PROGRAFEN PLA GRAPHENE STRONG

1 DESCRIPTION

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 EFG[1] (Edge Functionalized Graphene) 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.

2 KEY FEATURES

- 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.
- Easy and safe to print.
- Deep black colour.
- Biodegradable.

3 APPLICATIONS

- Prototype 3D models.
- Spare and service parts.
- Molds and masks for moulding other materials.
- Educational aids and miniatures.
- Everyday objects.

[1] Graphene EFG is a product of Garmor Inc, of which AGP is the exclusive European distributor.

4 PROPERTIES

Table 1: Filament properties

Properties	Value	
Diameter	1,75 ± 0,05 [mm]	
Weight	0,5 [kg]	1,0 [kg]
Length	170 [m]	330 [m]

Table 2: Physical properties of the material

Physical properties	Value	Method
Density	1,24 [g/cm^3]	Mass and volume measurement
Colour	black	-

Table 3: Mechanical properties of the material

Mechanical properties	Value	Method
Tensile strength*	58,43 ± 0,40 [MPa]	PN-EN ISO 527
Stress at break*	58,27 ± 0,41 [MPa]	PN-EN ISO 527
Relative elongation at max. stress	4,29 ± 0,15 [%]	PN-EN ISO 527
Relative elongation at break	4,39 ± 0,26 [%]	PN-EN ISO 527
Tensile modulus of elasticity	1756,74 ± 36,96 [MPa]	PN-EN ISO 527
Impact strength*	2,10 ± 0,16 [kJ/m^2]	PN-EN ISO 179

Table 4:Thermal properties of the material

Thermal properties	Value	Method
MFR	44,0 [g/10 min]	ISO 1133 (230 °C; 2,16 Kg)
Glass transition temperature	59-63 [°C]	ISO 11357
Melting point	146-155 [°C]	ISO 11357
Heat Deflection Temperature*	52,9 ± 0,1 [°C]	PN-EN ISO 75 (0,45 MPa)
Shrinkage	Minimal	-

Table 5: Printing conditions

Parameter	Value
Nozzle temperature	190-210 [°C]
Bed temperature	20-60 [°C]
Print speed	60-500 [mm/s]
Bed type	PEI board (smooth)

5 STORAGE:

Mechanical tests were carried out on samples moulded using the FDM method - filling 100%, XY printing direction. Test marked * carried out by a method accredited by the Polish Centre for Accreditation.

In order to maintain the highest possible quality of the product, care should be taken to adequately protect the 3D filament from moisture. Filament should be stored in a cool, dry and shaded place. In the case of problems with high humidity, it is recommended that the material be sealed in a sealable container with suitable drying agents. The original packaging maintains the optimum moisture content of the material.

6 SAFETY AND HANDLING CONSIDERATIONS:

In order to see the full safety information, please refer to the chemical safety data sheets for the substance. Safety data sheets for Prografen products are available at www.prografen.com. PLA-type biopolymers have a very low degree of toxicity. Under normal conditions of use, they should not pose a hazard or unusual problems if swallowed or in contact with the skin or eyes. It is recommended to use the product in a ventilated room. The material is flammable.

Disposal and environmental impact:
PLA, due to its chemical composition, does not pose a threat to the environment. Plastics should be disposed of properly in accordance with local regulations. The best way to dispose of PLA is industrial composting.

7 CONTACT INFORMATION

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