

3D Printing Glossary

Terminology	Explanation
3D Bio-Printing	It is the process of creating cell patterns in a confined space using 3D printing technologies, where cell function and viability are preserved within the printed object
3D Model	A three-dimensional design usually produced using various 3D modelling software
3D modelling	The act of using 3D CAD programs to produce a design
3D printer	An additive manufacturing machine that constructs a solid shape by building one layer at a time.
3D Printing	The process of creating three-dimensional object by depositing material layer by layer
3D Scan	A process by which the shape and texture of real-world object is captured and displayed as 3D Model
3D Bio-plotter	Well reputed 3D Bio-printing machine from Envisiontec
3Doodler	Is a kind of 3D Pen that can be used to draw three dimensional objects
3D Sand Casting	Sand casting is a metal casting process characterized by using sand as the mold material
ABS	A popular thermoplastic material heavily used in 3D Printing
ABS Glue	ABS Glue is made by adding bit of acetone to the ABS filament. This is used to stick the 3D Print to the build plate
Additive Manufacturing	The process of creating three-dimensional object by depositing material layer by layer
Acetone	An organic solvent used to dissolve left over filament in nozzle for unclogging the nozzle and also for smoothing the ABS printed object surface
All Metal Hot End	A nozzle design that can go up to very high temperature of 400 degrees °C
Alumide	Alumide is a material used in 3D printing consisting of nylon filled with aluminium dust, its name being a combination of the words; aluminium and polyamide. The printed objects have metallic look
AMF	Additive Manufacturing File Format (AMF) is an open standard for describing objects for additive manufacturing processes such as 3D printing
Amorphous	Without a clearly defined shape or form
Anisotropic	Object having physical property that is different in different directions
Bed	The platform on which material gets extruded
Biopolymer	Biopolymers are polymers produced by living organisms. Since they are polymers, biopolymers contain monomeric units that are covalently bonded to form larger structures
Binder Jetting	Is a 3D Printing process where binder is jetted after each layer to glue it to the next layer
Blender	An open-source 3D modelling software

Bridges	Printing horizontal layers in air without support. To achieve good quality for bridges, it is recommended to reduce printing speed and printing temperature
Brim	A brim is attached to a model and extends outward. Brims typically have several outlines and may be a few layers tall. Brims are often used to stabilize small parts of a model, such as legs of a table, because brims help these areas stay connected to the print bed
Brittleness	A property of materials where it breaks without significant deformation. Chalk and ceramics are examples of brittle materials.
Build platform	Build platform is the surface on which material is deposited layer by layer
Build plate	Build plate is the platform on which material is deposited layer by layer
Build resolution	Typically refers to the layer height that a 3D print is printed at. Similar to the resolution on a television or computer monitor but in 3D the lower the build layer height the higher the part resolution
BuildTAK	Is a sheet that is placed on build plate before extruding the material to avoid warping of printed objects
Build Time	The time it takes to print the object as per the parameters defined in slicing software
Build Volume	Build volume = Printer Length x Printer Width x Printer Height
CAD	Computer Aided Design - a method of design where a computer software is used to create 3D objects in the form of electronic files
CAE	Computer Aided Engineering is the broad usage of computer software to aid in engineering analysis tasks like Finite Element Analysis or CFD
Catia	3D Modelling software usually used in automotive industry
CAM	Computer Aided manufacturing
Casting	The process of pouring a liquid material (typically metal) into a hollow cavity to produce a solid part of a specific shape.
CFD	Computational Fluid Dynamics is the study of fluid mechanics that uses numerical analysis and data structures to analyse and solve problems that involve fluid flows
CJP: ColorJetPrinting	A type of 3D Printing technology from 3D Systems, primarily for printing multi-color objects
CLIP	Continuous Liquid Interface Production
CNC Machining	CNC Machining is a process used in the manufacturing sector that involves the use of computers to control machine tools
Creep	The tendency for materials to move or deform over time when subjected to a continuous load. Resins and polymers often experience such phenomena
Crystalline	A crystal or crystalline solid is a solid material whose constituents are arranged in a highly ordered microscopic structure, forming a crystal lattice that extends in all directions
Cupping	Occurs in the SLA process when a hollow section of a print sucks up resin during the peel process (similar to an upside-down empty cup entering water). This suction effect can cause a part with thin walls to fracture.
Curing	Curing is a process of hardening photopolymers through UV light

