

【Phrozen Filament User Guide】

High-Speed PLA

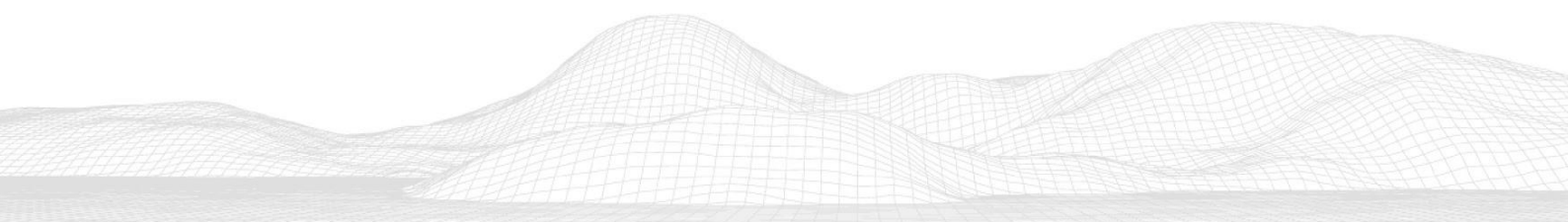
(Blue, Red, White, Black, Green, Gray, Yellow, Orange)

Outline

Before printing the perfect object, it is important to first understand the material limitations we are handling and how it can be successfully printed under various conditions. With this in mind, Phrozen provides the following design suggestions to help you better understand the properties of each material and how you can best utilize them to bring your wildest creation to life.

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Section 1

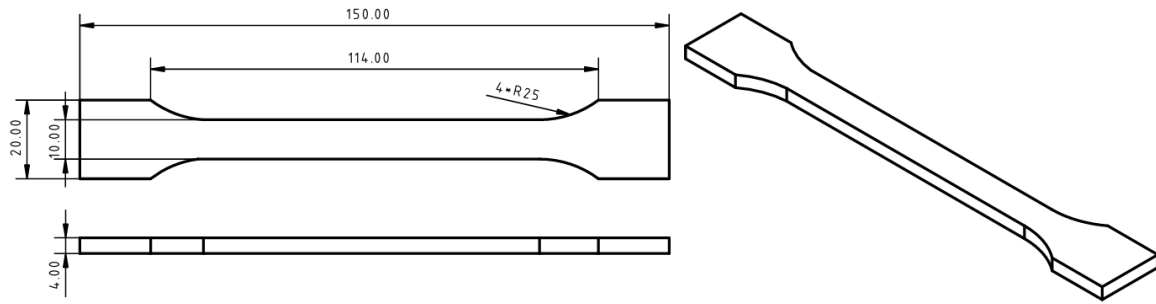
TDS

Tensile Properties	Norm	Values	
		Printing Direction (X-Y)	Printing Direction (Z)
Tensile Strength at Break	ISO 527	35.3–41.3 MPa	17.6–24.3 MPa
Tensile Modulus	ISO 527	2197–2838 MPa	1506–1989 MPa
Elongation at Break	ISO 527	1.3–1.8 %	0.5–1.3 %
Impact Properties	Norm	Values	
		Printing Direction (X-Y)	Printing Direction (Z)
Notched Izod Impact Strength	ISO 180	85.3–177.4 J/m	14.3–25.6 J/m
Thermal Properties	Norm	Values	
HDT at 0.45 MPa	ISO 75-2	50 °C	
Hardness	Norm	Typical values	
Shore D	ISO 7619-1	80–82 D	

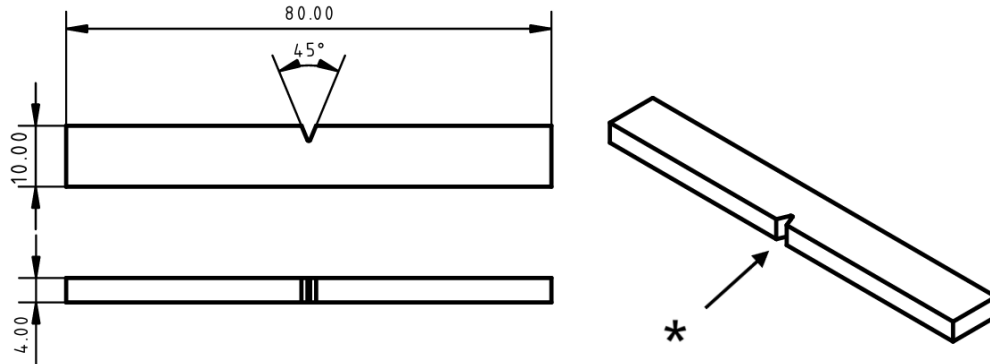
**All test pieces were printed in an environment of $25 \pm 2^{\circ}\text{C}$ and $\text{RH}55 \pm 10\%$ right after removing the vacuum bag and were set aside to cool down completely before testing.*

Performance values obtained in standard sample tests conducted by Phrozen are for design reference and comparison only. The actual performance of each 3D printed model might be impacted by other variables, including the printer, printing model, printing environment, printing parameters, etc.

Users are responsible for their legality, safety, and performance indicators when printing with Phrozen's material. Phrozen is not responsible for the materials and usage scenarios, nor is it responsible for any damage that occurs during the use of our materials.

