

# Material Sheet

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## Handling Notice

### Resin Materials

- Always wear gloves when handling uncured resin. If skin contact with resin occurs, flush with plenty of water and use soap if available for several minutes. If skin reactions occur, it could require medical treatment immediately.
- Do not expose this light-sensitive material to direct light source when opening the bottle.
- Resin in tank should be filtered before reuse.
- Wasted resin can be exposed under the sunlight/UV light until it solidified for disposal as plastic waste.

### Powder Materials

- Wear personal protective equipment during all work in the process chamber.
- Prepare suitable fire extinguisher. (Class D will be required for SLS/SLM).
- Ensure the room where machine is installed is adequately ventilated.

We recommend following OSHA Personal Protective Equipment guideline and selecting protective equipment. Read more: Occupational Safety and Health Administration, <https://www.osha.gov/>

## Chemical Information

All thermal energy reactions of materials can really depend on the properties like its glass transition temperature, melting point, and environmental conditions (e.g., print bed temperature, nozzle temperature, printer model, and cooling fans control) causing it to melt or solidify.

The information provided in this sheet is based on certain testing conditions that should help users to make an independent determination of the usage and wastage of the materials in a safe manner.

### Resin Materials

- The HDT of resins is a temperature range under certain testing conditions measured by ASTM D648.
- This does not explain for the resin that there is no chemical change or energy absorption below the temperature of HDT. It explains when a resin deforms under a specified load, due to a phase change.
- The thermal energy reaction is considered as an irreversible process, which means that the materials cannot be converted back to liquid for reuse.

## Important Notice

- It is suggested to use a hardened steel nozzle (HSN) for the abrasive filament, optional parts as follows:

Part Number	Printer Models
RSC1SXY100F	PartPro200 xTCS
RS3PMXY103D	Partpro300 xT

## Document History

Date	Description	Version	Editor
2018-12-18	Initial Draft	18.12.A	Andy Yan
2019-11-12	1. Revise BVOH 2. Add PC	19.11.A	Andy Yan
2019-11-22	1. Add PartPro200 xTCS supports filament 2. Modify color and weight	19.11.B	Ethan Chang
2019-12-11	1. Add Compatible sheet	19.12.A	Ethan Chang
2019-12-12	1. Modify Compatible sheet	19.12.B	Ethan Chang



## ABS (Acrylonitrile Butadiene Styrene)

ABS filament is a common and well-known thermoplastic used in consumer electronics and automotive components. The material offers superior layer bonding and high printability that make its greater resistance ideal for making functional prototypes. The characteristics of ABS are as follows:

- A cost-effective alternative to other materials
- High hardness and long lasting
- Good heat resistance and durability
- Smooth and consistent finish

IDENTIFICATION	
Material Name	ABS filament
Product Use	Printing material for 3D printers using FFF technology
For use with	<input checked="" type="checkbox"/> PartPro200 xTCS <input checked="" type="checkbox"/> PartPro300 xT
SPECIFICATIONS	
Color	Various (incl. red, white, black, steel blue, bottle green, grape purple, sun orange, cyber yellow and nature)
Package Available (N/W)	600 g ; 1 kg ; 3 kg
Filament Diameter	1.75 mm
MECHANICAL PROPERTIES	
Tensile Strength	174.55 kg/cm <sup>2</sup>
Tensile Elongation	3.88 %
Flexural Strength	358.47 kg/cm <sup>2</sup>
Flexural Modulus	11731.37 kg/cm <sup>2</sup>
Impact Strength	106.83 J/m
THERMAL PROPERTIES	
Storage Temperature	10-40 °C / 50-104 °F
Operation Temperature	15-32 °C / 59-90 °F
Nozzle Temperature	210-240 °C / 410-464 °F
Print Bed Temperature	70-90 °C / 158-194 °F



## PLA (Polylactic Acid)

PLA filament is a bio-compostable plastic derived from corn starch, sugar cane, or other sugar-containing crops. The most eco-friendly material requires lower printing temperatures perfect for making craft projects, children toys, and disposable items. The characteristics of PLA are as follows:

- A cost-effective alternative to other materials
- More environmental-friendly
- Great tensile strength
- Good dimensional accuracy and surface quality

