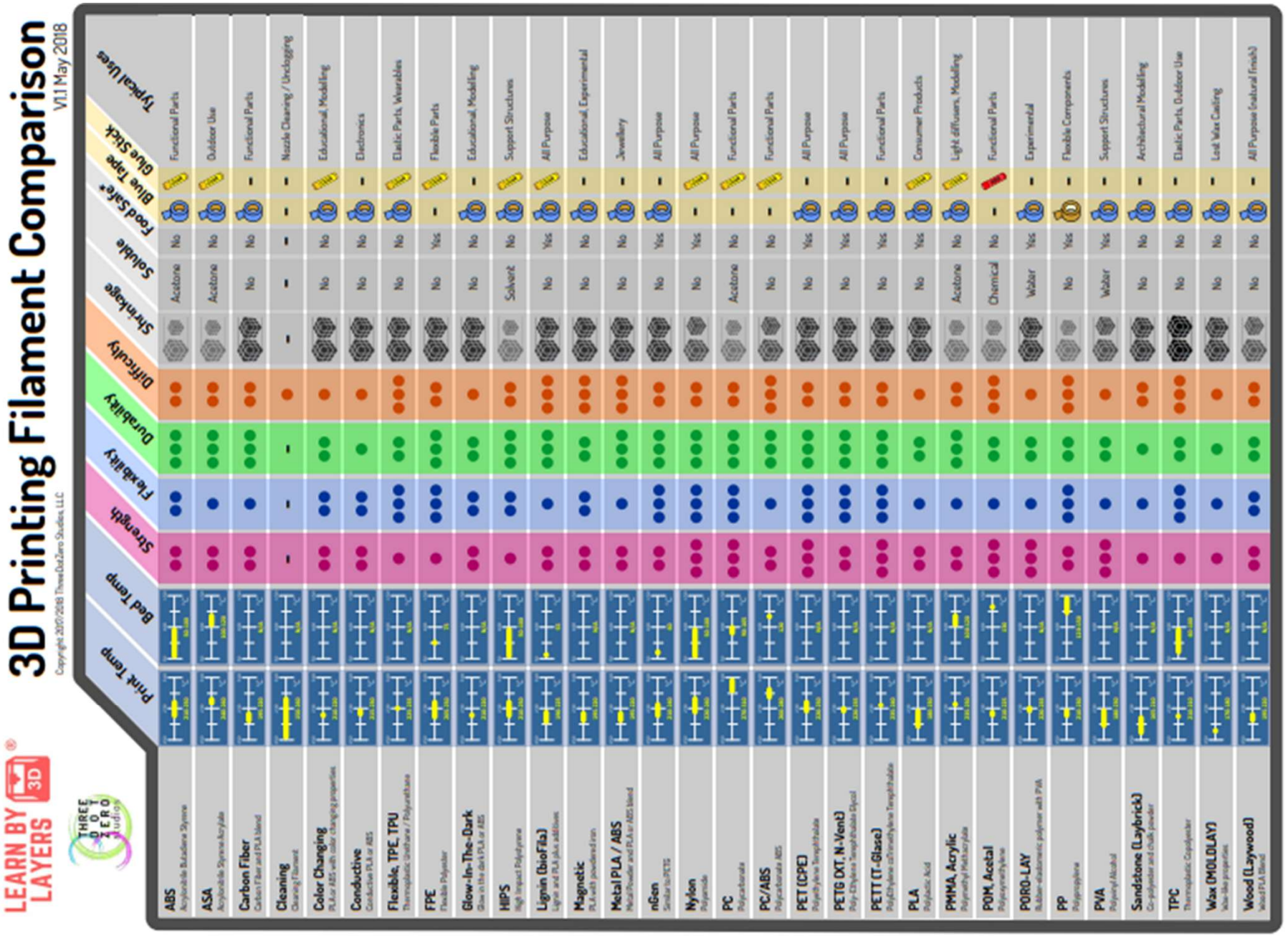
Filament 101

October 2025

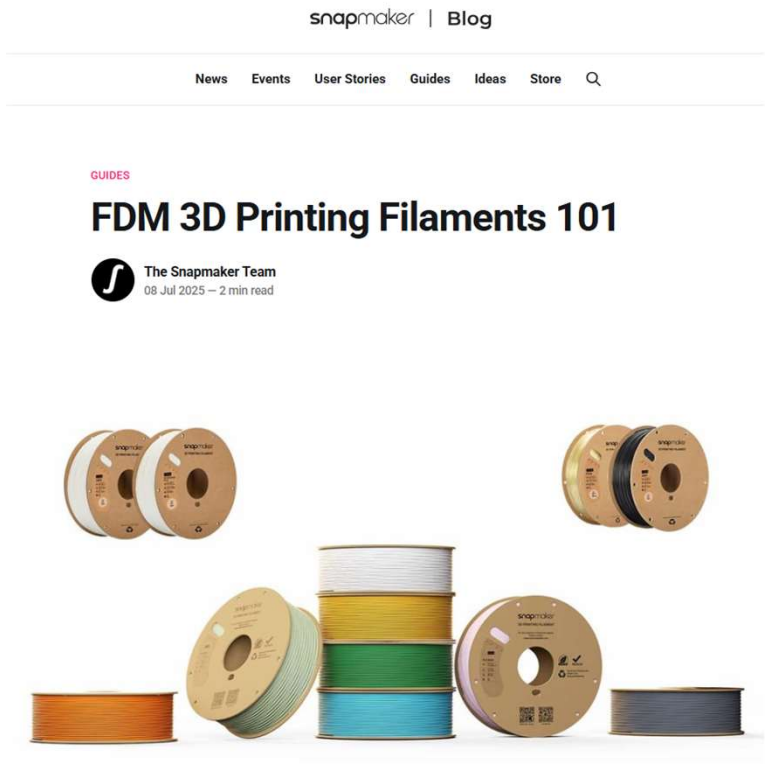


https://www.learnbylayers.com/wp-content/uploads/2018/06/ThreeDotZero-Filament-Comparison-LBL.pdf

Filament 101

- For beginners, choose either PLA or PETG: they are both easy and relatively cheap to print.
- Functional parts: Strong and durable materials that should be used are ABS, Nylon, and PC, for example, for any part that serves a functional purpose.
- Flexible Needs: TPU and PP flex with no breaking, suitable for flexible projects.
- High-heat settings: PC PEEK and ASA are high temperature-resistant.
- Decorative: Wood or metal filaments are ideal to create unique textures.
- Complex designs: Use PVA or HIPS to create complex designs.
- Include a comparison table: strength, heat resistance, cost, etc.

Filament Type	Strength	Heat Resistance	Cost
PLA	Medium	Low (60°C)	Low
PETG	High	Medium (75°C)	Medium
ABS	High	High (100°C)	Low
Nylon	Very High	High (90°C)	High
PC	Very High	Very high (150°C)	High
TPU	Medium	Medium (80°C)	Medium
PEEK	Very High	Extreme (250°C)	Very High
ASA	High	High (100°C)	High
PVA	Low	Low (50°C)	High



https://www.snapmaker.com/blog/fdm-3d-printing-filaments-101/

Filament 101

Common Types of 3D Filaments

1. PLA (Polylactic Acid)

PLA is one of the most popular and beginner-friendly filaments available. Made from renewable resources like corn starch or sugarcane, it's biodegradable and environmentally friendly.

Properties:

Ease of Use: Very forgiving and adheres well to the print bed.

Strength: Moderate strength and rigidity.

Temperature Resistance: Low; starts to deform around 60°C (140°F).

Finish: Has a glossy finish, making it great for detailed prints.

Best Uses: Ideal for prototypes, decorative items, and education projects.

https://3dprintingnews.com/2025/07/23/3d-filaments-101-a-beginners-guide-to-materials-and-their-properties/picsvg.com

Filament 101

SIMPLIFY3D® SOFTWARE INDUSTRIES RESOURCES BLOG COMPANY BUY

Ultimate 3D Printing Materials Guide

After over a year of research, countless filament spools, and hundreds of hours of printing, our team is proud to present the Ultimate 3D Printing Materials Guide. Covering over a dozen of the most popular materials in use today, this guide will help you select the best material for your next project or improve the quality of your prints with tips from our experts. Use the tags below to quickly sort the materials based on their characteristics, or view our extensive Filament Properties Table for a detailed side-by-side comparison. Once you have selected a material, view a detailed article with pros and cons, hardware requirements, best practices, pro-tips, example projects and more! Whether you're new to 3D printing or an advanced user looking to experiment with a new material, this guide has everything you need to make the most of your next project.

