ePLA-LW

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Product overviews-Features

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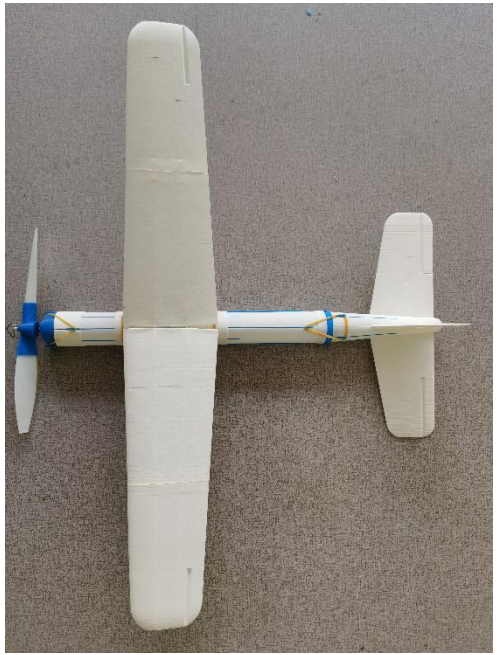
ePLA-LW is special material designed for the fields of aeromodelling, drones, and COSPLAY. The foaming technology generate the PLA in a low-density with a lighter weight. The layers is sticked firmly. The foaming rate and strength can be controlled by adjusting the printing temperature.



Features:

- After foaming, the density can reach to 0.54g/cm3.
- Foaming volume ratio high up to 220%, 1 roll of ePLA-LW is equivalent to 2.2 rolls of ordinary PLA in printing.
- Strength and foaming ratio can be changed freely by adjusting nozzel temperature.
- Excellent printing effect in matte and smooth surface.
- Great layer adhesion. It’ s broken into large pieces instead of tiny small pieces after impacting,which is easy to repair.
- Easy to paint with a strong adhesion on the surface.
- Excellent printability. No warping problem even for large models. No cloging and nonot need warm chamber in printing.
- For same model in the same flight speed,the model printed by ePLA-LW with a lower stall speed as lighter wings.

Product overviews-Features

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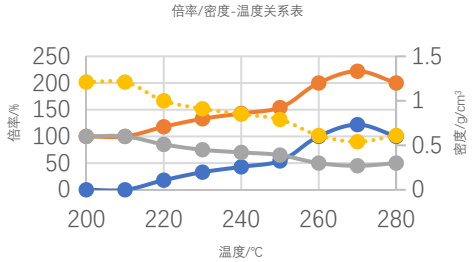
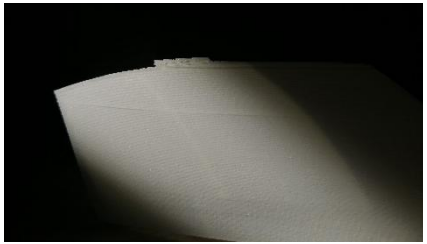
Lower density can up to 0.54g/cm3.

Foaming volume ratio high up to 220%, 1 roll of ePLA-LW is equivalent to 2.2 rolls of ordinary PLA.

Great layer adhesion



Stength and foaming volume ratio can be adjusted by nozzel temp.



Excellent printing effect in matte and smooth surface.

Easy in paint with a good adhesion

Product overviews-parameter

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Parameter	Standard	Result
Melt Flow Index(g/10min)	GB/T 3682-2000	8.1(190℃/2.16kg)
Density	GB/T 1033-86	1.2g/cm^3
IZOD Impact Strength(kJ/㎡)	GB/T 1843-96	8.58 kJ/㎡
Tensile Strength(MPa)	GB/T 1040-92	32.2Mpa
Elongation at Break(%)	GB/T 1040-92	68.9%
Flexural Strength(Mpa)	GB/T 9341-2000	41.31Mpa
Flexural Modulus(Mpa)	GB/T 9341-2000	1701Mpa

Product overviews-parameter

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Setting	ePLA-LW
Suggested printing temp	190-270℃
Suggested printing temperature in no foaming	190-210℃
Suggested printing temperature in foaming	210-270℃
Maximum foaming ratio (270℃)	122%
Min nozzel ratio (270℃)	45%
Bed temp.	45 - 60℃/no heat (Kapton and PET tape/Blue painters tape
Printing speed	40-80mm/s

Extruders Temp/℃	200	210	220	230	240	250	260	270	280
Extruding rate/%	100	100	90	75	55	50	45	45	55
Foaming ratio/%	0	0	11	33	82	100	122	122	82
Volume ratio/%	100	100	111	133	182	200	222	222	182
Density/g/cm^3	1.2	1.2	1.08	0.9	0.66	0.6	0.54	0.54	0.66
Printing speed	40mm/s								

