Tullomer™ Data Sheet

Material Properties	Test (ASTM)	Tullomer™	Units
Tensile Stress at Break	D3039	250	Mpa
Tensile Modulus	D3039	25	Gpa
Tensile Elongation at Break	D3039	5	%
Flexural Strength	D790	225	Mpa
Flexural Modulus	D790	20	GPa
Surface Resistance	-	Insulator	Ω
Density	-	1.4	g/cm^3
Dielectric Constant	-	3	-
Lost Tangent	-	.002	-

Thermal Properties	Value	Units	Comment
Melting Point	280	°C	DSC
Glass Transition (T_g)	n/a*	°C	DSC
Flammability (UL-94)	V0	---	Expected Value

The test specimens studied are entirely composed of Tullomer™ filament and are printed using commercially available hardware and software. Values shown are minimum values measured.

Test components are designed to maximize performance under specific test conditions and may not reflect performance in real-world conditions. Printed with 1 shell 100% aligned rectilinear infill in the long direction for the bars.

Test Sample Dimensions:

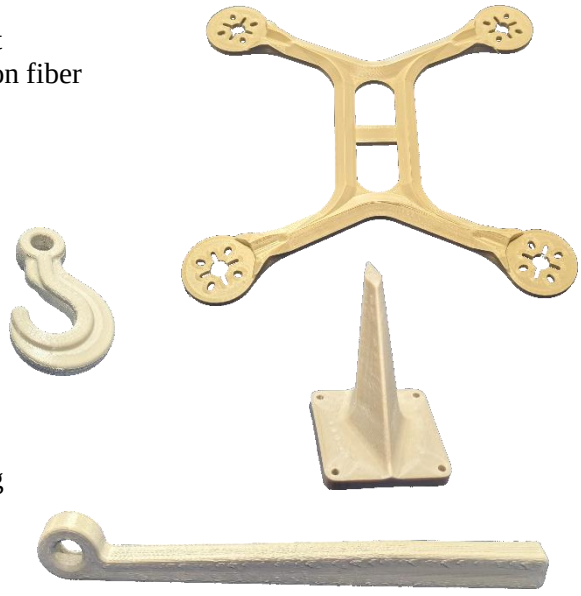
- Tensile: 175mm (L) x 12.7mm (W) x 1.5mm (H)
- Flexural: 3-pt. Bending, 100mm (L) x 12.7mm (W) x 3.2mm (H)

*Tullomer™ does not undergo a glass transition but may soften above 180°C.

Chemical Resistance	
Resistance to acids (ie. Nitric acid, phosphoric acid, acetic acid, chromic acid, monochloroacetic acid, formic acid, hydrochloric acid, sulfuric acid)	Excellent
Resistance to alkali (sodium hydroxide, calcium hydroxide, sodium hypochlorite)	Excellent
Resistance to most chemicals (Acetone, toluene, dimethyl formamide, methanol, ethanol, ethyl acetate, ethylene glycol, Brake fluids- Castrol TLX 988C, Fuels-gasoline, methylene chloride, nitrobenzene, engine oil, silicone oil, hydraulic oil, refrigerant)	Excellent
Resistance to water (ie. Chlorine water, Salt water)	Excellent

Additional Benefits

- 100% crystalline like metals
- Tensile strength > Stainless Steel & Carbon Filament
- 6X Lighter than Steel and 22-36% Lighter than carbon fiber
- Stiffer than most polymers
- Inert to most (harsh) chemicals
- Radio Transparent
- Low D_k and D_f (tailorable)
- Eliminates PFAS and environmental issues
- 100% Recyclable
- Inherently non-flammable
- Highest barrier (O_2 and water vapor)
- High dimensional stability (low creep)
- Low coefficient of thermal expansion (tailorable)
- High thermal stability
- No need for additional post processing like annealing
- Low moisture absorption (.04%)
- High dielectric strength



Tullomer™ Printing Parameters

Printer Settings	Minimum	Ideal for Low-Cost Printers	Ideal for High Temp Printers
Nozzle (ºC)	300	325	325
Bed (ºC)	120	≥120	180-200
Chamber (ºC)	45-50	≥65	≥120
Infill Speed (mm/s)	400	≥500	≥120
Inner Wall Speed (mm/s)	400	≥500	≥120
Cooling	None	None	None

- Print at .05 layer height.
- A high number of walls and infill density is recommended.
- Any infill patterns with continuous non-overlapping straight lines are recommended.
- Print sequence per object not per height.
- Glass, PEI, PEX, or Engineering Plate is best with some Magigoo PC adhesive.
- Glass beds are best for high temperature printers.
- Turn off first layer inspection on applicable machines.
- Use brim with 0mm object gap.
- For the best supported surfaces, use interface layers with ≤.1mm gap from the part.
- High print speeds contribute to part strength.
- Material is highly shear thinning. If the viscosity becomes too low either lower the temperature or flow rate.

Interested in learning more?

Go to Z-Polymers.com and reach out to us with a short description on your application and needs.

Disclaimer:

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