3D Printable Materials Information

Desktop 3d printing can be classified into two most prevailing technologies: the **SLA**(StereoLithograph apparatus) and the **FDM** (Fused Deposition Modeling). Based on these two categories this document discusses the type of materials to be used and their preferred applications.

FDM 3d Printer

SLA 3DPrinter

FDM materials:

	Material	**Description**	**Price**	**Application**
1	PLA Filament	Polylactic Acid, most commonly known as PLA, is a polymer made from renewable resources. Contrary to other thermoplastics which are petroleum-based, some of the raw materials used for PLA's production include corn starch, tapioca roots, or sugarcane. Melting temperature: 210 C	**~1200 INR /1Kg Spook**	Packaging materials, Dental Implants, Being a BioMaterial it is used in surgical tools as well. Toys, 3d Printer parts, prototyping parts before manufacturing.
2	ABS Filament	ABS or Acrylonitrile butadiene styrene is a common thermoplastic polymer typically used for injection molding applications. This engineering plastic is popular due to its low production cost and the ease with which the material is machined by plastic manufacturers. Melting Temperature : 240 C	**~1500 INR /1Kg Spool**	Most of electrical components are build using ABS, due to its high melting temperature can resist electrical residual heat from circuits thus being mostly used for casing of electrical circuits and toys ABS lasts realy long.
3	Nylon	Nylon plastic filaments can be used successfully in 3D printing. Compared to traditional ABS, nylon has several advantages: greater mechanical resistance of the minute and less tendency to delamination. Thanks to the self-sealing properties of nylon, better surface finish, no heated bed required or cooling systems. Melting Temperature: 240 C	**~5500 INR /Kg Spool**	Nylon is a hard tensile polymer much used for gears development and prototyping mechanical parts using 3d printing.
4	Wood Filament	Wood Filament is made with a mixture of bamboo wood and PHA/PLA. Parts are sturdy, like a block of wood. It feels and smells just like real wood Melting Temperature:170-220C	**~2500 /Kg Spool**	Display and design items – Trinkets and jewelry

5	Crystalized Filament	Usually made with crystalisation of PLA or PETG material	**~3390 INR /Kg Spool**	Transparent 3d prints, glass like 3d printing.
6	Dissolvable	These are low density polymer made usually to support a 3d print in different orientation usually used with multi material supporting 3d printers.	**~2200 INR /KG spool**	Used to print supports in 3d prints. So as to easily remove to support materials after 3d print
7	Flexible filament	These are silicon based filament made using composite of other 3d printable material these are soft flexible and cans be used like rubber mixed with other material conductive filaments are also available in this category Melting temp:220-240 C	**~3299 INR /Kg Spool**	Used to develope rubber like 3d prints like tyres, bands, etc.

SLA Materials:

SLA materials are usually resin based loquid polymer resin most of them are naturally occuring and some synthesized materials are also available.

Source: Formlabs

Standard resin has high tensile strength but is very brittle (very low elongation at break), so it is not suitable for functional parts. The ability to create fine features makes it ideal though for visual prototypes and art models.

Durable resin has the highest impact strength and elongation at break compared to the other SLA materials. It is best for prototyping parts with moving elements and snap-fits. It lacks though the strength thermoplastic 3D printing materials such, as SLA nylon.

Tough resin is a compromise between the material properties of durable and standard resin. It has tensile strength, so it is best suited for rigid parts that require high stiffness.

Heat resistant resin can withstand temperatures above 200^{o}C, but has poor impact strength and is even more brittle than the standard resin.

Ceramic reinforce resin has the highest tensile strength and flexural modulus, but is brittle (poor elongation at break and impact strength). It should be prefered over other engineering resins for parts with fine features that require a high stiffness.

Rubber-like resin allows engineers to simulate rubber parts that are soft to the touch. This material has a low tensile modulus and high elongation at break, and it is well-suited for objects that will be bent or compressed.

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(Internet Sources)