DLP: Digital Light Processing	A type of 3D Printing technology where photopolymers are cured using UV light
DMLS: Direct Metal Laser Sintering	A type of 3D Printing technology where a laser is used for sintering very thin layers of metal powder to create a 3D metal object. It is used to produce very complex geometries in great detail
Ductility	A material that can be deformed without losing toughness. Wire is an example of a ductile material. The opposite to brittle
EBM: Electron Beam Melting	A type of 3D Printing technology which uses an electron beam instead of a laser or thermal printhead. EBM is often used for the production of incredibly dense metal parts
Elongation	Pulling or stretching a material. An important term in plastics to understand how a material will deform under load
EOS	Industrial 3D Printing company well known for its metal 3D Printing
End part	A component that is intended to be used directly in a functional capacity
End Stop	3D Printer axes all need a datum (also known as home position or end-stop) to reference their movements
Extruder	It is a device that sends correct amount of filament to hot end
FabLab	It is a small-scale workshop for digital fabrication
FDM: Fused Deposition Modelling	A type of 3D Printing technology that uses heat to melt and extrude plastic filament onto the build plate
Flexural strength	The stress (in MPa) at failure in bending
Flowrate	It is the volume of fluid which passes per unit time
Filament	Is kind of plastic wires used in FDM 3D Printing
Fixture	Used to hold a workpiece during either a machining operation or some other industrial process
G-Code	G-code is the common name for the most widely used numerical control (NC) programming language. It is used mainly in computer-aided manufacturing to control automated machine tools
Glass Transition Temperature	Glass Transition Temperature (T _g) is the temperature region where the polymer transitions from a hard, glassy material to a soft, rubbery material
Hardening	Harden (make an object toughen) generally by using heat treatment
Heated Bed	Heated build platform (also called heated bed) improves printing quality by helping to prevent warping. As extruded plastic cools, it shrinks slightly. Heated beds usually yield higher quality finished builds with materials such as ABS and PLA.
Heated Build Chamber	Heated build chamber also improves the printing quality by maintaining the constant temperature in the chamber thereby avoiding cracks
HIPS	High Impact Polystyrene is a type of 3D Printing filament
Hollow	A 3D print that is not solid and also does not contain any infill. Hollow models are much faster and cheaper to print but have very low strength

Hot End	Hot End is the device that melts the filament and extrudes the molten filament on build plate
Hydrogel	A hydrogel is a network of polymer chains that are hydrophilic. Hydrogels are highly absorbent natural or synthetic polymeric networks
Infill	Material that is used to fill in the gaps / holes
Injection Molding	The plastic injection moulding process produces large numbers of parts of high quality with great accuracy, very quickly
Inkjet Bio-printing	Having a physical property which has the same value when measured in different directions
Islands	Occur in SLA printing and refer to cross sectional areas of a model that are not connected
Isotropic	An object having a physical property which has the same value when measured in different directions
Jig	Used to hold and guide a workpiece during either a machining operation or some other industrial process
Kapton Tape	A kind of tape used to avoid product warping during printing process. esp. for ABS material
Layer Height/Slice Thickness	Height of each layer that gets deposited on the build plate
Layer Thickness	Same as layer height / slice thickness
Layout	The way in which the parts of something are arranged or laid out
LCF: Laser Cladding Forming	It is a type of additive manufacturing technology. During the process of laser cladding forming, a high-power laser beam is focused onto the substrate to create a molten pool, metal powders are simultaneously injected into the focal zone by the powder delivering nozzles and then melted and rapidly solidified
LENS: Laser Engineered Net Shaping	Laser Engineered Net Shaping is an additive manufacturing technology developed for fabricating metal parts directly from CAD model using metal powder injected into a molten pool created by a focused, high-powered laser beam
Linear Guide	Used for movement across an axis (X, Y and Z). Meant for higher accuracy
Linear Rail	Used for movement across an axis (X, Y and Z)
LOM: Laminated Object Machining	Laminated object manufacturing (LOM) is a RP system where layers of adhesive-coated paper are used to build a 3D model
Melting point	The temperature a solid melt or turns into a liquid
Metal printing	The process of 3D printing in metal. Objects are created from thin layers of powdered material by selectively sintering or melting it using a high-power laser. There are a large range of metal printing technologies
Metal powder	The material used for metal printing.
Micron	A measurement of distance regularly used to describe 3D printing layer height. 1000th of a millimetre. A human hair is approximately 17 microns thick

