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3D-tiskanje - Splošna načela - Terminologija (ISO/ASTM 52900:2015)

Additive manufacturing - General principles - Terminology (ISO/ASTM 52900:2015)

Additive Fertigung - Grundlagen - Terminologie (ISO/ASTM 52900:2015)

Fabrication additive - Principes généraux - Terminologie (ISO/ASTM 52900:2015)

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Additive manufacturing — General principles — Terminology

Fabrication additive — Principes généraux — Terminologie

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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

ASTM International
100 Barr Harbor Drive, PO Box C700
West Conshohocken, PA 19428-2959, USA
Tel. +610 832 9634
Fax +610 832 9635
khooper@astm.org
www.astm.org

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Foreword

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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

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 first edition of ISO/ASTM 52900 cancels and replaces ASTM F2792.

Introduction

Additive manufacturing is the general term for those technologies that based on a geometrical representation creates 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.

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 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 Terms and definitions

2.1 General terms

2.1.1
3D printer, noun
machine used for *3D printing* (2.3.1).

2.1.2
additive manufacturing, noun
AM
process of joining materials to make *parts* (2.6.1) from 3D model data, usually *layer* (2.3.10) 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.

2.1.3
additive system, noun
additive manufacturing system
additive manufacturing equipment
machine and auxiliary equipment used for *additive manufacturing* (2.1.2)

2.1.4
AM machine, noun
section of the *additive manufacturing system* (2.1.3) including hardware, machine control software, required set-up software and peripheral accessories necessary to complete a *build cycle* (2.3.3) for producing *parts* (2.6.1)

2.1.5
AM machine user, noun
operator of or entity using an *AM machine* (2.1.4)

2.1.6
AM system user, noun
additive system user
operator of or entity using an entire *additive manufacturing system* (2.1.3) or any component of an additive system

2.1.7
front, noun
<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

2.1.8
material supplier, noun
provider of material/ *feedstock* (2.5.2) to be processed in *additive manufacturing system* (2.1.3)

2.1.9
multi-step process, noun
type of *additive manufacturing* (2.1.2) process in which *parts* (2.6.1) 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* (2.1.10) and multi-step processes are further discussed in Annex A.

2.1.10
single-step process, noun
type of *additive manufacturing* (2.1.2) process in which *parts* (2.6.1) 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* (2.1.9) are further discussed in Annex A.

2.2 Process categories

2.2.1
binder jetting, noun
additive manufacturing (2.1.2) process in which a liquid bonding agent is selectively deposited to join powder materials

2.2.2
directed energy deposition, noun
additive manufacturing (2.1.2) 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 (e.g. laser, electron beam, or plasma arc) is focused to melt the materials being deposited.

2.2.3
material extrusion, noun
additive manufacturing (2.1.2) process in which material is selectively dispensed through a nozzle or orifice

2.2.4
material jetting, noun
additive manufacturing (2.1.2) process in which droplets of build material are selectively deposited

Note 1 to entry: Example materials include photopolymer and wax.

2.2.5
powder bed fusion, noun
additive manufacturing (2.1.2) process in which thermal energy selectively fuses regions of a *powder bed* (2.5.8)

2.2.6
sheet lamination, noun
additive manufacturing (2.1.2) process in which sheets of material are bonded to form a *part* (2.6.1)

2.2.7
vat photopolymerization, noun
additive manufacturing (2.1.2) process in which liquid photopolymer in a vat is selectively cured by light-activated polymerization

2.3 Processing: General

2.3.1
3D printing, noun
fabrication of objects through the deposition of a material using a print head, nozzle, or another printer technology

Note 1 to entry: Term often used in a non-technical context synonymously with *additive manufacturing* (2.1.2); until present times this term has in particular been associated with machines that are low end in price and/or overall capability.

2.3.2
build chamber, noun
enclosed location within the *additive manufacturing system* (2.1.3) where the *parts* (2.6.1) are fabricated

2.3.3
build cycle, noun
single process cycle in which one or more components are built up in *layers* (2.3.10) in the process chamber of the *additive manufacturing system* (2.1.3)

2.3.4
build envelope, noun
largest external dimensions of the x-, y-, and z-axes within the *build space* (2.3.6) where *parts* (2.6.1) can be fabricated

Note 1 to entry: The dimensions of the build space will be larger than the build envelope.

2.3.5
build platform, noun
<of a machine> base which provides a surface upon which the building of the *part/s* (2.6.1), is started and supported throughout the build process

Note 1 to entry: In some systems, the *parts* (2.6.1) are built attached to the build platform, either directly or through a support structure. In other systems, such as *powder bed* (2.5.8) systems, no direct mechanical fixture between the build and the platform may be required.

2.3.6
build space, noun
location where it is possible for *parts* (2.6.1) to be fabricated, typically within the *build chamber* (2.3.2) or on a *build platform* (2.3.5)

2.3.7
build surface, noun
area where material is added, normally on the last deposited *layer* (2.3.10) 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* (2.3.5).

Note 2 to entry: In the case of *directed energy deposition* (2.2.2) 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.