



Technical Data Sheet

Filalab PETG ESD

Product Information

Product Name	Filalab PETG ESD
Chemical Name	Polyethylene Terephthalate Glycol Copolymer with Graphene
Diameter	1.75 ± 0.05 mm
Manufacturer	Filalab, Vilnius, Lithuania

General Description

Filalab's PETG ESD filament, developed in collaboration with Graphmatech, is a premium electrostatic discharge (ESD) safe filament. Enhanced with graphene, it offers exceptional ESD protection, making it ideal for 3D printing applications that require secure handling of sensitive electronic components. The graphene provides a uniform, conductive surface while preserving PETG's durability and flexibility, ensuring reliable performance across various industrial and technical applications. This filament is designed for high-quality prints with minimal warping and excellent layer adhesion, making it a go-to choice for precision manufacturing and electronic enclosures.



Product Properties

Property	Sample orientation	Test Method	Result
Electrical properties			
Surface resistivity (260-280°C)	X	ASTM D257 applied voltage: 100V	6.8E06 – 3.1E06 Ω/sq.
	Z		1.9E09 – 4.9E07 Ω/sq.
	X	ASTM D257 applied voltage: 500V	4.8E06 – 2.6E06 Ω/sq.
	Z		4.4E08 – 4.9E07 Ω/sq.
Mechanical properties			
Flexural modulus (250-280°C)	X	ISO 178, method B	1.2 – 2.3 GPa
Flexural Strength (250-280°C)			75 – 80 MPa
Tensile modulus (260-280°C)	X	ISO 527	1540 – 2040 MPa
Ultimate strength (260-280°C)			21.9 – 31.2 MPa
Elongation at break (260-280°C)			1.7 – 1.8 %

Samples were prepared on Creality Ender 3 S1 Pro and a 0.4 mm brass nozzle. Printing speeds were up to 100 mm/s, and the layer height was 0.2 mm.



Illustration of sample orientations:

Mechanical specimens are printed in their indicated orientations. For electrical specimens, the noted orientation represents the direction of current flow during ASTM D257 measurements, which is perpendicular to the silver electrode lines.



Printing Guidelines

Filalab PETG ESD filament gains its ESD properties with only a small fraction of graphene. Thus, nozzle clogging, and abrasion is not an issue. The surface conductivity is affected by the printing temperature, so staying within the recommended settings for ESD typically yields the desired surface resistance.

Recommended Printing Settings

Nozzle Temperature	250-285°C
Recommended nozzle temperature for ESD	260-280 °C
Bed Temperature	85°C
Fan Speed	Slow (0-40%)
Max speed (0.2 mm layer)	100 mm/s
First layer speed	25 mm/s
Outer wall speed	50 - 70 mm/s
Max volumetric flow	10 mm ³ /s
Flow ratio	0.95 - 0.98
Bed Type	Textured PEI Sheet, Smooth PEI Sheet*
Filament Drying Recommendations	Temperature: 55-65°C, Drying Time 6-12 hours



Safety Information:

Filalab PETG ESD Filament is non-toxic and safe for general use. However, ensure proper ventilation during printing to avoid inhaling any fumes that may be produced. Always consult the Safety Data Sheet (SDS) for more detailed safety guidelines.

Storage, Handling, and Drying Process:

PETG filament is hygroscopic, meaning it readily absorbs moisture from the air. Excessive moisture can lead to printing defects such as bubbling, poor surface finish, and reduced layer adhesion. To ensure optimal print quality, proper storage and drying of Filalab PETG Filament are essential.

Storage:

- **Environment:** Store in a cool, dry place away from direct sunlight and high humidity.
- **Sealing:** Keep the filament sealed in an airtight container with desiccant to prevent moisture absorption.
- **Desiccant Use:** Use silica gel packets or other desiccants inside the storage container to maintain low humidity levels.

Drying Process:

- **Drying Temperature:** 65-70°C (149-158°F)
- **Drying Duration:** 4-6 hours, depending on the level of moisture absorption
- **Drying Equipment:** Use a filament dryer, convection oven, or a food dehydrator with temperature control to remove moisture before printing.

After drying, immediately store the filament in an airtight container to prevent reabsorption of moisture during or between printing sessions.



Features:

- **ESD-Safe:** PETG ESD offers reliable electrostatic discharge protection, making it ideal for applications involving static-sensitive components.
- **Enhanced Durability:** With the toughness of standard PETG, this filament creates impact-resistant and durable parts.
- **Conductive Graphene:** The addition of graphene ensures effective conductivity, providing consistent ESD protection.
- **Chemical Resistance:** PETG ESD resists a variety of chemicals and solvents, suitable for industrial and electronics environments.
- **Minimal Warping:** It offers low shrinkage and strong layer bonding, resulting in accurate and stable prints.
- **Matte Finish:** The filament's matte finish gives parts a non-reflective, professional look, perfect for sleek, functional designs.

Pros and Cons:

Pros:

- High strength and flexibility
- Excellent chemical resistance
- Low shrinkage and good clarity
- ESD-Safe

Cons:

- Higher printing temperatures required
- Prone to stringing if not properly tuned and dried