NEMA	National Electrical Manufacturers Association
Nozzle	The metal tip where plastic material gets melted and extruded
Nozzle Diameter	Diameter of the nozzle from where material gets extruded
NPJ: Nano Particle Jetting	It is a metal inkjet 3D Printing process where nano particles suspend in liquid are jetted and later sintered
Nylon	Kind of synthetic polymers that can be melt-processed into fibers, films or shapes
Nylon powder	A common build material used in the SLS printing process
OBJ	A kind of 3D Printing file format
Offset	In 3D printing offset refers to layers that are not printed directly in line with one another and are instead shifted to the side. This is often a printer calibration issue and will impact the quality of a print
OpenSCAD	Software for creating solid 3D CAD objects
Organovo	calls itself a regenerative medicine company
OpenSCAD	Software for creating solid 3D CAD objects
Overhang	Overhangs occur when a newly printed layer of material is only partially supported by the layer below. Angled walls are considered overhangs and depending on the print technology and angle often require support to print successfully
PC	Polycarbonates (PC) are a group of thermoplastic polymers containing carbonate groups in their chemical structures. Polycarbonates are used in engineering applications
PEEK	Polyether ether ketone (PEEK) is a colourless organic thermoplastic polymer in the polyaryletherketone (PAEK) family, used in engineering applications
PET	Polyethylene terephthalate, commonly abbreviated PET is the most common thermoplastic polymer resin of the polyester family
Photopolymerization	Process of changing the properties of photopolymer by exposing it to light
PJP: Polyjet Printing	PolyJet 3D Printing works similarly to inkjet printing, but instead of jetting drops of ink onto paper, PolyJet 3D Printers jet layers of curable liquid photopolymer
PLA	PolyLacticAcid is a type of 3D Printing filament made out of corn starch
Plastic Jet Printing	Similar to FDM / FFF
Polyamide	A synthetic polymer of a type made by the linkage of an amino group of one molecule and a carboxylic acid group of another, including many synthetic fibres such as nylon.
Polymer	A material whose molecular structure is composed of multiple repeating units. Natural polymeric materials include amber, wool, silk and natural rubber while synthetic polymers include resin, nylon, polystyrene and silicon
Polyphenylsulfone (PPSF)	Polyphenylsulfone (PPSF or PPSU) is a type of high-performance polymer usually consisting of aromatic rings linked by sulfone (SO ₂) groups
Post Processing	A set of processes used to smooth out the 3D Printed object

PP: Plaster-based 3D printing	3D Printing using sandstone or plaster as the input material. This is popular for creation of miniatures.
PP: Polypropylene	Polypropylene (PP), also known as polypropene, is a thermoplastic polymer used in a wide variety of applications including packaging and labelling
Print head	The part of a 3D printer where material is extruded/jetted from. Is an assembly of multiple components including the nozzle in the case of FDM
Print speed	The speed the print head moves around the build plate typically measured in mm/s. 50mm/s is a common speed for desktop FDM printing
Print volume	The largest possible dimensions a 3D printer is able to print at. Varies significantly by technology
Prototype	An early part or model of a design built before production to test form, function, aesthetics and interaction usually at a low cost. Prototypes are typically items to learn from to improve a design
PTFE	Polytetrafluoroethylene (PTFE) is a synthetic fluoropolymer of tetrafluoroethylene used for multiple applications
PVA	Polyvinyl alcohol is a water-soluble synthetic polymer
Raft	A Raft is a horizontal latticework of filament that is located underneath your part. Rafts are primarily used with ABS to help with bed adhesion. Rafts are also used to help stabilize models with small footprints, or to create a strong foundation on which to build the upper layers of your part
RAMPS	RepRap Arduino Mega Pololu Shield
Rapid Prototyping	Rapid prototyping is a group of techniques used to quickly fabricate a scale model of a physical part or assembly using three-dimensional computer aided design (CAD) data
Resin	A solid or liquid synthetic organic polymer used as the basis of plastics, adhesives, varnishes, or other products
Rhinoceros	Rhinoceros is a commercial 3D computer graphics and computer-aided design application software
Sculptris	Well known 3D modelling software used for sculpting
SDL: Selective Deposition Lamination	Selective Deposition Lamination is a 3D printing process using paper
Shell	In FDM printing the shell refers to the walls of the print that are exposed to the outside of the model. FDM will print shells at the perimeter of the model and then fill the model with infill. Different to wall thickness.
Sintering	Join powder into a solid porous mass by heating
Sketchup	Well known 3D modelling software
Skirt	A skirt is an outline that surrounds your part but does not touch the part. The skirt is extruded on the print bed before starting to print the model. Skirts serve a useful purpose because they help prime the extruder and establish a smooth flow of filament
SLA: Stereolithography	A type of 3D Printing process where laser is used to cure a tank of liquid resin
Slicing	Process of dividing a 3D model into multiple layers for printing