Suggested setting： Extruders Temp:190-280℃;Layer hight:0.2mm;Bed temp.:45℃;Speed:40mm/s

Product overviews-parameter

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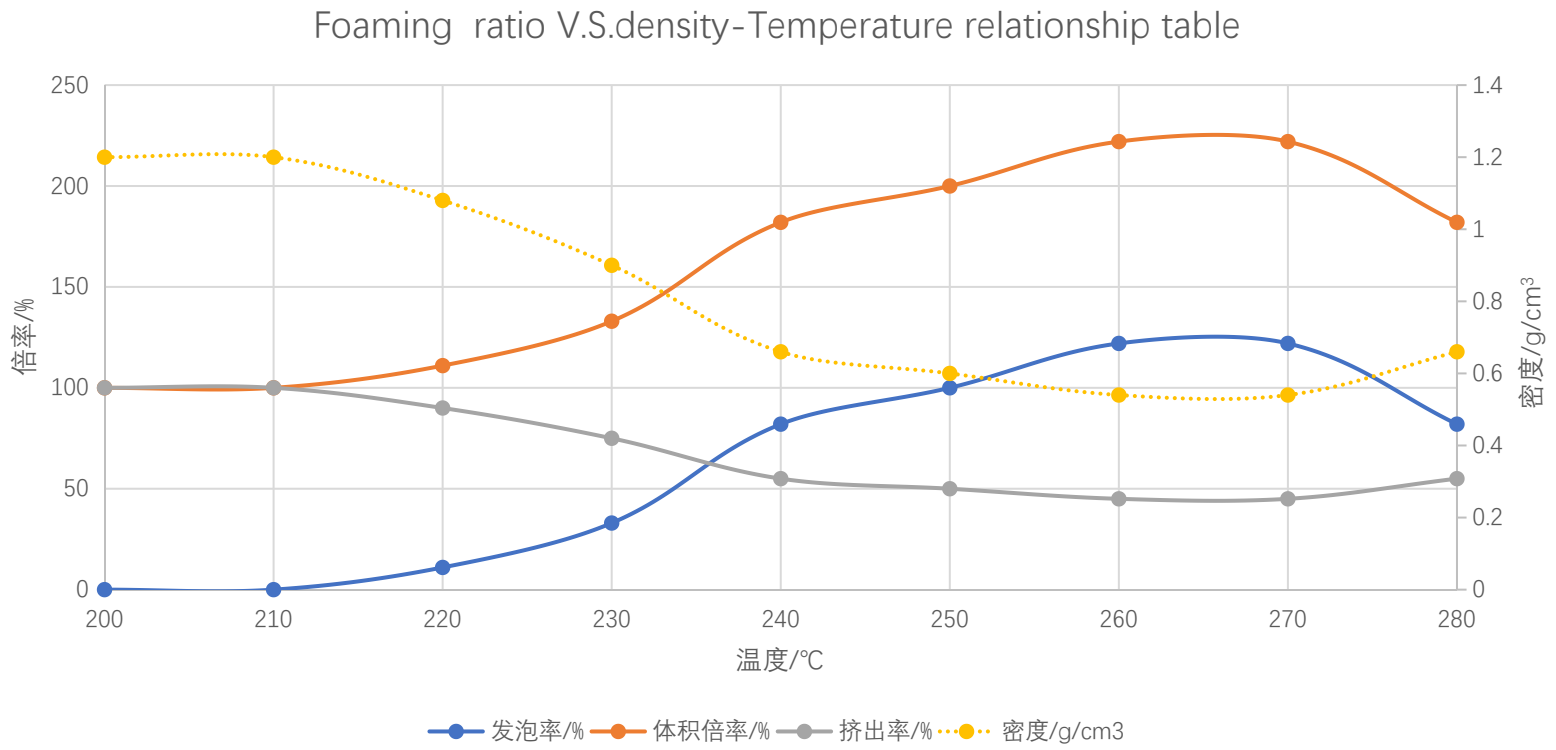

Product overviews-Points for attention

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1. Keep printing speed for the first layer consistent with other layers,. Pls.turn off printing speed reduction function, the first layer extrusion rate is consistent with the actual foaming extrusion rate, such as set 45% for the extrusion with extruders temp 270 ℃. If the first layer adhesion is too strong, pls add a raft in printing.

2.Attention the maximum operating temperature of the printer. Most printers with teflon tube cannot be operated above 250°C for a long time. Long-term printing in the high temperature always cause clogging. If the temperature exceeds 250°C, pls.go with the high-temperature printers.

3.It is normal for the printed moadel to yellowing after foaming in high temperature. Lowering the printing temperature can alleviate it

4.As the PLA continuously foaming in nozzel with high temperature,basically the retraction does not work as normal. it’ s normal for stringing in travel. It is recommended to print the vase mode airplane model drawings to reduce the effect of stringing.