IDENTIFICATION	
Material Name	PLA filament
Product Use	Printing material for 3D printers using FFF technology
For use with	<input checked="" type="checkbox"/> PartPro200 xTCS <input checked="" type="checkbox"/> PartPro300 xT
SPECIFICATIONS	
Color	Various (incl. neon magenta, neon green, clear yellow, clear green, clear tangerine, clear red, clear blue, white, black, nature, blue, green, yellow, silver, purple)
Package Available (N/W)	600 g ; 1 kg ; 3 kg
Filament Diameter	1.75 mm
MECHANICAL PROPERTIES	
Tensile Strength	316.93 kg/cm <sup>2</sup>
Tensile Elongation	3.98 %
Flexural Strength	702.70 kg/cm <sup>2</sup>
Flexural Modulus	23186.07 kg/cm <sup>2</sup>
Impact Strength	40.97 J/m
THERMAL PROPERTIES	
Melting Point	175 °C / 347 °F
Storage Temperature	10-40 °C / 50-104 °F
Operation Temperature	15-32 °C / 59-90 °F
Nozzle Temperature	190-215 °C / 374-419 °F
Print Bed Temperature	45 °C / 113 °F



## Tough PLA

Tough PLA is a biocompostible consumable that has better toughness than ABS and has stronger impact resistance than PLA. This allows you to create durable, impact resistant tools, accessories, and parts that make your finished product more reliable. The characteristics of Tough PLA filament are as follows:

- A cost-effective alternative to other materials
- High rigidity and tensile strength
- Withstand a severe impact-load
- DEHP free

IDENTIFICATION	
Material Name	Tough PLA filament
Product Use	Printing material for 3D printers using FFF technology
For use with	<input checked="" type="checkbox"/> PartPro200 xTCS <input checked="" type="checkbox"/> PartPro300 xT
SPECIFICATIONS	
Color	Various (incl. white, black)
Package Available (N/W)	600 g ; 1 kg ; 3 kg
Filament Diameter	1.75 mm
MECHANICAL PROPERTIES	
Tensile Strength	356.28 kg/cm <sup>2</sup>
Tensile Elongation	2.05 %
Flexural Strength	759.94 kg/cm <sup>2</sup>
Flexural Modulus	29995.2 kg/cm <sup>2</sup>
Impact Strength	53.25 J/m
THERMAL PROPERTIES	
Melting Point	175 °C / 347 °F
Storage Temperature	10-40 °C / 50-104 °F
Operation Temperature	15-32 °C / 59-90 °F
Nozzle Temperature	190-215 °C / 374-419 °F
Print Bed Temperature	45°C / 113 °F



## Antibacterial PLA

The Antibacterial PLA is a special filament which uses silver ions to inhibit bacterial growth by at least 99 percent, greatly reducing the risk of infections. Its antibacterial agent also complies with RoHS regulations, making it the ideal 3D printing material for households and schools. The characteristics of Antibacterial PLA filament are as follows:

- RoHS compliant
- Enhanced protection against germs and infections
- Safe and hygienic material
- Good for personalized pottery, kitchen measuring tools, and bathroom accessories

IDENTIFICATION	
Material Name	Antibacterial PLA filament
Product Use	Printing material for 3D printers using FFF technology
For use with	<input checked="" type="checkbox"/> PartPro200 xTCS <input checked="" type="checkbox"/> PartPro300 xT
SPECIFICATIONS	
Color	Various (incl. white, red, yellow, neon green)
Package Available (N/W)	600 g
Filament Diameter	1.75 mm
MECHANICAL PROPERTIES	
Tensile Strength	316.93 kg/cm <sup>2</sup>
Tensile Elongation	3.98 %
Flexural Strength	702.70 kg/cm <sup>2</sup>
Flexural Modulus	23186.07 kg/cm <sup>2</sup>
Impact Strength	40.97 J/m
THERMAL PROPERTIES	
Melting Point	175 °C / 347 °F
Storage Temperature	10-40 °C / 50-104 °F
Operation Temperature	15-32 °C / 59-90 °F
Nozzle Temperature	190-215 °C / 374-419 °F
Print Bed Temperature	45°C / 113 °F



## XYZ Carbon Fiber

The XYZ Carbon Fiber filament is made from high quality PLA and 15% carbon fiber. An exotic material which gives your printing objects a more rigid and highly impact-resistant result. Its material properties finish the prints with a slight gloss and an excellent structural strength perfect for making remote controlled vehicles, drones, propellers, and frames. The characteristics of XYZ Carbon Fiber are as follows:

- Increased strength and stiffness (over PLA)
- Better dimensional and higher thermal stability
- Higher temperature resistance
- Lightweight