SLM: Selective Laser Melting	Selective laser melting (SLM) is a rapid prototyping technique designed to use a high power- density laser to melt and fuse metallic powders together
SLS: Selective Laser Sintering	A type of 3D Printing process where laser is used sinter powder particles
SolidWorks	Well known 3D modelling software
Steel 3D printing	3D Printing of Steel powder
Stepper Motor	A stepper motor (or step motor) is a brushless DC electric motor that divides a full rotation into a number of equal steps. The motor's position can then be commanded to move and hold at one of these steps without any feedback sensor (an open-loop controller), as long as the motor is carefully sized to the application
STL File	A geometry definition file that uses triangles to describe the surfaces of a 3D model. CAD models are exported as STL files then imported into a slicer program. The slicer program then converts the file into G-code to be interpreted by the 3D printer.
Strain	Measure of the deformation of the material relative to its original shape measured in mm/mm (or a dimensionless ratio).
Stress	The internal forces that particles of a material exert on each other measured in Pascals.
Subtractive Manufacturing	Any manufacturing process that removes material to form a final shape (milling, turning etc). The opposite to additive manufacturing (3D printing)
Support Material	Support material is used to hold the suspend parts of a 3D Printed object
Supports	Supports are used when models have steep overhangs or unsupported areas
Surface Finish	Surface finish, also known as surface texture, is the characteristics of a surface. It has three components: lay, surface roughness, and waviness
SVG (Scalable Vector Graphics)	Scalable Vector Graphics (SVG) is an XML-based vector image format for two-dimensional graphics with support for interactivity and animation
Tank (Resin)	Is a holder of resin in SLA / DLP 3D Printing
Temperature Differential	The difference in temperature between 2 points. In 3D printing reducing the temperature differential between 2 nearby points reduces the likelihood of warping or deformation
Tensile Strength (ultimate)	The stress (usually in MPa) at which a material will fracture or break when subjected to a tensile load
Tensile Strength (Yield)	The stress (usually in MPa) at which a material will shift from elastic deformation (returning to its original shape) to plastic deformation (permanent deformation) when subjected to a tensile load
Thermoplastic	having the property of softening or fusing when heated and of hardening and becoming rigid again when cooled
Tissue Engineering	Tissue engineering is the use of a combination of cells, engineering and materials methods, and suitable biochemical and physicochemical factors to improve or replace biological tissues
Titanium 3D Printing	3D Printing using Titanium powder

TPP: Two-photopolymerization	A new approach to micromachining and can be considered the next level to SLA. Very precise 3D models can be created within a very short span of time
Triple Jetting	Is a Stratasys process where 3D Printers also jet a gel-like support material specially formulated to uphold overhangs and complex geometries during the printing process
Ultem	Polyetherimide is an amorphous, amber-to-transparent thermoplastic with characteristics similar to PEEK
UV Light	Ultraviolet (UV) is an electromagnetic radiation with a wavelength from 10 nm (30 PHz) to 400 nm (750 THz) generally used for curing in DLP process
VAT	a large open vessel for holding or storing liquids. In 3D Printing, generally for holding resin in DLP or SLA process
Wall Thickness	thickness of the wall or the outer part of the 3D object
Warping	Is bending of an object on the edges due to material shrinkage while 3D Printing
X-Axis	X-Axis of a 3D Printer
Y-Axis	Y-Axis of a 3D Printer
Yield	Stress at which material starts deforming plastically
Young's Modulus	Young's Modulus is stress / strain. It is measure of stiffness of a solid material
Z-Axis	Z-Axis of a 3D Printer