Overview of materials for Polyetherimide (PEI)

Categories: Polymer; Thermoplastic; Polyetherimide (PEI)

Material Notes: This property data is a summary of similar materials in the MatWeb database for the category "Polyetherimide". Each property range of values reported is minimum and maximum values of appropriate MatWeb entries. The comments report the average value, and number of data points used to calculate the average. The values are not necessarily typical of any specific grade, especially less common values and those that can be most affected by additives or processing methods.

Vendors: Ensinger TECAPEI™ shapes combine Ultem® PEI polymer with Ensinger's proprietary extrusion techniques for exceptional reliability, consistency, dimensional stability, and high temperature mechanical performance. FDA, USP Class VI and NSF compliant.

Click here to view all available suppliers for this material.

Please click here if you are a supplier and would like information on how to add your listing to this material.

Physical Properties	Metric	English	Comments
Density	0.0500 - 1.90 g/cc	0.00181 - 0.0686 lb/in³	Average value: 1.38 g/cc Grade Count:665
Filler Content	5.00 - 50.0 %	5.00 - 50.0 %	Average value: 30.2 % Grade Count:67
Water Absorption	0.0150 - 1.30 %	0.0150 - 1.30 %	Average value: 0.225 % Grade Count:222
Moisture Absorption at Equilibrium	0.000 - 1.30 %	0.000 - 1.30 %	Average value: 0.198 % Grade Count:370
Water Absorption at Saturation	0.100 - 2.90 %	0.100 - 2.90 %	Average value: 1.06 % Grade Count:220
Additive Loading	10.0 - 40.0 %	10.0 - 40.0 %	Average value: 20.2 % Grade Count:32
Particle Size	15.0 µm	15.0 µm	Average value: 15.0 µm Grade Count:3
Viscosity	3.00 - 87.0 cP @Temperature 220 - 360 °C	3.00 - 87.0 cP @Temperature 428 - 680 °F	Average value: 16.8 cP Grade Count:161
	3.00 - 87.0 cP @Load 2.16 - 10.0 kg	3.00 - 87.0 cP @Load 4.76 - 22.0 lb	Average value: 16.8 cP Grade Count:161
Maximum Moisture Content	0.0200	0.0200	Average value: 0.0200 Grade Count:3
Linear Mold Shrinkage	0.000 - 0.0230 cm/cm	0.000 - 0.0230 in/in	Average value: 0.00440 cm/cm Grade Count:519
Linear Mold Shrinkage, Transverse	0.00100 - 0.0240 cm/cm	0.00100 - 0.0240 in/in	Average value: 0.00535 cm/cm Grade Count:160
Melt Flow	1.80 - 113 g/10 min	1.80 - 113 g/10 min	Average value: 13.8 g/10 min Grade Count:271

Mechanical Properties	Metric	English	Comments
Hardness, Rockwell M	85.0 - 115	85.0 - 115	Average value: 110 Grade Count:95
Hardness, Rockwell R	100 - 127	100 - 127	Average value: 119 Grade Count:48
Hardness, Shore D	72.0 - 93.0	72.0 - 93.0	Average value: 84.4 Grade Count:17
Ball Indentation Hardness	125 - 220 MPa	18100 - 31900 psi	Average value: 149 MPa Grade Count:90

