

# Technical Data Sheet

## PLA PROGRAFEN GRAPHENE STRONG

Prografen PLA Graphene Strong is a high-quality polymer 3D printer filament created from renewable materials. This filament was developed in response to market demand for a professional material that would unleash the full potential of the latest generation of 3D printers. PLA with the addition of graphene allows for the production of precise details at ultra-high printing speeds without issues with voids or stringing. This is possible due to its high MFR and extremely low shrinkage. The components of the filament are poly(lactic acid) and flake graphene. In addition, the material does not require special nozzles or climate chambers. Graphene doping also increases the stiffness of the material by over 15% compared to pure polymer.

- MFR 115% higher than pure PLA.
- Ability to print faster at the same nozzle temperature compared to pure PLA.
- Ability to print at a lower temperature while maintaining the same speed compared to pure PLA.
- Less shrinkage compared to pure PLA.
- Stiffness (Young's modulus) 15% higher than pure PLA.
- Can be extruded with standard nozzles without the risk of excessive wear unlike carbon fibre materials.
- Biodegradable.

### Applications

Potential applications for PLA PROGRAFEN GRAPHENE STRONG include:

- Prototype 3D models
- Spare parts
- Construction elements
- Every-day-use items

### Processing Information

PLA PROGRAFEN GRAPHENE STRONG is easily processed on FDM/FFF 3D printers. The material is stable in the filament state, if it is being stored in a dry environment

### Process Details

#### Preparation for printing

PLA GRAPHENE STRONG is graphene enhanced PLA filament, before printing following steps must be taken:

1. **Load filament into extruder head:** Is very important to heat up extruder before printing (optimal extruder temperature are 190-210 °C). When extruder reach set temperature insert filament into the way approved by 3D Printer manufacturer.
2. **Level up printing table and turn up it's heating** (optimal printing table temperatures for PLA are 0-45 °C).
3. **Upload previously prepared 3D model into 3D printer controller.**

4. **Printing process can be started.**

#### Storage

In order to maintain the highest possible quality of the printout, care should be taken to properly protect the filament against moisture. The filament should be stored in a cool, dry and shaded place. In case of problems with too high humidity, drying agents can be used, which should be placed in the filament packaging. The original packaging maintains optimal humidity and temperature of the filament.

### Typical Material & Application Properties <sup>(1)</sup>

Physical Properties	PLA PROGRAFEN GRAPHENE STRONG	Method
Specific Gravity	1.24	D792
MFR, g/10 min (230°C, 2.16kg)	44.0	ISO 1133
Color	Black	
Mechanical Properties		
Tensile Strength, MPa	58.43 ± 0.40	ISO 527
Tensile Modulus of elasticity, MPa	1756.74 ± 36.96	ISO 527
Elongation at break, %	4.39 ± 0.26	ISO 527
Impact strength, kJ/m <sup>2</sup>	2.10 ± 0.16	ISO 179

(1) Typical properties; not to be construed as specifications.

### Processing Temperature Profile <sup>(1)</sup>

Extruder Head Temperature	190-210°C
Printing table Temperature	35-45°C
Post-treatment	Painting

(1) These are starting points and may need to be optimized.

## **PLA PROGRAFEN GRAPHENE STRONG Technical Data Sheet**

### **Safety and Handling Considerations**

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Safety Data Sheets (SDS) for PLA PROGRAFEN GRAPHENE STRONG are available at <https://prografen.com>. SDS's are provided to help customers satisfy their own handling, safety, and disposal needs, and those that may be required by locally applicable health and safety regulations. SDS's are updated regularly; therefore, please request and review the most current SDS's before handling or using any product.

### **Hazards and Handling Precautions**

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PLA biopolymers have a very low degree of toxicity and under normal conditions of use, should pose no unusual problems from incidental ingestion or eye and skin contact. However, caution is advised when handling, storing, using, or disposing of these resins, and good housekeeping and controlling of dusts are necessary for safe handling of product. No other precautions other than clean, body-covering clothing should be needed for handling PLA biopolymers. Use gloves with insulation for thermal protection when exposure to the melt is localized. Good general ventilation of the polymer processing area is recommended. At temperatures exceeding the polymer melt temperature (typically 175°C), polymer can release fumes, which may contain fragments of the polymer,

creating a potential to irritate eyes and mucous membranes. Good general ventilation should be sufficient for most conditions. Local exhaust ventilation is recommended for melt operations. Use safety glasses (or goggles) to prevent exposure to particles, which could cause mechanical injury to the eye.

### **Disposal**

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DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. For unused or uncontaminated material, the preferred option is to recycle into the process otherwise, send to an incinerator or other thermal destruction device. For used or contaminated material, the disposal options remain the same, although additional evaluation is required. Disposal must be in compliance with Federal, State/Provincial, and local laws and regulations.

### **Environmental Concerns**

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Due to its chemical composition, PLA does not pose a threat to the environment. Nevertheless, plastics should be disposed of in appropriately labeled containers.

#### **Contact:**

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