

---

---

# Glossary of 3D Printing Terms

(compiled from several online sources)

---

## **ABS**

Acrylonitrile Butadiene Styrene. One type of plastic filament used in the Fused Filament Fabrication 3D printing process. Lightweight, high heat resistance. Sometimes filament sold as ABS is in fact mixed with other thermoplastics, thus altering its characteristics.

## **Additive Metal Manufacturing (AMM)**

Any 3D printing process which builds up metal objects in layers, often refers to the process of binding or fusing powdered metal together.

## **Alumide**

A mixture of aluminium and plastic powder which is used to produce objects with a metallic look and feel but at a much lower cost than pure metal.

## **Build Plate**

The surface on which the 3D printed model is formed. Also **Bed**.

## **Build Platform**

The part that supports the build plate.

## **Build Envelope**

The measured limitations of a 3D printer's space, which determines the maximum physical size of a 3D model that can be produced.

## **Cubify**

Website run by 3D Systems based around their Cube printers. Not only does it sell printers but it provides a 3D printing service, sells a range of objects, and supports the Cube owning community.

## **Direct Metal Laser Sintering (DMLS)**

Using a laser to selectively heat and fuse a vat of metal powder, in order to build up a 3D object in layers.

## **Directed Energy Deposition**

Similar to DMLS except metal powder is deposited from a print head before fusing it together with a laser. This allows the repair of objects as well as their manufacture.

## **Digital Light Processing (DLP) Projection**

The solidification of a photocurable polymer liquid using a DLP projector. This solidifies the liquid one layer at a time and can be used to produce very high resolution objects in a very short time.

## **Dual Extrusion**

The ability to print in two colors at once. The 3D printer with dual extrusion capabilities is equipped with two extruders, each feeding its own spool of plastic filament and depositing on the build plate.

## **EVA**

Ethylene Vinyl Acetate. Several early RepRap research experiments used off-the-shelf EVA glue sticks in hot-glue guns. Those glue sticks are mostly EVA which melts around 85°C.

## **Extruder**

A group of parts which handles feeding and extruding of the build material. Consists of two assemblies: a cold end to pull and feed the thermoplastic from the spool, and a hot end that melts and extrudes the thermoplastic.

## **Fab@Home**

An open source 3D printer which uses a syringe type extrusion mechanism. This means it can be used to produce objects out of a range of materials including: silicon rubber, cake icing, cheese, PlayDoh, and clay.

## **Filament**

The plastic material that is melted and extruded to create the 3D printed object in the Fused Filament Fabrication method.

## **Fused Deposition Method (FDM)**

The Stratasys Inc. trademarked term for Fused Filament Fabrication.

## **Fused Filament Fabrication (FFF)**

An additive manufacturing process in which a spool of plastic filament is heated to a melting point and deposited, built from the bottom up one layer at a time until a 3D model is created.

## **Infill**

The interior structure of a 3D printed model. Rather than printing a solid interior, which is a waste of plastic, a model is typically printed with a patterned internal "mesh." In the 3D print settings this is usually represented by a percentage (ex. 10% infill).

## **Heated Bed**

A build surface warmed in order to keep the base of an extruded part from cooling (and shrinking) too quickly. Such shrinking leads to warping internal stresses in RP parts. The most common result is corners of parts lifting off the build surface. Heated beds usually yield higher quality finished builds. They commonly consist of glass, ceramics, or metal.

## **Heated Build Chamber**

A heated build chamber is typically sealed and heated to prevent warping during the printing process.

## **HIPS**

High Impact Polystyrene, a thermoplastic used as a 3D printing material. Similar to ABS in material properties and can be dissolved using limonene. HIPS is also BPA-free and less inflexible than either ABS or PLA.

## **Hot End**

The heated nozzle portion of the extruder mechanism, which gets hot enough to melt plastic (or potentially other materials). Hot end parts use materials that withstand temperatures up to ~240 °C (and higher for newer all-metal designs). The diameter of available nozzle orifices ranges from about 0.15mm to 1.0mm, with sizes in the range 0.3mm-0.5mm currently being the most common.

## **Layer Height**

The thickness of a particular layer in a 3D printed model.

## **Laywood-3D**

Composition of wooden fibres mixed with a polymer binder used to 3D print wooden objects.

## **Material Extrusion**

Any technology which extrudes a material in order to build up an object. Examples would be thermoplastics which are heated first using an element or even cheese which is extruded through a syringe. All are forms of material extrusion.

## **Material Jetting**

Any technology which builds up an object by jetting a photopolymer through a print head before solidifying it using a UV light.

