



Graphene4D Conductive PLA 3D Printing Filament

Graphene 4D's nanomaterial enhanced polylactic acid (PLA) filaments for 3D printing are improving the speed, strength, print quality and accuracy of 3D printed parts.

- Electrically conductive
- 50% increase in Young's modulus
- 30% increase in the strength of the filament
- 3x increase in thermal conductivity
- High quality print and excellent first layer adhesion and z-axis bonding

Product code: FM-ELC
Physical form: 1.75mm diameter filament packaged on 1000g reels
Appearance: Black filament
Product status: Commercial

Properties			
Property Tested	Method Standard	Units	Average Value
Filament:			
Volume Resistivity	ASTM D257-14	Ω .cm	3.2E+02
Young's Modulus	Internal	MPa	762
Tensile Strength	Internal	MPa	65
Strain to Failure	Internal	%	14
XY Direction Printed Test Specimens:			
Volume Resistivity	ASTM D257-14	Ω .cm	4.7E+05
Young's Modulus	ISO 527-2	MPa	3144
Tensile Strength	ISO 527-2	MPa	40
Strain to Failure	ISO 527-2	%	2.3
Thermal Conductivity	ASTM D7984	W/mK	0.41
Z Direction Printed Test Specimens:			
Volume Resistivity	ASTM D257-14	Ω .cm	4.5E+04
Young's Modulus	ISO 527-2	MPa	3057
Tensile Strength	ISO 527-2	MPa	36
Strain to Failure	ISO 527-2	%	1.4
Thermal Conductivity	ASTM D7984	W/mK	0.44
Injection Moulded Test Specimens:			
Volume Resistivity	ASTM D257-14	Ω .cm	3.5E+02
Young's Modulus	ISO 527-2	MPa	4184
Tensile Strength	ISO 527-2	MPa	65
Strain to Failure	ISO 527-2	%	2.4
Flexural Modulus	ISO 178	MPa	4114
Flexural Strength	ISO 178	MPa	103
Thermal Conductivity	ASTM D7984	W/mK	0.41

NB: All properties listed are typical properties only, using 1.75mm diameter filament unless stated otherwise. Data are indicative of as-tested performance and are not to be construed as specifications.

Processing Guidance • Graphene 4D Conductive PLA 3D printing filament can be processed on all FDM/FFF type 3D printers.

- Graphene 4D Conductive PLA 3D printing filament should typically be extruded using a nozzle temperature of 210°C and a heated bed temperature of 60°C is recommended for good first layer adhesion in 3D printing.
- Graphene 4D Conductive PLA 3D printing filament should be printed at a maximum of 50mm/sec using a 0.4mm brass or tungsten carbide nozzle (tungsten carbide recommended) with a retraction distance of 14mm and speed of 8mm/sec.
- Graphene 4D Conductive PLA 3D printing filament should not be left hot in the nozzle when not printing and should be removed immediately after printing using a forward purge followed by retraction.
- 3D printers, especially their nozzles, should always be maintained, and should be cleaned before and after use in line with the printer manufacturer's instructions.

Storage

PLA is a biodegradable thermoplastic polyester and will absorb moisture over time which can affect product performance. To ensure a good shelf life before use the 3D printing filament is packaged under a controlled vacuum and sealed to prevent moisture ingress. It is recommended that filament be kept in cool and dry conditions before use.

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