5.Foaming ratio is related to temperature of printing, printing speed, nozzle melting cavity size, pay attention to compare model design in thickness according to the printing situation, adjusting extrusion rate, temperature, speed and other parameters

Market -traditional aeromodelling

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The ePLA-LW is mainly for the application market of making DIY aeromodelling or cosplay props by using 3D printing technology.

The following is a market analysis of the characteristics, current situation and development trend of the aeromodelling market:

At present, there are commercial aeromodelling and DIY aeromodelling.

The common materials for making commercial aeromodelling include epo foam, balsa wood, glass fiber reinforced plastics, etc. The commercial aeromodelling in below materials has no special advantage in performance and price. Epo foam has high resistance to tearing, scratching and chipping. It is used for making aeromodelling. It has the advantages of moderate in light weight and repair easily. The disadvantage is that’ s difficult to make production. The modifications in terms of size and wing load can not be made easily. Under the premise of controlling the weight, the balsa glass fiber reinforced plastic has better tolerance than foam, and the rigidity of the fuselage is also better. It is mostly the choice of diesel engine and turbojet fuselage.

The common material range for self-made aeromodelling materials from thermal cutting foam, magic board, and then to balsa wood, glass fiber reinforced plastic, carbon brazing and so on. The models can reflect the various pursuits of players, including control wing load, model, size, price, configuration, performance, etc..

Market-**3D** aeromodelling

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3D printing aeromodelling have increased rapidly in recent years according the popularization of 3D printing technology.

There are many common materials for 3D printing aeromodelling, such as the general recognition of pla, abs, tpu, pteg, etc., The foaming PLA that has replaced the traditional PLA in recent years. Compared with the common epo and eps aeromodellings, the PLA aeromodelling are not so good in resistant to temperature, high in density, heavy loads and not resistant to falling. As the advantages of cheaper cost and easy printing, many users prefer PLA in printingaeromodelling. Foamed PLA as the new material,it has obvious advantages as an material for printing aeromodelling. The most important is lightness. The model printed with foamed PLA is ligher than the models printed by kt board, epp, PP board. The density can be adjusted according the temperature of the nozzle,the maker is more freely in making.

3D printed aeromodelling as a self-made machine has the advantages of simple production with short manual labor, high image fidelity, smooth in appearance and cheaper production cost than other material, It has a more real appearance than the model made by kt board or pp board,which is close to or even beyond the commercial models. The wing load can also close or surpass the models made with kt and epp. The production process is relatively easy without cutting foam in hot. Self-made machines made with glass fiber and balsa wood require a large production area, many tools, and skills. The 3D printed aeromodelling,the maker can easily design the size of the model, control the material density, and choose printing materials with different properties. The cost 3D printed aeromodelling is chaper with appearance of a commercial machine.

Market-Comparison of different aeromodelling

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Aeromodelling	Commercial aeromodelling	Self made aeromodelling			
Material	EPO foam, balsa wood, FRP	KT board, PP sheet, EPP, balsa wood, FRP, carbon brazing	PLA+、ABS、TPU、PETG	Wood	ePLA-LW
Advantage	tear resistance, scratch and chip resistance, easy to repair, moderate weight	Control wing load, model, size, price, configuration, performance, low price, simple production	Cheap cost and easy to print	Easy to print, low density, light wing load	Easy to print, low density, light wing load, free adjustment of strength-foaming ratio, good surface effect, easy coating, falling resistance, easy repair
Disadvantage	High performance limitations, expensive in cost ,difficulty in production difficulty, and no way to do any modification	Expensive in cost and poor surface transition	bad in temperature resistance, high density with heavy load, general interlayer adhesion, not so good in resistence of falling	General temperature resistance, general adhesion between layers, not resistant to falling, not easy to repair	Not so good in temperature resistence

Market-aeromodelling Community

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The DIY aeromodelling community has a high degree of recognition for 3D printing technology in this field from the personalization of the aeromodelling in race and fixed wing, functional accessories, to the whole fixed wing aircraft, and helicopter accessories can all be seen in 3D printing.

Here are some drawing for 3D printing aeromodelling and commercial aeromodelling website:https://3dlabprint.com/, https://www.planeprint.com/, https://www.eclipson-airplanes.com/.

Market-application examples

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A: One aeromodelling printed by light PLA hit a tree with some broken problem. It back to fly to sky after sticking by glue.

B:One user printed a glider with the light PLA with the character of density and strength can be adjustment. It take off even with a lower speed with a long glide distance.

C:One aeromodelling printed with ordinary PLA hit a tree also with broken problem.The body was all shattered in pieces, so it can not be fixed well.

D：Some large COSPLAY props printed by the light PLA can be posed casually well.The photographer took many perfect photos.

Thank you!