

SLOVENSKI STANDARD
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Aditivna proizvodnja - Splošna načela - Terminologija (ISO/ASTM DIS 52900:2018)

Additive manufacturing - General principles - Terminology (ISO/ASTM DIS 52900:2018)

Additive Fertigung - Grundlagen - Terminologie (ISO/ASTM DIS 52900:2018)

Fabrication additive - Principes généraux - Terminologie (ISO/ASTM DIS 52900:2018)

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Additive manufacturing — General principles — Terminology

Fabrication additive — Principes généraux — Terminologie

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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.

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).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information \(standards.iteh.ai\)](http://Foreword - Supplementary information (standards.iteh.ai))

The committee responsible for this document is 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.

This second edition of ISO/ASTM 52900 replaces first edition (ISO/ASTM 52900:2015), which has been technically revised.

The main changes compared to the previous edition are as follows:

- new and modified terms and definitions
- abbreviations added for seven process categories
- a normative guideline for specification of AM processes based on process categories and determining characteristics (Annex A)

Introduction

Additive manufacturing is the general term for those technologies that, based on a geometrical representation, create physical objects by successive addition of material. These technologies are presently used for various applications in engineering industry as well as other areas of society, such as medicine, education, architecture, cartography, toys and entertainment.

During the development of additive manufacturing technology there have been numerous different terms and definitions in use, often with reference to specific application areas and trademarks. This is often ambiguous and confusing which hampers communication and wider application of this technology.

It is the intention of this International Standard to provide a basic understanding of the fundamental principles for additive manufacturing processes, and based on this, to give clear definitions for terms and nomenclature associated with additive manufacturing technology. The objective of this standardization of terminology for additive manufacturing is to facilitate communication between people involved in this field of technology on a world-wide basis.

This International Standard has been developed by ISO/TC 261 and ASTM F42 in close cooperation 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.

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Additive manufacturing — General principles — Terminology

1 Scope

This International Standard establishes and defines terms used in additive manufacturing (AM) technology, which applies the additive shaping principle and thereby builds physical three-dimensional (3D) geometries by successive addition of material.

The terms have been classified into specific fields of application.

New terms emerging from the future work within ISO/TC 261 and ASTM F42 will be included in upcoming amendments and overviews of this International Standard.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

3.1 General terms

3.1.1

3D printer

machine used for 3D printing (3.3.1).
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3.1.2

additive manufacturing AM

process of joining materials to make *parts* (3.9.1) from 3D model data, usually *layer* (3.3.7) upon layer, as opposed to subtractive manufacturing and formative manufacturing methodologies

Note 1 to entry: Historical terms: additive fabrication, additive processes, additive techniques, additive layer manufacturing, layer manufacturing, solid freeform fabrication and freeform fabrication.

Note 2 to entry: The meaning of “additive-”, “subtractive-” and “formative-” manufacturing methodologies are further discussed in Annex A.

3.1.3

additive system

additive manufacturing system

additive manufacturing equipment

machine and auxiliary equipment used for *additive manufacturing* (3.1.2)

3.1.4

AM machine

section of the *additive manufacturing system* (3.1.3) including hardware, machine control software, required set-up software and peripheral accessories necessary to complete a *build cycle* (3.3.8) for producing *parts* (3.9.1)

3.1.5

AM machine user

operator of or entity using an *AM machine* (3.1.4)

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3.1.6

AM system user
additive system user

operator of or entity using an entire *additive manufacturing system* (3.1.3) or any component of an *additive system* (3.1.3)

3.1.7

front

<of a machine; unless otherwise designated by the machine builder> side of the machine that the operator faces to access the user interface, or primary viewing window, or both

3.1.8

material supplier

provider of material/ *feedstock* (3.6.6) to be processed in *additive manufacturing system* (3.1.3)

3.1.9

multi-step process

type of *additive manufacturing* (3.1.2) process in which *parts* (3.9.1) are fabricated in two or more operations where the first typically provides the basic geometric shape and the following consolidates the part to the fundamental properties of the intended material (metallic, ceramic, polymer or composite)

Note 1 to entry: Removal of the support structure and cleaning may be necessary, however in this context not considered as a separate process step.

Note 2 to entry: The principle of *single-step* (3.1.10) and *multi-step* processes are further discussed in Annex A.

3.1.10

single-step process

type of *additive manufacturing* (3.1.2) process in which *parts* (3.9.1) are fabricated in a single operation where the basic geometric shape and basic material properties of the intended product are achieved simultaneously

Note 1 to entry: Removal of the support structure and cleaning may be necessary, however in this context not considered as a separate process step.

Note 2 to entry: The principle of *single-step* and *multi-step processes* (3.1.9) are further discussed in Annex A.