## **Mesh**

The surface area of a 3D model in digital form. In curved shapes this is typically represented by a series of flat triangles. The smaller the triangles the finer the printed results will be.

---

---

## Glossary of 3D Printing Terms, continued

---

### **Multiphase Jet Solidification (MJS)**

Ceramic or metal powder is mixed with a binder and extruded to build up an object in layers. The binder is then removed by heat or by chemicals before the object is densified by heating it in a kiln.

### **Nozzle**

The part of the extruder that deposits the melted plastic material.

### **Nylon**

Nylon or polyamide is an engineering grade thermal plastic used in extruder based and laser sintering systems. There are different versions providing a range mechanical properties in either filament or powder form. These include nylon-6,6; nylon-6; nylon-6,9; nylon-6,10; nylon-6,12; nylon-11; nylon-12, and nylon-4,6.

### **OBJ**

Short for Object file. A file format from 3D modeling programs commonly used in 3D printing.

### **Overhang**

A part of a 3D model where there is no support below it. Parts that jut out at an angle of over 45 degrees are generally considered overhangs.

### **PLA**

Polylactic Acid. Corn-based plastic filament used in the Fused Filament Fabrication 3D printing process. Biodegradable and doesn't give off fumes like ABS. Used in applications such as medical implants, compostable packing material, and disposable garments.

### **Photopolymer**

Photopolymers are used in light reaction systems either with ultraviolet or visible energy. The liquid material is cross-linked or hardened when exposed to light. Photopolymers are used in both Digital Light Processing(DLP) and Stereolithography(SLA) systems.

### **PolyJet Matrix**

A technology which mixes polymers together during the creation of an object allowing up to 14 different materials to be used while 3D printing a single object.

### **Raft**

To prevent warping during printing and to ensure successful prints of models with minimal area on their base surfaces, a flat layer of support material will print below the model on the build plate. Raft supports are constructed to be removable, either by dipping in a chemical bath or pulling apart

### **Resolution**

The minimum feature size that can be expected to be reproduced. On the Makerbot Replicator 2x, the highest resolution available is 100 microns (0.0039 in).

### **Selective Heat Sintering (SHS)**

Created by a company called BluePrint and similar to selective laser sintering. However, it uses a thermal print head instead of a laser to selectively fuse together layers of powder together.

### **Selective Laser Melting (SLM)**

A technology similar to SLS, but which uses a high powered laser to selectively and completely melt together powdered metal.

### **Selective Laser Sintering (SLS)**

A powder bed technology which uses a laser to selectively fuse/sinter together powder to build up a 3D object in layers.

### **Shapeways**

An online company which provides 3D printing services and allows users to share their 3D designs.

### **Sintering**

Heating up powdered material in order to fuse the granules together by slightly melting the outside of the granules.

### **Shell**

The outer layer of a 3D printed model. In 3D printing programs this is represented by the number of layers of plastic used to create the outer layer (ex. 2 shells).

### **Slice**

A single layer of the 3D printed model. Slices vary in thickness depending on the design (ex. 0.1 mm). Most 3D printer programs automatically generate or "slice" your 3D digital model into the layers to prepare for printing.

### **SLA**

Stereo Lithography Apparatus. SLA is a registered trademark of 3D Systems Corporation. SL or stereolithography is commonly used in place of SLA.

### **SLS**

Selective Laser Sintering. SLS is a registered trademark of 3D Systems Corporation. LS or laser sintering is commonly used in place of SLS.

### **Stereophotogrammetry**

The process of estimating the 3D coordinates of various points on an object. These are calculated by processing multiple photographs taken of the object from different angles.

### **STL**

File format used by stereolithography CAD software originally developed by 3D Systems in 1987 and still used by most 3D printers today. What it actually stands for is debatable, but it's most likely to be either Stereo Lithographic or Standard Tessellation Language.

### **Supports**

Models that have large overhangs or gaps between parts require support material to be printed. With the Makerbot Replicator 2x, the material used for supports is the same as the material used to print the model itself. Support material is constructed to be removable.

### **Two-Photon Polymerization (2PP)**

A technology which uses a femtosecond pulsed laser to selectively solidify a special photopolymer that solidifies when hit by two photons. Allows X and Y axis resolutions of down to 100 nanometers, making it the highest resolution 3D printing technology currently known.

### **Vitamin**

Any part of a RepRap printer which it is unable to print itself. Examples being nuts, bolts and electronics.

### **X, Y, Z axes**

3-dimensional coordinate system. Z axis represents what would typically be considered "vertical."