Select one of the materials below to get started. Each image highlights a sample project that was printed with that material.

All | Chemically Resistant | Composite | Dissolvable | Elastic | Fatigue Resistant | Flexible | Heat Resistant | Heated Bed Not Required | Impact Resistant | Rigid | Soft | UV Resistant | Water Resistant

ABS

ABS is a low-cost material, great for printing tough and durable parts that can withstand high temperatures.

Flexible

Flexible filaments, commonly referred to as TPE or TPU, are known for their elasticity allowing the material to easily stretch and bend.

PLA

PLA is the go-to material for most users due to its ease-of-use, dimensional accuracy, and low cost.

HIPS

HIPS is a lightweight material most commonly used as a dissolvable support structure for ABS models.

PETG

PET and PETG filaments are known for their ease of printability, smooth surface finish, and water resistance.

Nylon

Nylon is a tough and semi-flexible material that offers high impact and abrasion resistance. It is an ideal choice for printing durable parts.

Carbon Fiber Filled

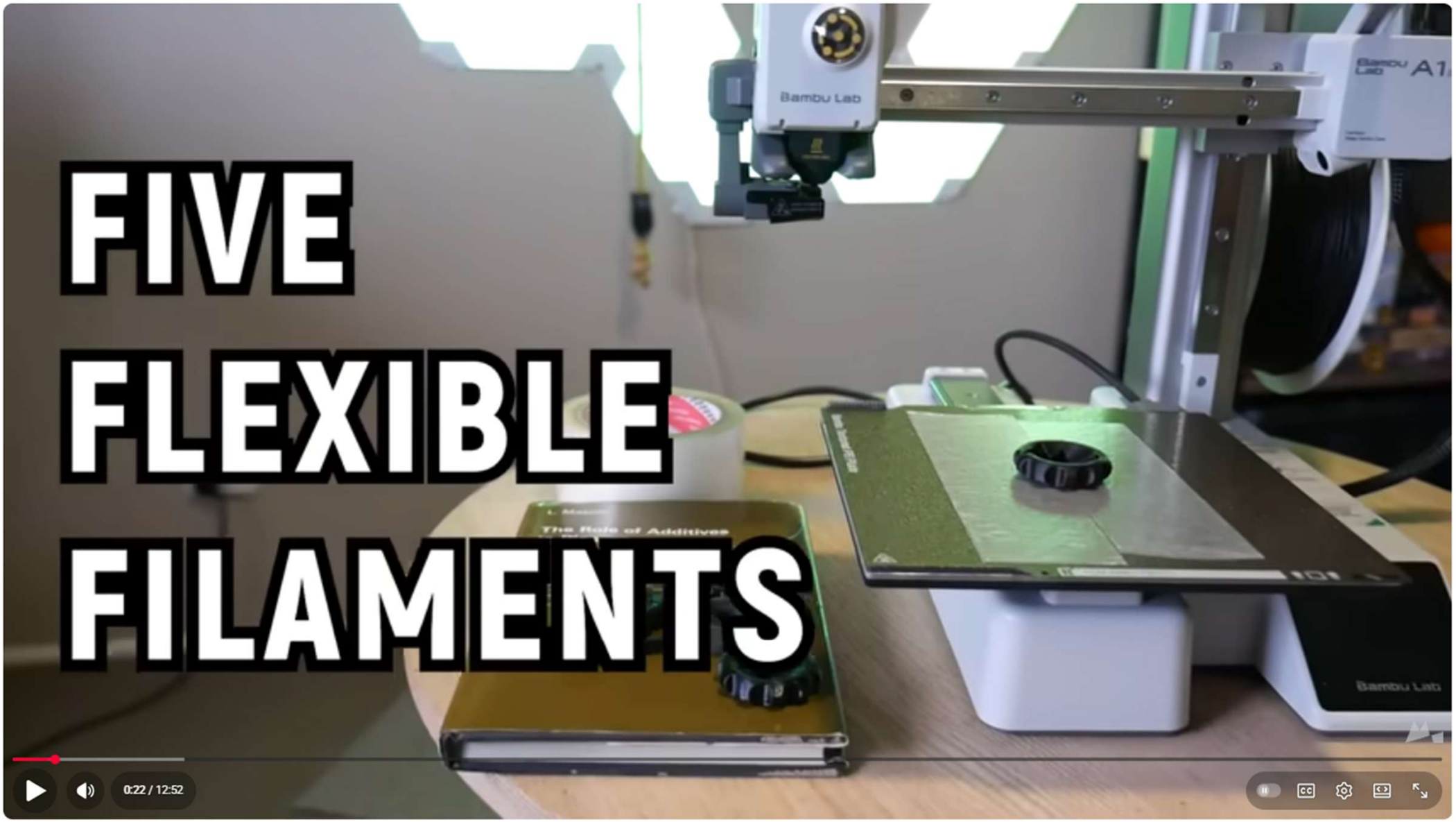
Carbon fiber filaments contain short fibers that are infused into a PLA or ABS base material to help increase strength and stiffness.

