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Status of additive manufacturing standardization

This overview presents the publications and open work items prepared by the technical committee ISO/TC 261 'Additive Manufacturing'. It is the central international committee for standardization in the field of additive manufacturing, which works in close cooperation with ASTM committee F42 'Additive Manufacturing Technologies' and CEN/TC 438 'Additive Manufacturing'. Most of the standards for additive manufacturing are drawn up as ISO/ASTM standards, which are then also confirmed as EN ISO/ASTM standards in Europe.

Standardization related to the field of additive manufacturing is rapidly developing. The standards cover a wide range of topics, from terminology and general principles to processes, methods and materials, to design and data, to testing, acceptance and qualification, and to safety and environmental aspects.

For quality assurance, it is highly recommended that standardized methods and principles are used in all stages of the process, starting with design, handling and characterization of feedstock materials and ending with NDT testing and product approval after the various manufacturing stages. Standards have also been drawn up for the qualification of equipment operators and production coordinators. The most recent topic in the standardization of additive manufacturing is the safety and environmental aspects of equipment and material handling. A new working group was established in 2024, to draw up standards on life cycle assessment (LCA) issues of additive manufacturing.

The standardization of additive manufacturing is followed in Finland by METSTA's standardization group SR 261 'Additive manufacturing'.

Additional information: suvi.papula@metsta.fi

1. Published standards

In the following table all currently published standards are listed. In 2025, five new standards have been published (marked with light yellow background colour).

Reference	Title	Committee	Vienna agreement
ISO 17295:2023	Additive manufacturing — General principles — Part positioning, coordinates and orientation	ISO/TC 261	null lead, joint,ISO lead, joint,CHECK VA
ISO 17296-2:2015	Additive manufacturing — General principles — Part 2: Overview of process categories and feedstock	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO 27548:2024	Additive manufacturing of plastics — Environment, health, and safety — Test method for determination of particle and chemical emission rates from desktop material extrusion 3D printer	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52900:2021	Additive manufacturing — General principles — Fundamentals and vocabulary	ISO/TC 261	ASTM lead, joint,ISO lead, joint
ISO/ASTM 52901:2017	Additive manufacturing — General principles — Requirements for purchased AM parts	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52902:2023	Additive manufacturing — Test artefacts — Geometric capability assessment of additive manufacturing systems	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52903-1:2020	Additive manufacturing — Material extrusion-based additive manufacturing of plastic materials — Part 1: Feedstock materials	ISO/TC 261	ISO lead, joint,ISO lead, joint

ISO/ASTM 52903-2:2020	Additive manufacturing — Material extrusion-based additive manufacturing of plastic materials — Part 2: Process equipment	ISO/TC 261	ASTM lead, joint,ISO lead, joint
ISO/ASTM 52904:2024	Additive manufacturing of metals — Process characteristics and performance — Metal powder bed fusion process to meet critical applications	ISO/TC 261	ASTM lead, joint,ISO lead, joint
ISO/ASTM 52907:2019	Additive manufacturing — Feedstock materials — Methods to characterize metal powders	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52908:2023	Additive manufacturing of metals — Finished part properties — Post-processing, inspection and testing of parts produced by powder bed fusion	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52909:2024	Additive manufacturing of metals — Finished part properties — Orientation and location dependence of mechanical properties for metal parts	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52910:2018	Additive manufacturing — Design — Requirements, guidelines and recommendations	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52911-1:2019	Additive manufacturing — Design — Part 1: Laser-based powder bed fusion of metals	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52911-2:2019	Additive manufacturing — Design — Part 2: Laser-based powder bed fusion of polymers	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52911-3:2023	Additive manufacturing — Design — Part 3: PBF-EB of metallic materials	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52915:2020	Specification for additive manufacturing file format (AMF) Version 1.2	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52919:2025	Additive manufacturing — Qualification principles — Test methods for metal casting sand moulds	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52920:2023	Additive manufacturing — Qualification principles — Requirements for industrial additive manufacturing processes and production sites	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52924:2023	Additive manufacturing of polymers — Qualification principles — Classification of part properties	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52925:2022	Additive manufacturing of polymers — Feedstock materials — Qualification of materials for laser-based powder bed fusion of parts	ISO/TC 261	ASTM lead, joint,ISO lead, joint
ISO/ASTM 52926-1:2023	Additive manufacturing of metals — Qualification principles — Part 1: General qualification of operators	ISO/TC 261	ASTM lead, joint,ISO lead, joint
ISO/ASTM 52926-2:2023	Additive manufacturing of metals — Qualification principles — Part 2: Qualification of operators for PBF-LB	ISO/TC 261	ASTM lead, joint,ISO lead, joint
ISO/ASTM 52926-3:2023	Additive manufacturing of metals — Qualification principles — Part 3: Qualification of operators for PBF-EB	ISO/TC 261	ASTM lead, joint,ISO lead, joint
ISO/ASTM 52926-4:2023	Additive manufacturing of metals — Qualification principles — Part 4: Qualification of operators for DED-LB	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52926-5:2023	Additive manufacturing of metals — Qualification principles — Part 5: Qualification of operators for DED-Arc	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52927:2024	Additive manufacturing — General principles — Main characteristics and corresponding test methods	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52928:2024	Additive manufacturing of metals— Feedstock materials — Powder life cycle management	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52929:2025	Additive manufacturing of metals — Powder bed fusion — Presentation of material properties in material data sheets	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52931:2023	Additive manufacturing of metals — Environment, health and safety — General principles for use of metallic materials	ISO/TC 261	ASTM lead, joint,ISO lead, joint
ISO/ASTM 52933:2024	Additive manufacturing — Environment, health and safety — Test method for the hazardous substances emitted from material extrusion type 3D printers in the non-industrial places	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52935:2023	Additive manufacturing of metals — Qualification principles — Qualification of coordination personnel	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52936-1:2023	Additive manufacturing of polymers — Qualification principles — Part 1: General principles and preparation of test specimens for PBF-LB	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52938-1:2025	Additive manufacturing of metals — Environment, health and safety — Part 1: Safety requirements for PBF-LB machines	ISO/TC 261	ISO lead, joint,ISO lead, joint

