Introduction

Our manufacturing industry generally – and 3D printing specifically – is driven by innovation. Indeed, key technological developments and new applications in industrial-grade 3D printing, or additive manufacturing, continue to advance this technology, which has only been around for a little more than 30 years.

Designers and engineers can now choose from several distinct classes of 3D printing technologies. Your choice of “tool” just depends on what it is you’re designing and what its final application is. Here’s a brief roundup of some of the main industrial-grade 3D printing options:

Source: https://www.medicaldesignandoutsourcing.com/3d-printing-options-medical-device-development/

Stereolithography (SL)

Stereolithography (SL) uses an ultraviolet laser that draws on the surface of a liquid thermoset resin to create thousands of thin layers until final parts are formed. SL is used to create concept models, cosmetic prototypes, and complex parts with intricate geometries.

Selective laser sintering (SLS)

Selective laser sintering (SLS) uses a CO2 laser that lightly fuses nylon-based powder, layer by layer, until final thermoplastic parts are created. SLS produces accurate prototypes and functional production parts.

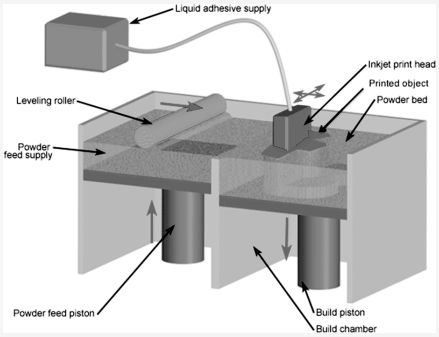
Direct metal laser sintering (DMLS)

Direct metal laser sintering (DMLS) uses a fiber laser system that draws onto a surface of atomized metal powder, welding the powder into fully dense metal parts. DMLS builds fully functional metal prototypes and production parts and works well to reduce metal components in multipart assemblies.

PolyJet

PolyJet uses a jetting process in which small droplets of liquid photopolymer are sprayed from multiple jets onto a build platform and cured in layers that form elastomeric parts. PolyJet produces multi-material prototypes with flexible features at varying durometers and is often used to concept overmolding designs.

3D Printing



Fused Deposition Modeling (FDM)

Fused deposition modeling (FDM) works by feeding a filament or spool of plastic into a heated nozzle, which then extrudes successive layers of thermoplastics onto the workpiece. FDM offers a wide thermoplastic material selection and is leveraged for iterative prototyping.

Continuous Liquid Interface Production (CLIP)

Carbon is the name of the company that is using a process called CLIP, Continuous Liquid Interface Production, which builds parts from the top down, unlike other additive technologies that work from the bottom up. Final plastic parts exhibit excellent mechanical properties and surface finishes.

Multi Jet Fusion

Multi Jet Fusion process selectively applies fusing and detailing agents across a bed of nylon powder, which are fused in thousands of layers by heating elements into a solid functional component. Final parts exhibit improved surface roughness, fine feature resolution, and more isotropic mechanical properties when compared to processes like SLS.