**Specification of Standard PLA**

**Writer： Proofreader： Translator: Reviewers：**

①**Background**

A degradable, environment-friendly, common-used material in the market, the most basic material in the 3D printing industrial.

②**Main Ingredients**

PLA, Toughener, Toner.

③**Features**

* Environmentally-friendly, no odor, nontoxic.
* High intensity, bright and clear color.
* Low shrinking percentage and hardly curl.
* Suitable for 99% common-used FDM 3D printers.

④**Application and Target Audience**

Any occasion without special requirements, 3D printing groups at all levels.

 ⑤**PLA Filament Technical Specification**

* + - Filament Diameter: 1.75mm
		- Tolerance: ±0.03mm
		- Printing Temperature: 190°C-220°C
		- Heated Bed Temperature: 55-70°C
		- Printing Speed: 30-100mm/s

**⑥Relevant Parameters of Recommended Machine Types**

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| Relevant Parameters of Recommended Machine Types |
| Type | Extruder Type/Heated Bed Type | Parameter |
| Creality Ender 3 | Bowden/Flexible Bed Sticker | Printing Temperature: 190-220℃Heated Bed Temperature: 55-65℃Printing Speed: 30-65mm/sRetracting Length: 2-4mmRetracting Speed: 60-100mm/s |
| Creality CR-10 | Bowden/Glass Bed | Printing Temperature: 190-215℃Heated Bed Temperature: 65-70℃ Printing Speed: 30-60mm/sRetracting Length: 2-5mmRetracting Speed: 80-110mm/s |
| Anycubic Mega-S | Bowden/ Microporous Coating Glass Bed | Printing Temperature; 190-220℃ Heated Bed Temperature: 60-70℃Printing Speed: 30-80mm/sRetracting Length: 2-4mmRetracting Speed: 70-100mm/s |
| Prusa i3 | Direct Drive Extruder/PEI Bed Sticker | Printing Temperature: 190-220℃Heated Bed Temperature: 55-70℃Printing Speed: 30-100mm/sRetracting Length: 0.8mmRetracting Speed: 30-40mm/s |
| Eryone Thinker S | Bowden/PEI Bed Sticker | Printing Temperature: 190-220℃Heated Bed Temperature: 55-70℃Printing Speed: 30-60mm/sRetracting Length: 4mmRetracting Speed: 90-110mm/s |
| Eryone Thinker SE | Bowden/Glass Bed | Printing Temperature: 200-220℃Heated Bed Temperature: 65-70℃Printing Speed: 30-70mm/sRetracting Length: 4mmRetracting Speed: 80-110mm/s |
| Eryone Thinker ER-20 | Bowden/Silk-Screen Glass Bed | Printing Temperature: 190-220℃Heated Bed Temperature: 60-70℃Printing Speed: 30-100mm/sRetracting Length: 2-5mmRetracting Speed: 80-110mm/s |

⑦Basic Parameters

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| PLABasic Parameter |
| Physical Properties | Typical Value: Standard Value | Method: Standard |
| Peak Melt Temperature | 167±5℃ | ISO 11357 |
| Glass Transition Temperature | 55-60 | ISO 11357 |
| MFR [g/10min] (1) | 7-15 | ISO 1133 |
| MVR [cm3/10 min] (1) | / | ISO 1133 |
| Specific Gravity [g/cm3] | 1.24 | ISO 1183 |
| Moisture Absorption 24 h [%] (2) | / | / |
| Moisture Absorption 7 day [%] (2) | / | / |
| Moisture Absorption 4 weeks [%] (2) | / | / |
| Heat Deflection Temperature (0,45MPa) | 55 | ISO 75 |
| Tensile Yield Strength Filament [MPa] | 60 | ISO 527-1 |
| Explain |  |  |
| (1) 2.16kg; 210℃ |  |  |
| (2) 28℃; humidity: 37% |  |  |

Table 1

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| **Mechanical Strength of** **PLA Standard Printed Objects** |
| Property / Print Direction  | Horizontal | Vertical X,Y Axis | Vertical Z Axis | Method |
| Tensile Modules [GPa]  | / | / | / | ISO 527-1 |
| Tensile Yield Strength [MPa] | 60 | / | / | ISO 527-1 |
| Elongation at Yield Point [%] | 3 | / | / | ISO 527-1 |
| Impact Strength Charpy (2) [kJ/m2] | 24 (no notch) | / | / | ISO 179-1 |
| * (1)1. Used Printer Type2. Used Slice Software3. Slice Parameter, Layer Height,

Fill RatioPrinting Speed, Top Layer Number, Bottom Layer Number | 1. Eryone Thinker SE/ER-202.Cura/Prusa Slicer 3.205℃，0.2mm,100%,50mm/s, 5,5 | / | / |  |
| (2) Charpy unnotched, edgewise direction of flow according to ISO 179-1 | / | / | / | Place it according to the left picture, use slice software and print it. |

Table 2



Diagram 1

## ⑧FAQ

1.Q: Can PLA be used to print tableware?

A: Not recommended. Although PLA is degradable, food-grade raw material, the PLA with toner is non-food grade. If you really want to print a set of tableware, transparent PLA is suggested.

2.Q: The nozzle is clogged by PLA, and how can I solve it?

 A: Inconstant filament diameter, the lower nozzle temperature and frequent replacement with different kinds of filaments will lead to this problem. So, before you get started, clean the nozzle and turn up the temperature to a proper value.

3.Q: My prints have web-like strings (stringing) issues. How can I troubleshoot it?

 A: Too high temperature makes the PLA filament melt and flow so fast. Please turn the temperature down to a proper value.

 The retracting parameters are improper, so adjust the retracting length and speed.

4.Q: There are too much melted filament around the nozzle. What should I do?

 A: This problem can be attributed to over-high temperature, low printing speed, and in the slice software, the nozzle diameter doesn’t match with the extrusion output.

5.Q: The PLA filament was perfect when I opened the package. After several times of intermittent printing, my PLA filament snaps by accident during printing. Why?

A: Normally, the PLA filament in the printing process will not snap by themselves. However, after being affected by moisture, the degradable material PLA will be more brittle and easier to break, so you should pay attention to dampproof.

6.Q: The surface of my print isn’t very smooth, and the extruded filament has inconstant diameters. Why?

 A: The printing temperature is too high or too low. The temperature doesn’t match well with the printing speed. You need to adjust the printing speed or temperature.

7.Q: Why my PLA-printed objects don't stick to the heated bed? How do I solve?

A: The distance between the nozzle and the bed is too far. Make sure your heated bed is leveled and it’s clean. Then judge if the printing temperature and heated bed temperature are too low, and our customers should adjust them to correct ranges.