ASA

ASA is a common alternative to ABS and is great for outdoor applications due to its high UV, temperature, and impact resistance.

simplify3d.com/resources/materials-guide/

Filament 101

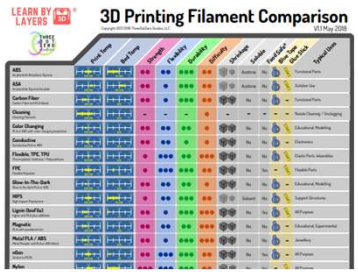


3D Printing Filaments that Flex, Bounce and FOAM!

https://www.youtube.com/watch?v=osuI3fD6L3g

Filament 101

October 2025



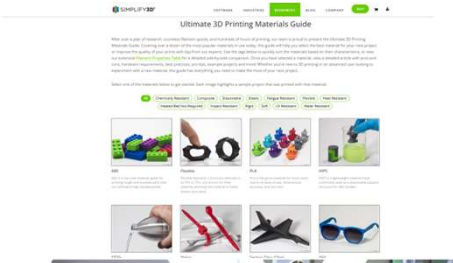
https://www.learnbylayers.com/wp-content/uploads/2018/06/ThreeDotZero-Filament-Comparison-LBL.pdf

- Include a comparison table: strength, heat resistance, cost, etc.

Filament Type	Strength	Heat Resistance	Cost
PLA	Medium	Low (60°C)	Low
PETG	High	Medium (75°C)	Medium
ABS	High	High (100°C)	Low
Nylon	Very High	High (90°C)	High
PC	Very High	Very high (150°C)	High
TPU	Medium	Medium (80°C)	Medium
PEEK	Very High	Extreme (250°C)	Very High
ASA	High	High (100°C)	High
PVA	Low	Low (50°C)	High

https://www.snapmaker.com/blog/fdm-3d-printing-filaments-101/

https://3dprintingnews.com/2025/07/23/3d-filaments-101-a-beginners-guide-to-materials-and-their-properties/picsvg.com



https://www.simplify3d.com/resources/materials-guide/

https://www.youtube.com/watch?v=osuI3fD6L3g

Filament 101 – Cliff Notes

- For beginners, choose either PLA or PETG: they are both easy and relatively cheap to print.
- Functional parts: Strong and durable materials that should be used are ABS, Nylon, and PC, for example, for any part that serves a functional purpose.
- Flexible Needs: TPU and PP flex with no breaking, suitable for flexible projects.
- High-heat settings: PC PEEK and ASA are high temperature-resistant.
- Decorative: Wood or metal filaments are ideal to create unique textures.
- Complex designs: Use PVA or HIPS to create complex designs.
- Include a comparison table: strength, heat resistance, cost, etc.

Filament Type	Strength	Heat Resistance	Cost
PLA	Medium	Low (60°C)	Low
PETG	High	Medium (75°C)	Medium
ABS	High	High (100°C)	Low
Nylon	Very High	High (90°C)	High
PC	Very High	Very high (150°C)	High
TPU	Medium	Medium (80°C)	Medium
PEEK	Very High	Extreme (250°C)	Very High
ASA	High	High (100°C)	High
PVA	Low	Low (50°C)	High