Tensile Strength, Ultimate	1.00 - 650 MPa	145 - 94300 psi	Average value: 134 MPa Grade Count:548
Tensile Strength, Yield	20.0 - 255 MPa	2900 - 37000 psi	Average value: 114 MPa Grade Count:305
Elongation at Break	0.500 - 110 %	0.500 - 110 %	Average value: 21.4 % Grade Count:622
Elongation at Yield	0.700 - 400 %	0.700 - 400 %	Average value: 8.05 % Grade Count:191
Modulus of Elasticity	0.00280 - 56.0 GPa	0.406 - 8120 ksi	Average value: 7.75 GPa Grade Count:574
Flexural Yield Strength	17.9 - 770 MPa	2600 - 112000 psi	Average value: 192 MPa Grade Count:624
	85.0 - 214 MPa @Temperature 80.0 - 200 °C	12300 - 31000 psi @Temperature 176 - 392 °F	Average value: 151 MPa Grade Count:2
Flexural Modulus	0.380 - 46.0 GPa	55.1 - 6670 ksi	Average value: 7.23 GPa Grade Count:632
	7.30 - 17.9 GPa @Temperature 80.0 - 200 °C	1060 - 2600 ksi @Temperature 176 - 392 °F	Average value: 12.4 GPa Grade Count:2
Flexural Strain at Break	0.900 - 3.80 %	0.900 - 3.80 %	Average value: 2.45 % Grade Count:12
	1.00 - 2.60 % @Temperature 80.0 - 200 °C	1.00 - 2.60 % @Temperature 176 - 392 °F	Average value: 1.89 % Grade Count:2
Compressive Yield Strength	0.500 - 1130 MPa	72.5 - 163000 psi	Average value: 230 MPa Grade Count:60
Compressive Modulus	0.0220 - 52.0 GPa	3.19 - 7540 ksi	Average value: 13.0 GPa Grade Count:33
Poissons Ratio	0.300 - 0.440	0.300 - 0.440	Average value: 0.368 Grade Count:33
Shear Modulus	0.0130 - 4.73 GPa	1.89 - 685 ksi	Average value: 2.33 GPa Grade Count:10
Shear Strength	0.600 - 128 MPa	87.0 - 18600 psi	Average value: 77.4 MPa Grade Count:21
Izod Impact	16.0 - 3300 J	11.8 - 2430 ft-lb	Average value: 452 J Grade Count:275
	20.0 - 120 J @Temperature -30.0 - -30.0 °C	14.8 - 88.5 ft-lb @Temperature -22.0 - -22.0 °F	Average value: 54.1 J Grade Count:57
Izod Impact, Notched	0.0298 - 19.2 J/cm	0.0558 - 36.0 ft-lb/in	Average value: 1.10 J/cm Grade Count:260
	0.350 - 0.742121 J/cm @Temperature -30.0 - -30.0 °C	0.656 - 1.39030 ft-lb/in @Temperature -22.0 - -22.0 °F	Average value: 0.460 J/cm Grade Count:11
Izod Impact, Unnotched	0.120 J/cm - NB	0.225 ft-lb/in - NB	Average value: 7.43 J/cm Grade Count:343
	15.0 - 99.99 J/cm @Temperature -30.0 - -30.0 °C	28.1 - 187.3 ft-lb/in @Temperature -22.0 - -22.0 °F	Average value: 15.2 J/cm Grade Count:23
Izod Impact, Notched (ISO)	2.00 kJ/m² - NB	0.952 ft-lb/in² - NB	Average value: 7.95 kJ/m² Grade Count:202
	2.00 kJ/m² - NB @Temperature -40.0 - -30.0 °C	0.952 ft-lb/in² - NB @Temperature -40.0 - -22.0 °F	Average value: 7.89 kJ/m² Grade Count:127
	5.00 - 5.00 kJ/m² @Temperature -30.0 - -30.0 °C	2.38 - 2.38 ft-lb/in² @Temperature -22.0 - -22.0 °F	Average value: 7.89 kJ/m² Grade Count:1
	5.00 - 5.00 kJ/m² @Thickness 4.00 - 4.00 mm	2.38 - 2.38 ft-lb/in² @Thickness 0.157 - 0.157 in	Average value: 7.89 kJ/m² Grade Count:1
Izod Impact, Unnotched (ISO)	5.00 kJ/m² - NB	2.38 ft-lb/in² - NB	Average value: 33.4 kJ/m² Grade Count:175
	13.0 kJ/m² - NB @Temperature -40.0 - -30.0 °C	6.19 ft-lb/in² - NB @Temperature -40.0 - -22.0 °F	Average value: 32.2 kJ/m² Grade Count:112
	NB - NB @Temperature -30.0 - -30.0 °C	NB - NB @Temperature -22.0 - -22.0 °F	Average value: 32.2 kJ/m² Grade Count:1

