPYRIGHT PROTECTED DOCUMENT

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

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

Published in Switzerland

Contents

Page

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. 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 to the possibility that some of the elements of this document may be the subject of patent rights. 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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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.

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.

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 — 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.

The primary characterization of the AM system obtained by applying this document is via geometric accuracy, surface finish, and minimum feature sizes of the benchmarking test piece(s).

4.2 Comparing results from one machine

The test piece(s) can be built and measured for example when the new machine is installed. The test piece(s) can be used to periodically evaluate the performance or diagnose a fault in one AM system, for example, after system maintenance or as specified by the requirements of a quality system.

The test piece(s) described in this test method can be used as a demonstration of capabilities for a contract between a buyer and seller of AM parts or AM systems.

Data from the measurements described in this document can be used to gauge the impact of new process parameters or material on the AM system performance.

Certain test geometries can be included with every build on a particular AM system to help establish performance traceability. Depending on the needs of the user, not all test artefacts need to be built, and individual test artefacts can be built separately if required.

5 General principles for producing test artefacts

5.1 General

This clause outlines principles applicable for producing all of the test artefact geometries in this document. Reporting requirements are previewed in connection with the production steps in this clause, but more details about recording and reporting can be found with the individual artefact descriptions given in Clause 7.

5.2 Need to use feedstock conforming to a material specification

In order to ensure repeatable results, the use of a quality feedstock material is needed. Clear definition of the material specification is important. Often a standard specification is preferred, but specifications do not need to be limited to standards and can be defined by the user. A feedstock material specification should be selected or required by the user and the feedstock used for test artefact trials should match said specification. For example, the specification can include the particulate properties (particle size, size distribution, morphology) for powder feedstock, bulk properties (such as flow) and chemical properties (such as chemical composition and level of contamination). Although the details of the material specification shall not be disclosed (unless otherwise agreed between buyer and seller), it should be documented by the producer and reported with a unique alphanumeric designation as specified by ASTM F2971-13:2021, Annex A1, element “B”. For powder-based processes, the material specification should specifically address limitations of powder re-use and percent of virgin/re-used powder.

5.3 Need to undertake artefact building according to a documented process specification

The processing of the material in the AM system should be undertaken according to a documented process specification/manufacturing plan, as specified by ASTM F2971-13:2021, Annex A1, element “C”. This can be a proprietary internal standard or external standard (subject to buyer/seller negotiations), but the producer should document the exact values of user-specifiable settings and conditions surrounding the building of parts. For example, it should document the layer thickness, build strategies (e.g. scan path, tool path, and/or scan parameters), temperatures, etc. used during the build. This process should be consistent for all test artefacts produced within one build. These recommendations can be different for each use, so the parameters in the process specification should be agreed between the buyer and seller.