IDENTIFICATION	
Material Name	XYZ Carbon Fiber filament
Additive	15 % carbon fiber
Product Use	Printing material for 3D printers using FFF technology
For use with	<input checked="" type="checkbox"/> PartPro200 xTCS <input checked="" type="checkbox"/> PartPro300 xT
SPECIFICATIONS	
Color	Black
Package Available (N/W)	600 g ; 1 kg
Filament Diameter	1.75 mm
MECHANICAL PROPERTIES	
Tensile Strength	330.97 kg/cm <sup>2</sup>
Tensile Elongation	2.11 %
Flexural Strength	606.30 kg/cm <sup>2</sup>
Flexural Modulus	29957.23 kg/cm <sup>2</sup>
Impact Strength	43.88 J/m
THERMAL PROPERTIES	
Melting Point	175 °C / 347 °F
Storage Temperature	10-40 °C / 50-104 °F
Operation Temperature	15-32 °C / 59-90 °F
Nozzle Temperature	215 °C / 419 °F
Print Bed Temperature	45 °C / 113 °F

### Important Notice:

- It is suggested to use a hardened steel nozzle (HSN) for the abrasive filament, optional parts as listed on the cover page.



## Premium Metallic PLA

The Premium Metallic PLA filament is made from high quality PLA and 65% copper powder. Its characteristics allow the outer surface of printed objects to be polished to a reflective metallic shine. The material is often used for making metallic looking and feeling objects (e.g., statues, artifact replicas, and ornaments). The characteristics of Premium Metallic PLA are as follows:

- Metal-like feel and surface shine
- High stiffness and high precision
- Easy polishing and post-processing
- PLA-based filament; two times heavier (than PLA)

IDENTIFICATION	
Material Name	Premium Metallic PLA filament
Additive	65 % copper powder
Product Use	Printing material for 3D printers using FFF technology
For use with	<input checked="" type="checkbox"/> PartPro200 xTCS <input checked="" type="checkbox"/> PartPro300 xT
SPECIFICATIONS	
Color	Red
Package Available (N/W)	600 g ; 1 kg
Filament Diameter	1.75 mm
MECHANICAL PROPERTIES	
Tensile Strength	190.57 kg/cm <sup>2</sup>
Tensile Elongation	1.27 %
Flexural Strength	179.42 kg/cm <sup>2</sup>
Flexural Modulus	10461.36 kg/cm <sup>2</sup>
Impact Strength	49.66 J/m
THERMAL PROPERTIES	
Melting Point	175°C / 347 °F
Storage Temperature	10-40 °C / 50-104 °F
Operation Temperature	15-32 °C / 59-90 °F
Nozzle Temperature	200 °C / 392 °F
Print Bed Temperature	45 °C / 113 °F

### Important Notice:

- It is suggested to use a hardened steel nozzle (HSN) for the abrasive filament, optional parts as listed on the cover page.





## PETG (Polyethylene terephthalate Glycol-modified)

PETG filament is a durable and high impact resistance thermoplastic used in consumer products, mechanical parts, and protective components. The material offers excellent UV light resistance that adds to printed objects' toughness and keeps them from yellowing. It is also made from recyclable materials, ideal for eco-friendly field application. The characteristics of PETG are as follows:

- High strength and ductility
- High transparency and good gloss
- More environmental-friendly and odorless
- Better water-resistance

<b>IDENTIFICATION</b>	
Material Name	PETG filament
Product Use	Printing material for 3D printers using FFF technology
For use with	<input checked="" type="checkbox"/> PartPro200 xTCS <input checked="" type="checkbox"/> PartPro300 xT
<b>SPECIFICATIONS</b>	
Color	Various (incl. nature, clear red, clear blue, clear tangerine)
Package Available (N/W)	600 g ; 1 kg ; 3 kg
Filament Diameter	1.75 mm
<b>MECHANICAL PROPERTIES</b>	
Tensile Strength	206.11 kg/cm <sup>2</sup>
Tensile Elongation	3.72 %
Flexural Strength	359.64 kg/cm <sup>2</sup>
Flexural Modulus	10683.00 kg/cm <sup>2</sup>
Impact Strength	15.70 J/m
<b>THERMAL PROPERTIES</b>	
Melting Point	Not defined
Storage Temperature	10-40 °C / 50-104 °F
Operation Temperature	15-32 °C / 59-90 °F
Nozzle Temperature	190-235 °C / 374-455 °F
Print Bed Temperature	45 °C / 113 °F



### BVOH (Butenediol Vinyl Alcohol Co-polymer)

BVOH is water-soluble filament which is the perfect PLA/ Tough PLA/ PETG support material, immerse the object in clean water at ambient temperature until the material dissolves and falls apart from the object.

