Electrifi Conductive Pellets

Product Type: Highly conductive copper-filled thermoplastic pellets for extrusion, pellet-based additive manufacturing, and injection molding

Manufacturer: Multi3D, Inc.

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1. Product Description

Electrifi Conductive Pellets are a highly electrically conductive polymer composite supplied in pellet form for use in **pellet-fed additive manufacturing systems, filament extrusion, and injection molding**. Like Electrifi filament, the pellets achieve metal-like conductivity through a percolated copper network embedded in a thermoplastic matrix, enabling electrical functionality directly within molded or extruded polymer parts.

The pellet form is intended for **industrial processing routes** where higher throughput, improved consistency, and compatibility with standard polymer processing equipment are required. Compared to filament, pellets eliminate filament handling constraints and are better suited for scalable manufacturing.

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2. Key Features

- Electrical conductivity orders of magnitude higher than carbon-filled plastics
- Supplied in pellet form for industrial-scale processing
- Compatible with pellet extrusion 3D printers and injection molding machines
- Enables molded or printed conductive features without post-sintering
- Suitable for hybrid manufacturing workflows (printing + molding)

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3. Typical Properties

Note: Values are typical and depend on processing method, part geometry, and processing conditions.

Electrical Properties

Property	Typical Value
Volume resistivity	0.001–0.1 Ω·cm
Electrical conductivity	1,000–100,000 S/m
Temperature Coefficient of Resistance (TCR)	Positive

Physical Properties

Property	Typical Value
Density	~2.0–4.0 g/cm^3 (formulation dependent)
Pellet form	Cylindrical or lenticular pellets
Color	Metallic bronze

Thermal Properties

Property	Typical Value
Typical processing temperature	100–190 °C
Glass transition (polymer matrix)	Low (soft polymer system)
Recommended continuous use temperature	≤ 45 °C (suitable for room-temperature applications)

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4. Processing Guidelines

Recommended Processing Methods

- Pellet-fed extrusion 3D printing systems
- Filament extrusion lines (for conversion into Electrifi filament)
- Injection molding (low-shear, low-residence-time preferred)

General Processing Notes

- Use **moderate melt temperatures** to avoid thermal degradation
- Minimize residence time in the melt
- Avoid excessive shear, which may disrupt the conductive network
- Drying is typically not required, but pellets should be kept free of moisture and contamination

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5. Design Considerations

- Electrical resistance scales with **cross-sectional area and flow-induced orientation**
- Gate design and flow path in injection molding can influence conductivity
- Mechanical compression and robust interfaces improve electrical contact performance
- Avoid prolonged exposure to elevated temperatures during processing

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6. Applications

- Injection-molded conductive components
- Pellet-extruded conductive structures
- Bus bars and grounding features
- Embedded heaters and thermal elements
- EMI shielding components
- Feedstock for conductive filament production

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7. Compatibility & Assembly

- Compatible with conductive epoxies and low-temperature metal alloys (e.g., Field's metal)
- Best electrical performance achieved through mechanical contact and compression
- Not intended for conventional soldering processes

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8. Storage & Handling

- Store in sealed containers in a dry environment
- Prevent pellet deformation under load at elevated temperatures
- Avoid contamination with other polymers or fillers

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9. Disclaimer

The information provided in this data sheet is based on typical values and experience. Actual performance depends on processing equipment, part geometry, processing conditions, and application environment. Users should validate material suitability for their specific manufacturing process and end-use application.

For additional guidance, processing recommendations, or custom formulations, please contact Multi3D, Inc.