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PEOPLE'S REPUBLIC OF CHINA**

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**Additive manufacturing - Test artifacts - Geometric capability
assessment of additive manufacturing systems
(English Translation)**

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is modified to adopt ISO/ASTM52902:2023 "Additive Manufacturing Standard Test Parts Additive Manufacturing System Geometric Forming Capability Evaluate".

This document has more structural adjustments compared to ISO/ASTM52902:2023. Comparison of structural number changes between the two documents See Appendix A for a list.

This document has many technical differences compared to ISO/ASTM52902:2023.

These technical differences and their reasons are indicated by a single vertical line (|). See Appendix B for a list of these technical differences and their reasons.

The following editorial changes were made to this document.

- Deleted the AMF file recommendation in 5.7 of ISO/ASTM52902:2023;
- Added informative references GB/T 3505, GB/T 10610, GB/T 33523 (all parts), GB/T 35022, GB/T 41507;
- Deleted the informative references ISO 21920-2, ISO 21920-3, ISO 25178 (all parts), ISO/ASTM52927, ISO 17295;
- Replace ISO/IEC 17025 and ISO/ASTM52915 with GB/T 27025 and GB/T 35352 as informative references;
- Deleted the references to measurement uncertainty in 6.4 of ISO/ASTM52902:2023;
- Added the measurement methods in 6.3.1.4, 6.3.2.4, 6.3.3.4, 6.3.4.4 and 6.4.4, see Appendix F;
- Deleted the examples of measuring protrusions, spacing and steps in 7.2.1.2 and 7.2.3.2 of ISO/ASTM52902:2023;
- Added Appendix C (informative) "Additive manufacturing test report format";
- Added the graphics and placement of the drum test piece in Figure E.1 in Appendix E (informative);
- Added the recommended measurement methods and main features of the drum test piece in Appendix F (informative).

Introduction

The test methods described in this document are used to evaluate the performance of an additive manufacturing system under given system settings and process parameters in combination with specific raw materials.

system performance.

This document is conducted by testing the minimum feature size, surface roughness and geometric accuracy of the test piece that can be formed by the additive manufacturing system.

Geometric performance evaluation.

Standard test pieces can be formed and measured directly when new equipment is installed.

Requirements for regularly evaluating the performance of an additive manufacturing system or diagnosing faults.

This document describes a standard test piece that can be used by both suppliers and

buyers to evaluate the capabilities of an additively manufactured part or additive manufacturing system.

The test data described in this document can be used to measure the effect of new process parameters or materials on the performance of an AM system.

To assist in establishing performance traceability, specific test geometries can be built during each build process of the AM system.

Users can form specific standard test pieces individually according to their specific needs, without having to form all test pieces.

Additive Manufacturing Standard Test Parts Evaluation of geometric forming capability of additive manufacturing system

1 Scope

This document describes the geometry of standard test pieces for additive manufacturing, as well as their preparation and measurement methods.

This document is intended for calibration of additive manufacturing systems and assessment of forming capabilities using standard test pieces.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

GB/T 35351 Terminology for Additive Manufacturing GB/T 39329-2020 Additive manufacturing test method standard test piece accuracy inspection

3 Terms and definitions

The terms and definitions defined in GB/T 35351 apply to this document.

4.1 General

This chapter establishes the general principles applicable to the preparation of standard test pieces (hereinafter referred to as "test pieces") of all geometries described in this document.

The preparation process specified in this chapter is used for test reporting, but detailed recording and reporting of specific geometries is given in Chapter 6.

4.2 Material specifications

To ensure the repeatability of the test results, the raw materials used to make the test pieces must meet the material specifications determined by the user.

In the final form, material specifications may include particle characteristics (particle size, particle size distribution, particle shape), volume characteristics (such as flowability), and chemical characteristics (such as chemical the requirements for the reuse of virgin powder should be clearly stated, including the mixing percentage of virgin powder/used powder, the mixing for raw materials that are not in powder form, the material specifications may include chemical composition, state and other negotiated contents.

Unless otherwise agreed, material specifications do not need to specify detailed content, but suppliers should record and uniquely identify element "B" according to Appendix C.

Report.

4.3 Process Specifications

Before processing the test piece, both the supplier and the buyer should follow the process specifications given in element "C" of Appendix C. During processing, the user should record the definition the process conditions of part forming, such as layer thickness, forming strategy (scanning path, scanning parameters, etc.), temperature, etc. All tests in a forming process the forming parameters of different batches of test pieces may be different, so the supply and demand parties should agree on the process specifications before forming.

parameters in the specification.