<b>IDENTIFICATION</b>	
Material Name	BVOH (Butenediol Vinyl Alcohol Co-polymer)
Product Use	Printing material for 3D printers using FFF technology
For use with	<input checked="" type="checkbox"/> PartPro200 xTCS <input checked="" type="checkbox"/> PartPro300 xT
<b>SPECIFICATIONS</b>	
Color	Natural
Package Available (N/W)	1 kg
Filament Diameter	1.75mm
<b>MECHANICAL PROPERTIES</b>	
Tensile Strength	NA
Tensile Modulus	NA
Flexural Strength	NA
Flexural Modulus	NA
Impact Strength	NA
<b>THERMAL PROPERTIES</b>	
Melting Point	176°C / 349 °F
Storage Temperature	10-40 °C / 50-104 °F avoid moisture
Operation Temperature	15-32 °C / 59-90 °F
Print Temperature	210 °C / 410 °F
Print Bed Temperature	45 °C / 113 °F
<b>OTHERS</b>	
Printing notice	BVOH filament absorbs moisture easily from their surroundings. Please seal the filament into the zipper bag and put in the electronic dry box (Set under 30% RH) after finish printing.
Wastewater treatment	20 times weight of water to this material required for disposal (i.e >20cc water to 1g BVOH) with a maximum of 2kg of BVOH per day. When more BVOH is to be used per day, professional organic effluent treatment will be required.



## PC (Polycarbonate)

PC (Polycarbonate) whose appearance is clear and transparent, anti-high temperature, high strength, and high impact resistance make it for a wide range of industrial applications.

The characteristics of PC filament are as follows:

- High impact resistance
- High strength
- Medium toughness between Nylon and ABS (Nylon > PC > ABS)
- Anti-high temperature

IDENTIFICATION	
Product Name	PC (Polycarbonate)
Material Name	Printing material for 3D printers using FFF technology
Application	<ul style="list-style-type: none"> <li>- Prototypes</li> <li>- 3C production's case</li> <li>- Lampshade</li> <li>- Car parts (inside)</li> </ul>
For use with	<input checked="" type="checkbox"/> PartPro200 xTCS <input checked="" type="checkbox"/> PartPro300 xT
SPECIFICATIONS	
Color	White
Package Available (N/W)	3 kg
Filament Diameter	1.75 mm
MECHANICAL PROPERTIES	
Tensile Strength(Kgf/cm <sup>2</sup> )	315.06
Tensile Elongation(%)	3.85
Flexural Strength(Kgf/cm <sup>2</sup> )	474.99
Flexural Modulus(Kgf/cm <sup>2</sup> )	9839.75
Impact Strength(J/m)	191.17
THERMAL PROPERTIES	
Storage Temperature	10-40 °C / 50-104 °F avoid moisture
Operation Temperature	15-32 °C / 59-90 °F
Print Temperature	260 °C / 500°F
Print Bed Temperature	100 °C / 212°F
OTHERS	
Printing notice	<ol style="list-style-type: none"> <li>1. Brim support must be added before slicing to avoid corner warping of printing parts.</li> <li>2. Need to open the Chamber.</li> <li>3. Harden steel nozzle is required</li> <li>4. The layer height is locked to 0.2mm. Above 0.2mm is difficult to control the accuracy, and below 0.2mm will warp easily.</li> </ol>



### Compatible Sheet

Filament Type	Weight	PartPro300 xT	PartPro200 xTCS (Color AiO)
ABS	600g		
	1 kg		
	3 kg	●	
PLA	600g		●
	1 kg		●
	3 kg	●	
Tough PLA	600g		●
	3 kg	●	
PETG	600g		●
	3 kg	●	
Antibacterial PLA	600g		●
3D Color inkjet PLA	600g		●
	1 kg		●
	3 kg	●	
*XYZ Carbon Fiber	600g		●
	1 kg	●	●
*Premium Metallic PLA	600g		●
	1 kg	●	●
BVOH	1 kg	●	
*PC	3 kg	●	

\*Hardened Steel nozzle is required