

3D Printing Glossary

This glossary defines terms used to discuss 3D printing in collecting institutions. The definitions in this glossary are reprinted with permission, from ISO/ASTM52900-21, Additive manufacturing — General principles — Fundamentals and vocabulary, copyright ISO/ASTM International. A copy of the complete standard may be obtained from ASTM, www.astm.org Cultural heritage professionals are encouraged to use these terms consistently to facilitate common vocabulary and ease of communication between collections professionals, 3D printing service providers, and 3D print technology manufacturers.

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3D printer, n—machine used for [3D printing](#).

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

3D scanning, n—3D digitizing method of acquiring the shape and size of an object as a 3-dimensional representation by recording x, y, z coordinates on the object’s surface and through software converting the collection of points into digital data.

ABC

additive manufacturing ([AM](#)), n—process of joining materials to make parts from 3D model data, usually layer upon layer, as opposed to subtractive manufacturing and formative manufacturing methodologies.

Additive Manufacturing File Format ([AMF](#)), n—file format for communicating additive manufacturing model data including a description of the 3D surface geometry with native support for color, materials, lattices, textures, constellations and metadata.

as-built, adj—state of parts made by an additive process before any post-processing, besides, if necessary, the removal from a [build platform](#) as well as the removal of support and/or unprocessed feedstock.

as-designed, adj—state representing the part to be built by an additive process in digital form, typically as 3D model data.

batch, n—of [feedstock](#), defined quantity of feedstock with uniform properties and composition.

binder jetting ([BJT](#)), n—[additive manufacturing](#) process in which a liquid bonding agent is selectively deposited to join powder materials.

build chamber, n—enclosed location within the additive manufacturing system where the parts are fabricated.

build cycle, n—single process cycle in which one or more components are built by successive joining of material within the [build space](#) of the additive manufacturing system.

build platform, n—of a machine, base which provides a surface upon which the building of the parts is started and supported throughout the build process.

build space, n—location where it is possible for parts to be fabricated, typically within the [build chamber](#) or on a [build platform](#).

build volume, n—total usable volume available in the machine for building parts.

cure, v—change the physical properties of a material by means of a chemical reaction.

DEF

directed energy deposition ([DED](#)), n—additive manufacturing process in which focused thermal energy is used to fuse materials by melting as they are being deposited.

extrusion nozzle, n—component with an orifice through which [feedstock](#) is extruded.

feedstock, n— bulk raw material supplied to the additive manufacturing building process.

filament, n—[feedstock](#) characterized by extreme length relative to its uniform cross section.

fully dense, adj—state in which the material of the fabricated part is without significant content of voids.

fusion, n—act of uniting two or more units of material into a single unit of material.

LMP

laser sintering (LS), n—[powder bed fusion](#) process used to produce objects from powdered materials using one or more lasers to selectively fuse or melt the particles at the surface, layer upon layer, in an enclosed chamber.

lattice, n—lattice structure geometric arrangement composed of connective links between vertices (points) creating a functional structure.

layer, n—matter, material laid out, or spread, to create a surface.

machine coordinate system, n—three-dimensional coordinate system as defined by a fixed point on the build platform, with the three principal axes labelled x-axis, y-axis and z-axis with rotary axis about each of these axes labelled A, B and C, respectively, where the angles between x-, y- and z-, can be Cartesian or defined by the machine manufacturer.

material extrusion (MEX), n—additive manufacturing process in which material is selectively dispensed through a nozzle or orifice.

material jetting (MJT), n—additive manufacturing process in which droplets of [feedstock](#) material are selectively deposited.

part, n—joined material forming a functional element that can constitute all or a section of an intended product.

pellets, n—small mass of preformed feedstock material, having relatively uniform dimensions in any given [batch](#).

porosity, n—property, presence of small voids in a part making it less than fully dense.

post-processing, n—process step, or series of process steps, taken after the completion of an additive manufacturing [build cycle](#) in order to achieve the desired properties in the final product.

powder bed fusion (PBF), n—additive manufacturing process in which thermal energy selectively fuses regions of a powder bed.

powder bed, n—part bed, location in an additive manufacturing system where [feedstock](#) is deposited and selectively fused by means of a heat source or bonded by means of an adhesive to build up parts.

powder blend, n—quantity of powder made by thoroughly intermingling powders originating from one or several powder lots of the same nominal composition.

process parameters, n—operating parameters and system settings used during a [build cycle](#).

prototype, n—physical representation of all or a component of a product that, although limited in some way, can be used for analysis, design and evaluation.

RSUV

rapid prototyping, n—in additive manufacturing, application of additive manufacturing intended for reducing the time needed for producing [prototypes](#).

sheet lamination (SHL), n—additive manufacturing process in which sheets of material are bonded to form a part.

STL, n—file format for model data describing the surface geometry of an object as a tessellation of triangles used to communicate 3D geometries to machines in order to build physical parts.

support, n—structure separate from the part geometry that is created to provide a base and anchor for the part during the building process.

used powder, n—powder that has been supplied as [feedstock](#) to an AM machine during at least one previous build cycle.

vat photopolymerization (VPP), n—additive manufacturing process in which liquid photopolymer in a vat is selectively cured by light-activated polymerization.

virgin, adj—feedstock, condition of feedstock from a single manufacturing lot before being applied to the additive manufacturing process.