

Polyetherimide (PEI) is an amorphous, amber-to-transparent thermoplastic with characteristics similar to the related plastic PEEK. Relative to PEEK, PEI is cheaper, but is lower in impact strength and usable temperature.

Pros

- Low moisture absorption
- Super electrical properties
- Excellent strength, rigidity and toughness

Cons

Uses

- Electrical Components
- Aerospace
- Automotive

1. Identification of the material

Trade name	tm Filament PEI
Chemical name	Polyetherimide
Chemical family	Thermoplastic copolymer
Use	3D Printing
Origin	tm Filament Netherlands

2. Material properties

Melt Volume Rate, MVR at 340 °C/5.0 kg	13	cm ³ /10 min	ISO 1130
Melt Volume Rate, MVR at 360 °C/5.0 kg	25	cm ³ /10 min	ISO 1130
Glass transition temperature	217	°C	ISO 11357
Density	1.27	g/cm ³	ISO 1183
Water absorption, (23 °C/sat)	1.25	%	ISO 62
Mold Shrinkage on tensile bar, flow	0.5-0.7	%	

3. Mechanical properties

Tensile Stress (yield, 50 mm/min)	105	MPa	ISO 527
Tensile Stress (break, 50 mm/min)	85	MPa	ISO 527
Tensile Strain (yield, 50 mm/min)	6	%	ISO 527
Tensile Strain (break, 50 mm/min)	60	%	ISO 527
Tensile Modulus, 1 mm/min	3200	MPa	ISO 527
Flexural Stress (yield, 2 mm/min)	160	MPa	ISO 178
Flexural Modulus (2 mm/min)	3300	MPa	ISO 178
Izod Impact (Notched) 80*10*4 +23 °C	5	kJm ²	ISO 180/1A
Izod Impact (Unnotched) 80*10*4 +23 °C	-	kJm ²	ISO 180/1U
Izod Impact (Notched) 80*10*4 +30 °C	5	kJm ²	ISO 180/1A
Izod Impact (Unnotched) 80*10*4 +30 °C	-	kJm ²	ISO 180/1U

4. Electrical Data

Volume resistivity	1E+15	Ω cm	IEC 60093
Surface resistivity, ROA	>1E+15	Ω	IEC 60093
Dielectric Strength, in oil, 0.8 mm	33	kV/mm	IEC 60243-1
Dielectric Strength, in oil, 1.6 mm	25	kV/mm	IEC 60243-1
Dielectric Strength, in oil, 3.2 mm	16,000	kV/mm	IEC 60243-1
Relative Permittivity, 1 MHz	2.9		IEC 60250
Dissipation Factor, 50/60 Hz	0.0005		IEC 60250
Dissipation Factor, 1 MHz	0.006		IEC 60250
Dissipation Factor, 2450 MHz	0.0025		IEC 60250
Comparative Tracking Index	150	V	IEC 60112
Comparative Tracking Index, M	100	V	IEC 60112
Relative Permittivity, 50/60 MHz	2.9		IEC 60250

5. Thermal

Thermal Conductivity	0.21	W/m-°C	ISO 8302
CTE 23 °C to 150 °C, flow	5.E-05	1/°C	ISO 11359-2
CTE 23 °C to 150 °C, xflow	5.E-05	1/°C	ISO 11359-2
Ball pressure test 125 °C +/- 2°C	PASSES		IEC 60695-10-2
Vicat Softening Temp, Rate A/50	215	°C	ISO 306
Vicat Softening Temp, Rate B/50	211	°C	ISO 306
Vicat Softening Temp, Rate B/120	212	°C	ISO 306
HDT/Be, 0.45 MPa Edgew 120*10*4 sp=100mm	200	°C	ISO 75/Be
HDT/Ae, 1.8 MPa Edgew 120*10*4 sp=100mm	190	°C	ISO 75/Ae
Relative Temp Index, Elec	170	°C	UL 746B
Relative Temp Index, Mech w/impact	170	°C	UL 746B
Relative Temp Index, Mech w/o impact	170	°C	UL 746B

6. Flame characteristics

UL recognised, 94V-0 Flame Class Rating	1.5	mm	UL 94
UL recognised, 94-5VA Rating	3	mm	UL 94
Glow wire flammability index 960 °C passes at	3.2	mm	IEC 60695-2-12
Oxygen index	47	%	ISO 4589

7. Printer settings

Printer	Desktop FFF printer
Nozzle	0.4 mm A2 hardened
Layer height	0.2 mm
Infill	100%
Extrusion temperature	360 - 400 °C
Bed Temperature	120 - 150 °C
Print chamber temperature	70 - 150 °C
Cooling fan	yes
Bed preparation	3D lac
Print speed	10 -50 mm/s (the lower the better)

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