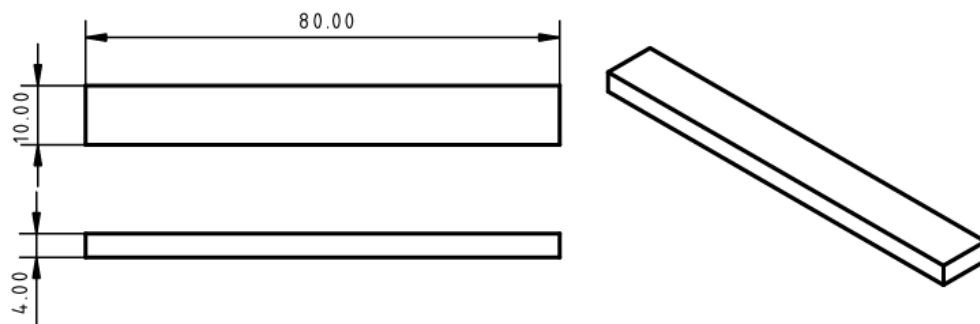


ISO 527 Tensile Test Bar (unit: mm)



ISO 180 Impact Test Bar (unit: mm)

*Impact test direction



ISO 75 HDT Test Bar (unit: mm)

Section 2

Printing

Printing Parameters

Filament Specifications

Appearance	Blue / Red / White / Black / Green / Gray / Yellow / Orange
Diameter	1.75 ± 0.2 mm
Density	1.2–1.25 cm ³
HDT 0.45 Mpa	50 °C
Melt Flow Index	10.68 g / 10min
Weight	1 kg

Test Print Parameters

Nozzle Diameter	0.4 mm
Nozzle Temperature	195 ± 10 °C
Heat Bed Temperature	60 °C
Printing Speed	100 mm/s
Fan Speed	100 %
Infill Percentage	100 %

Recommended Printing Parameters

Nozzle Temperature	200 ± 20 °C
Heat Bed Temperature	60 °C
Printing Speed	<600 mm/s
Fan Speed	100 %

Drying Conditions

Drying Temperature	50–55°C
Drying Time	6–8 hours

※Be sure to bake the filament before each print to remove moisture.

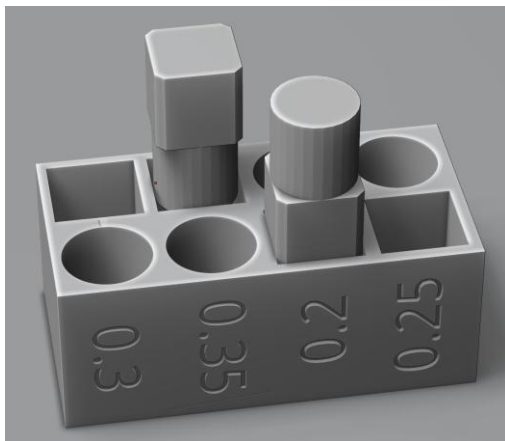
Section 3

Design Specifications

※Note: All indicators are the limit values of PLA and will vary depending on the machine, parameters, operating environment, and printing model used※

Size Tolerance, X-Y plane

This indicator is the minimum tolerance allowed when printing the pin and hole connection.

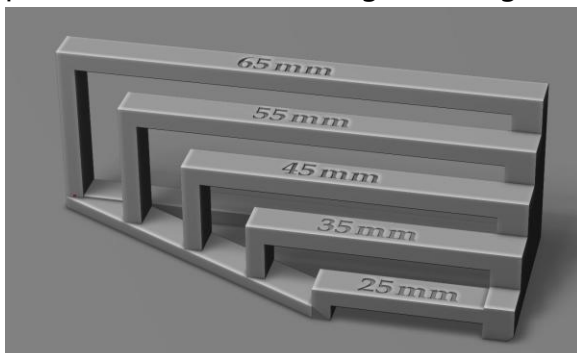


Recommended square aperture: ≥ 0.35 mm

Recommended circular aperture: ≥ 0.35 mm

Maximum Horizontal Bridge Span

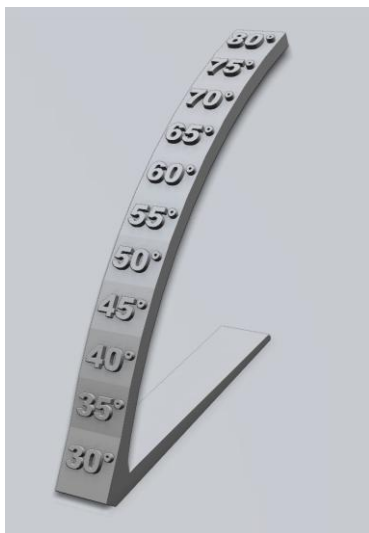
This indicator shows the maximum width between the supporting walls that can be printed without deforming the bridge.



Recommended distance: ≤ 25 mm

Maximum Hanging Angle

This indicator is the maximum angle that can be printed completely without support.



Recommended angle: < 50°

Block Shrinkage Test at 0.2 mm Layer Height

This indicator shows the possible deformation for a 2x2x2 cm cube printed parallel to the XY plane. A Vernier caliper is used to measure the cuboid after cold down to calculate the shrinkage rate. (This test result is only for reference purposes. Different machines and models may affect results.)



Calculation method: $[(\text{Cured size} - \text{Original size}) / \text{Original size}] \times 100\%$

X-Axis Recommended Shrinkage Rate: 1%

Y-Axis Recommended Shrinkage Rate: 1%

Z-Axis Recommended Shrinkage Rate: 1%