Electrifi Conductive PE Filament

Recommended Printing Parameters (FFF/FDM)

Electrifi Conductive PE Filament is a copper-filled polyethylene composite optimized for electrical performance and moderate thermal stability. The following parameters prioritize print reliability, dimensional control, and conductivity rather than print speed.

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1. Printer & Hardware Configuration (Critical)

- **Extruder type:**
  - **Direct-drive extruder strongly recommended**
  - Bowden-style extruders not recommended for best results
  - AMS / shared-path multi-material feed systems not compatible
- **Filament path:**
  - Short, straight, and well-constrained
  - Avoid sharp bends, long PTFE tubes, or high filament drag
- **Nozzle:**
  - Brass or hardened steel
  - **Minimum diameter:** 0.4 mm
  - **Preferred diameter:** 0.6 mm for improved flow and reliability

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2. Temperature Settings

Parameter	Recommended Range
Nozzle temperature	**170–200 °C**
Bed temperature	**40–60 °C**
Chamber temperature	Ambient (enclosure highly recommended)

Notes:

- Use the lowest nozzle temperature that provides stable extrusion
- Avoid prolonged dwell time at elevated nozzle temperature to reduce heat creep
- Lower standby nozzle temperature in start G-code when possible

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3. Print Speed & Motion

Parameter	Recommended Value
Print speed	**10–30 mm/s**
First-layer speed	**5–15 mm/s**
Travel speed	Moderate
Acceleration	Low to moderate

Lower speeds reduce compressive stress in the filament and improve electrical consistency.

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4. Retraction & Extrusion Control

Parameter	Recommendation
Retraction	**Minimize or disable**
Retraction distance	≤ 0.5 mm (if required)
Retraction speed	Slow
Coasting / wipe	Use cautiously

Excessive retraction is a common source of jams with conductive PE filaments.

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5. Layer & Geometry Settings

Parameter	Recommended Range
Layer height	**0.2–0.3 mm**
Line width	≥ nozzle diameter (preferably +10–20%)
Wall count	≥ 2 perimeters
Infill	100% for conductive features

Electrical performance improves with:

- Wider and thicker traces
- Shorter conductor lengths
- Fewer inter-layer interfaces

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6. Cooling

- **Part cooling fan:**
    - **OFF (0%) at all times**

    - Part cooling is not recommended, as forced cooling can reduce interlayer bonding and negatively impact electrical performance
- **Hotend cooling:**
    - Strong, continuous cooling of the heat break is essential to prevent heat creep

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7. Adhesion & Multi-Material Printing Notes

- Conductive PE adheres well to **PE and PP substrates**
- Adhesion to **PLA, ABS, PETG**, or other polymers may be limited without surface treatment or mechanical interlocking
- For multi-material designs, mechanical features (dovetails, press-fit slots) are recommended over reliance on chemical adhesion

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8. Material Handling

- Filament is moderately flexible; avoid tight bends
- Use low-drag spool holders
- Keep filament clean and dry
- Drying is typically not required

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9. Recommended Applications

- Printed conductors and interconnects
- Embedded heaters (≤ 85 °C continuous use)
- EMI shielding and grounding features
- Antennas and RF structures
- Functional electrical prototypes on PE/PP substrates

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10. Practical Note

Electrifi Conductive PE performs best when treated as a **conductive structural material**, not a solder replacement. Electrical performance is strongly influenced by **trace geometry, contact pressure, and interface design**, in addition to bulk conductivity.

For troubleshooting guidance, printer-specific profiles, or application support, please contact Multi3D, Inc.