PEI Filament Ultem 1010

Polyether Imide (PEI) Ultem is an amorphous, amber to transparent thermoplastics with a glass transition temperature (Tg) of 217 °C and performs in continuous use up to 170 °C. This inherently flame retardant plastic has UL94 VO and 5VA ratings. 3D4MAKERS has selected Ultem 1010 for their filament.

The 3D4MAKERS PEI Filament has unique properties because it does not come into contact with water during the production process and is directly packaged in a vacuum packaging. These properties make the 3D4MAKERS PEI Filament particularly suitable for usage in FDM and FFF 3D printers. The material has an excellent adhesion between layers which results in great improvement of the impact resistance, strength, durability and the printing process.

PHYSICAL	CONDITIONS	TEST METHOD	TYPICAL VALUE
Density		ISO 1183	1.27 g/cm^3
Melt volume-Flow Rate (MVR)		ISO 1183	
	340 °C/5.0 kg		13.0 cm^3/10 min
	360 °C/5.0 kg		25.0 cm ^{3}/10 min
Molding Shrinkage-Flow		Internal Method	0.50 to 0.70 %
Water Absorption			ISO 62
	Saturation, 23 °C	1.3%	
	Equilibrium, 23 °C, 50% RH	0.70%	
MECHANICAL			
Tensile modulus		ISO 572-2/1	3200 MPa
Tensile Stress		ISO 527-2/50	
Yield			105 MPa
Break			85.0 MPa
Tensile Strain		ISO 527-2/50	
Yield			6.0%
Break			60%
Flexural Modulus		ISO 178	3300 MPa
Flexural Stress		ISO 178	160 MPa
Taber Abrasion Resistance		Internal Method	
	1000 cycles, 1000 g CS-17 Wheel		10.0 mg
IMPACT			
Notched Izod Impact Strength	23°C	ISO 180/1A	5.0 kJ/m^2
Unnotched Izod Impact Strength	23 °C	ISO 180/1U	No Break

HARDNESS			
Ball Indentation Hardness		ISO 2039-1	140 MPa
THERMAL			
Heat Deflection Temperature			
	0,45 MPa, Unannealed, 100 mm Span	ISO 75-2/Be	200 °C
	1.8 MPa, Unannealed, 100 mm Span	ISO 75-2/Ae	190 °C
Vicat Softening Temperature			
		ISO 306/A50	215 °C
		ISO 306/B50	211°C
		ISO 306/B120	212 °C
Ball Pressure Test	125 °C	IEC 60695-10-2	Pass
CLTE		ISO 11359-2	
Flow	23 °C to 150 °C		5.0E -5 cm/cm/°C
Transverse	23 °C to 150 °C		5.0E -5 cm/cm/°C
Thermal Conductivity		ISO 8302	0,21 W/m/K
RTI Elec		UL 746	170 °C
RTI Imp		UL 746	170 °C
RTI Str		UL 746	170 °C
ELECTRICAL			
Surface Resistivity		IEC 60093	> 1.0E+15 ohms
Volume Resistivity		IEC 60093	1.0E+15 ohms·cm
Electric Strength		IEC 60243-1	
	0.800 mm, in Oil		33 kV/mm
	1.60 mm, in Oil		25 kV/mm
	3.20 mm, in Oil		16 kV/mm
Relative Permittivity		IEC 60250	
	50 Hz		2.90
	60 Hz		2.90
	1MHz		2.90
Dissipation factor		IEC 60250	
	50 Hz		5.0 E-4
	60 Hz		5.0 E-4
	1MHz		6.0 E-3
	2.45 GHz		2.5 E-3

Comparative Tracking Index		IEC 60112	
	--		150 V
	Solution B		100 V
FLAMMABILITY			
Flame Rating		UL 94	
	1.50 mm		V-0
	3.00 mm		5VA
Glow Wire Flammability Index	3.20 mm	IEC 60695-2-12	960 °C
Oxygen Index		ISO 4589-2	47%

PRINT RECOMMENDATIONS			
Nozzle Temperature	355 – 390 °C		
Bed Temperature	120 - 160 °C		
Print Speed	20-35 mm/s		
Bed Adhesion	PEI Sheet		

To get the best results while printing we advise you to keep the 3D printer in a room where there is hardly any draft and/or temperature fluctuations. Keep the 3D printer out of the sun. This cannot be a room where people sleep. When the 3D printer is not being used it is important to keep the 3D4MAKERS PEI Filament in a bag and stored in a cool, dry and dark place until it is used again.

Disclaimer: 3D4Makers makes no warranties what so ever, expressed or implied, including but not limited to, any implied fitness for any particular purpose. From the moment the product is shipped it is beyond our control. The information in this document is believed to be correct at the time of writing. However, handling, processing, settings, the type of 3D printer, slicing and other variables are completely up to the user. The method through which the product is used can be varied. It is up for the customer to determine how it is 3D printed and whether it is fit for purpose or suited to a particular application.