TECHNICAL DATA SHEET (TDS)

PLA Conductive Filament

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1. Product Description

PLA Conductive Filament is a polylactic acid (PLA)-based material enhanced with conductive additives (typically carbon-based) to provide electrical conductivity. It is designed for low-voltage electrical applications, prototyping of circuits, and projects requiring static dissipation or signal transmission.

This filament retains the ease of printing of standard PLA while offering functional conductivity, making it ideal for educational, prototyping, and creative electronics applications.

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2. Key Features

- Electrically conductive
- Easy to print (PLA-based)
- Low warping and minimal shrinkage
- Good surface finish
- Suitable for low-voltage circuits
- Compatible with most FDM 3D printers
- No heated enclosure required

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3. Typical Applications

- Printed circuits (low current)
- Touch sensors and capacitive buttons
- EMI shielding prototypes
- Wearable electronics
- Educational STEM projects
- Anti-static components
- Signal routing paths

4. Typical Material Properties

(Values are typical and not for specification purposes)

Mechanical Properties

Property	Test Method	Typical Value
Tensile Strength	ASTM D638	25 – 35 MPa
Tensile Modulus	ASTM D638	1500 – 2000 MPa
Elongation at Break	ASTM D638	3 – 8 %
Flexural Strength	ASTM D790	40 – 60 MPa

Thermal Properties

Property	Test Method	Typical Value
Glass Transition Temperature (Tg)	ASTM D3418	55 – 60 °C
Heat Deflection Temperature	ASTM D648	50 – 55 °C
Recommended Printing Temperature	—	200 – 220 °C
Recommended Bed Temperature	—	50 – 60 °C

Electrical Properties

Property	**Test Method**	**Typical Value**
Volume Resistivity	ASTM D257	10^2 – 10^5 Ω·cm
Surface Resistivity	ASTM D257	10^2 – 10^5 Ω/sq

Conductivity Type: Semi-Conductive / Conductive (application dependent)

Note: Conductivity may vary depending on print orientation, layer adhesion, and infill density.

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5. Printing Guidelines

- Nozzle Temperature: 200 – 220 °C
- Bed Temperature: 50 – 60 °C
- Cooling Fan: Medium to high
- Print Speed: 30 – 60 mm/s (slower speeds improve conductivity)
- Layer Height: 0.1 – 0.2 mm
- Nozzle: Hardened steel recommended (due to carbon additives)

Tips for Better Conductivity:

- Use higher infill (≥80%)
- Increase line width and layer bonding
- Print slower for better particle contact

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6. Storage Conditions

- Store in a cool, dry environment
- Keep sealed with desiccant
- Recommended humidity: < 50% RH

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7. Filament Specifications

Parameter	Specification
Diameter	1.75 mm ± 0.02 mm
Net Weight	1 kg
Density	~1.2 – 1.3 g/cm³
Color	Black (conductive grade)

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8. Limitations

- Not suitable for high-current applications
- Higher brittleness compared to standard PLA
- Conductivity is lower than metal conductors
- Not recommended for structural load-bearing parts

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9. Compliance

- RoHS Compliant
- REACH Compliant

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10. Safety Information

- Ensure good ventilation during printing
- Avoid inhalation of fumes
- Refer to MSDS for detailed safety handling