ISO/ASTM 52939:2023	Additive manufacturing for construction — Qualification principles — Structural and infrastructure elements	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52941:2020	Additive manufacturing — System performance and reliability — Acceptance tests for laser metal powder-bed fusion machines for metallic materials for aerospace application	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52942:2020	Additive manufacturing — Qualification principles — Qualifying machine operators of laser metal powder bed fusion machines and equipment used in aerospace applications	ISO/TC 261	ISO lead, joint,null lead, joint
ISO/ASTM 52943-2:2024	Additive manufacturing for aerospace — Process characteristics and performance — Part 2: Directed energy deposition using wire and arc	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52945:2023	Additive manufacturing for automotive — Qualification principles — Generic machine evaluation and specification of key performance indicators for PBF-LB/M processes	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52950:2021	Additive manufacturing — General principles — Overview of data processing	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52953:2025	Additive manufacturing for metals — General principles — Registration of data acquired from process monitoring and for quality control	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM 52967:2024	Additive manufacturing for aerospace — General principles — Part classifications for additive manufactured parts used in aviation	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM TR 52905:2023	Additive manufacturing of metals — Non-destructive testing and evaluation — Defect detection in parts	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM TR 52906:2022	Additive manufacturing — Non-destructive testing — Intentionally seeding flaws in metallic parts	ISO/TC 261	ISO lead, joint,null lead, joint
ISO/ASTM TR 52912:2020	Additive manufacturing — Design — Functionally graded additive manufacturing	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM TR 52913-1:2025	Additive manufacturing — Feedstock materials — Part 1: Guidelines for the selection of measurement methods for characterization of powder flow properties	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM TR 52916:2022	Additive manufacturing for medical — Data — Optimized medical image data	ISO/TC 261	ISO lead, joint,null lead, joint
ISO/ASTM TR 52917:2022	Additive manufacturing — Round robin testing — General guidelines	ISO/TC 261	ISO lead, joint,ISO lead, joint
ISO/ASTM TR 52952:2023	Additive manufacturing of metals — Feedstock materials — Correlating of rotating drum measurement with powder spreadability in PBF-LB machines	ISO/TC 261	ISO lead, joint
ISO/ASTM TS 52930:2021	Additive manufacturing — Qualification principles — Installation, operation and performance (IQ/OQ/PQ) of PBF-LB equipment	ISO/TC 261	null lead, joint
ISO/ASTM TS 52949:2025	Additive manufacturing of metals — Qualification principles — Installation, operation and performance (IQ/OQ/PQ) of PBF-EB equipment	ISO/TC 261	ISO lead, joint

2. Open work items

The current status of the work items, including new standards under development and ongoing revision of previously published standards, is presented in the table below.

Reference	Title	Committee	Vienna agreement	Current phase
ISO/ASTM 52940	Additive manufacturing of ceramics — Feedstock materials — Characterization of ceramic slurry in vat photopolymerization	ISO/TC 261	ISO lead, joint,ISO lead, joint	Registered for publication
ISO/ASTM FDIS 52948	Additive manufacturing of metals — Powder bed fusion — Classification of imperfections	ISO/TC 261	ISO lead, joint,ISO lead, joint	Start of formal vote
ISO/ASTM FDIS 52959	Additive Manufacturing of metals — Test artefacts — Compression validation coupons for lattice designs	ISO/TC 261	ISO lead, joint,ISO lead, joint	Registered for formal vote