3.2 Process categories

3.2.1

binder jetting

BJT

additive manufacturing (3.1.2) process in which a liquid bonding agent is selectively deposited to join powder materials

3.2.2

directed energy deposition

DED

additive manufacturing (3.1.2) process in which focused thermal energy is used to fuse materials by melting as they are being deposited

Note 1 to entry: "Focused thermal energy" means that an energy source (for example: laser, electron beam, or plasma arc) is focused to melt the materials being deposited.

3.2.3

material extrusion

MEX

additive manufacturing (3.1.2) process in which material is selectively dispensed through a nozzle or orifice

3.2.4**material jetting**

MJ *additive manufacturing* (3.1.2) process in which droplets of feedstock material are selectively deposited

Note 1 to entry: Example feedstock materials for material jetting include photopolymer resin and wax.

3.2.5**powder bed fusion****PBF**

additive manufacturing (3.1.2) process in which thermal energy selectively fuses regions of a *powder bed* (3.8.5)

3.2.6**sheet lamination****SHL**

additive manufacturing (3.1.2) process in which sheets of material are bonded to form a *part* (3.9.1)

3.2.7**vat photopolymerization****VPP**

additive manufacturing (3.1.2) process in which liquid photopolymer in a vat is selectively cured by light-activated polymerization

3.3 Processing: General**3.3.1****3D printing**

fabrication of objects through the deposition of a material using a print head, nozzle, or another printer technology

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Note 1 to entry: Term often used in a non-technical context synonymously with *additive manufacturing* (3.1.2); until present times this term has in particular been associated with machines that are low end in price and/or overall capability.

3.3.2**build chamber**

enclosed location within the *additive manufacturing system* (3.1.3) where the *parts* (3.9.1) are fabricated

3.3.3**build space**

location where it is possible for *parts* (3.9.1) to be fabricated, typically within the *build chamber* (3.3.2) or on a *build platform* (3.3.5)

3.3.4**build volume**

total usable volume available in the machine for building *parts* (3.9.1)

3.3.5**build platform**

<of a machine> base which provides a surface upon which the building of the *part/s* (3.9.1) is started and supported throughout the build process

Note 1 to entry: In some systems, the *parts* (3.9.1) are built attached to the build platform, either directly or through a *support* (3.3.9) structure. In other systems, such as *powder bed* (3.8.5) systems, no direct mechanical fixture between the build and the platform may be required.

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3.3.6

build surface

area where material is added, normally on the last deposited *layer* (3.3.7), which becomes the foundation upon which the next layer is formed

Note 1 to entry: For the first layer, the build surface is often the *build platform* (3.3.5).

Note 2 to entry: In the case of *directed energy deposition* (3.2.2) processes, the build surface can be an existing part onto which material is added.

Note 3 to entry: If the orientation of the material deposition or consolidation means, or both, is variable, it may be defined relative to the build surface.

3.3.7

layer

<matter> material laid out, or spread, to create a surface

3.3.8

build cycle

single process cycle in which one or more components are built by successive joining of material within the *build space* (3.3.3) of the *additive manufacturing system* (3.1.3)

3.3.9

support

structure separate from the *part* (3.9.1) geometry that is created to provide a base and anchor for the part during the building process

Note 1 to entry: Supports are typically removed from the part prior to use.

Note 2 to entry: For certain processes such as *material extrusion* (3.2.3) and *material jetting* (3.2.4) the support material can be different from the part material and deposited from a separate nozzle or print head.

Note 3 to entry: For certain processes such as *metal powder bed fusion* (3.2.5) processes, auxiliary supports can be added to serve as an additional heat sink for the part during the building process.

3.3.10

process parameters

set of operating parameters and system settings used during a *build cycle* (3.3.8)

3.3.11

system set-up

configuration of the *additive manufacturing system* (3.1.3) for a build

3.3.12

manufacturing lot

set of manufactured *parts* (3.9.1) having commonality between *feedstock* (3.6.6), *production run* (3.3.14), *additive manufacturing system* (3.1.3) and *post-processing* (3.6.11) steps (if required) as recorded on a single manufacturing work order

Note 1 to entry: The additive manufacturing system could include one or several *AM machines* (3.1.4) and/or post-processing machine units as agreed by *AM* (3.1.2) provider and customer.

3.3.13

manufacturing plan

document setting out the specific manufacturing practices, technical resources and sequences of activities relevant to the production of a particular product including any specified acceptance criteria at each stage

Note 1 to entry: For *additive manufacturing* (3.1.2), the manufacturing plan would typically include, but not be limited to *process parameters* (3.3.10), pre-, and *post processing* (3.6.11) operations as well as relevant verification methods.