ISO/ASTM DIS 52941	Additive manufacturing — System performance and reliability — Acceptance tests for laser metal powder-bed fusion machines for metallic materials for aerospace application	ISO/TC 261	ISO lead, joint,ISO lead, joint	Approved for formal vote
ISO/ASTM DIS 52951	Additive Manufacturing — Data — Data packages for AM parts	ISO/TC 261	ISO lead, joint,ISO lead, joint	Approved for formal vote
ISO/ASTM DIS 52957	Additive manufacturing of ceramics — Design — Design guidelines	ISO/TC 261	ISO lead, joint,ISO lead, joint	Approved for formal vote
ISO/ASTM DIS 52937	Additive manufacturing of metals — Qualification principles — Tasks and related skills for AM	ISO/TC 261	ISO lead, joint,ISO lead, joint	Close of voting (enquiry)
ISO/ASTM DIS 52946	Additive manufacturing of metals — Powder bed fusion — Material properties of stainless steel alloys	ISO/TC 261	ISO lead, joint,ISO lead, joint	Close of voting (enquiry)
ISO/ASTM DIS 52969	Additive manufacturing of metals — Non-destructive testing and evaluation — Classification of imperfections in DED parts	ISO/TC 261	ISO lead, joint,ISO lead, joint	Close of voting (enquiry)
ISO/ASTM DIS 52922	Additive manufacturing — Design — Directed energy deposition of metals	ISO/TC 261	ISO lead, joint,ISO lead, joint	Start of voting (enquiry)
ISO/ASTM DIS 52966	Additive manufacturing — Qualification Principles — Framework for categorizing resources and process capabilities	ISO/TC 261	ISO lead, joint,ISO lead, joint	Start of voting (enquiry)
ISO/ASTM CD 52954-1	Additive manufacturing — Qualification principles — Part 1: Common failure modes used for risk mapping	ISO/TC 261	ISO lead, joint,ISO lead, joint	Approved for voting (enquiry)
ISO/ASTM CD 52961	Additive manufacturing of polymers — Environment, health and safety — General principles for use of polymers with material extrusion	ISO/TC 261	ISO lead, joint,ISO lead, joint	Approved for voting (enquiry)
ISO/ASTM CD 52965	Additive manufacturing for metals — Qualification principles — Test method for indentation plastometry	ISO/TC 261	ISO lead, joint,ISO lead, joint	Approved for voting (enquiry)
ISO/ASTM CD TR 52958	Additive manufacturing of metals — Powder bed fusion — In-situ coaxial photodiode monitoring for lack of fusion flaw detection in PBF-LB	ISO/TC 261	ISO lead, joint,ISO lead, joint	Approved for voting (enquiry)
ISO/ASTM CD TR 52918	Additive manufacturing — Data formats — File format support, ecosystem and evolutions	ISO/TC 261	ISO lead, joint	Committee draft (CD) registered
ISO/ASTM AWI 52970	Additive manufacturing — Data — Data capturing and structure for PBF-LB/M machine log	ISO/TC 261	ISO lead, joint,ISO lead, joint	Work item registered
ISO/ASTM AWI 52971	Additive manufacturing — Non-destructive testing and evaluation — Dimensional measurements on XrayComputed Tomography images	ISO/TC 261	ISO lead, joint	Work item registered
ISO/ASTM AWI 52972	Additive manufacturing — Qualification principles — Test method for the gas permeability of sand moulds and cores designed with a property control structure	ISO/TC 261	ISO lead, joint	Work item registered
ISO/ASTM PWI 52960	Additive manufacturing — Qualification principles — Optical properties of fixed resolution UV engine	ISO/TC 261	ISO lead, joint	Close of voting for preliminary work item
ISO/ASTM PWI 52900	Additive manufacturing — General principles — Fundamentals and vocabulary	ISO/TC 261	ISO lead, joint,CHECK VA	Preliminary work item registered

ISO/ASTM PWI 52947	Additive Manufacturing — Feedstock materials — Nickel alloy UNS N06625 for Powder bed fusion	ISO/TC 261	ISO lead, joint	Alustava työkohde rekisteröity
ISO/ASTM PWI 52954-2	Additive manufacturing — Qualification principles — Part 2: Specific PBF-LB/M failure modes used for risk mapping	ISO/TC 261	ISO lead, joint	Alustava työkohde rekisteröity
ISO/ASTM PWI 52962	Additive manufacturing for construction – General Principles – Design Process of Additively Manufactured Construction Elements	ISO/TC 261	ISO lead, joint	Alustava työkohde rekisteröity
ISO/ASTM PWI 52963	Additive manufacturing for construction – General Principles – Evaluation of Structural Printed Elements	ISO/TC 261	ISO lead, joint	Alustava työkohde rekisteröity
ISO/ASTM PWI 52964	Additive manufacturing – Environment, health and safety – Qualification principles for life cycle assessment of parts and processes	ISO/TC 261	ISO lead, joint	Alustava työkohde rekisteröity
ISO/ASTM PWI 52968	Additive Manufacturing of Metals — Test Artifacts — Load bearing cross section area determination for small/medium size as deposited specimens for mechanical properties determination	ISO/TC 261	ISO lead, joint	Alustava työkohde rekisteröity
ISO/ASTM PWI 52973	Additive manufacturing — Design — Vat Photopolymerization	ISO/TC 261	ISO lead, joint	Alustava työkohde rekisteröity