	NB - NB @Thickness 3.00 - 3.00 mm	NB - NB @Thickness 0.118 - 0.118 in	Average value: 32.2 kJ/m² Grade Count:1
Charpy Impact Unnotched	0.0110 J/cm² - NB	0.0524 ft-lb/in² - NB	Average value: 3.54 J/cm² Grade Count:67
	1.40 - 999.9 J/cm² @Temperature -30.0 - -30.0 °C	6.66 - 4759 ft-lb/in² @Temperature -22.0 - -22.0 °F	Average value: 3.44 J/cm² Grade Count:51
Charpy Impact, Notched	0.200 - 1000 J/cm²	0.952 - 4760 ft-lb/in²	Average value: 0.777 J/cm² Grade Count:154
	0.300 - 1.00 J/cm² @Temperature -30.0 - -30.0 °C	1.43 - 4.76 ft-lb/in² @Temperature -22.0 - -22.0 °F	Average value: 0.523 J/cm² Grade Count:57
Gardner Impact	2.26 - 36.0 J	1.67 - 26.6 ft-lb	Average value: 29.5 J Grade Count:56
Dart Drop, Total Energy	2.00 - 380 J	1.48 - 280 ft-lb	Average value: 27.9 J Grade Count:108
	88.0 - 99.0 J @Temperature -20.0 - 0.000 °C	64.9 - 73.0 ft-lb @Temperature -4.00 - 32.0 °F	Average value: 94.8 J Grade Count:6
Falling Dart Impact	4.90 - 21.4 J	3.61 - 15.8 ft-lb	Average value: 9.18 J Grade Count:17
Instrumented Impact Total Energy	1.48 - 38.0 J	1.09 - 28.0 ft-lb	Average value: 20.1 J Grade Count:19
Coefficient of Friction	0.110 - 0.770	0.110 - 0.770	Average value: 0.387 Grade Count:40
Coefficient of Friction, Static	0.110 - 0.630	0.110 - 0.630	Average value: 0.405 Grade Count:31
Tear Strength	37.0 - 147 kN/m	211 - 839 pli	Average value: 73.7 kN/m Grade Count:3
K Factor (Wear Factor)	27.0 - 1900	27.0 - 1900	Average value: 605 Grade Count:5
K (wear) Factor	40.3 - 423 x 10^{-8} mm³/N-M	20.0 - 210 x 10^{-10} in³-min/ft-lb-hr	Average value: 147 x 10^{-8} mm³/N-M Grade Count:28
Limiting Pressure Velocity	1.90 - 2.10 MPa-m/sec	54200 - 60000 psi-ft/min	Average value: 2.00 MPa-m/sec Grade Count:6
Taber Abrasion, mg/1000 Cycles	2.00 - 60.0	2.00 - 60.0	Average value: 16.4 Grade Count:93

Electrical Properties	**Metric**	**English**	**Comments**
Electrical Resistivity	0.0500 - 1.00e+18 ohm-cm	0.0500 - 1.00e+18 ohm-cm	Average value: 2.59e+16 ohm-cm Grade Count:303
Surface Resistance	1.00 - 5.80e+16 ohm	1.00 - 5.80e+16 ohm	Average value: 1.38e+15 ohm Grade Count:219
Static Decay	0.0100 - 2.00 sec	0.0100 - 2.00 sec	Average value: 1.10 sec Grade Count:46
Shielding Effectiveness	50.0 - 97.0 dB	50.0 - 97.0 dB	Average value: 78.6 dB Grade Count:3
Dielectric Constant	2.52 - 6.80	2.52 - 6.80	Average value: 3.18 Grade Count:182
Dielectric Strength	4.33 - 244 kV/mm	110 - 6200 kV/in	Average value: 25.7 kV/mm Grade Count:181
Dissipation Factor	0.000500 - 0.266	0.000500 - 0.266	Average value: 0.00357 Grade Count:173
Dielectric Loss Index	0.00100 - 0.00150	0.00100 - 0.00150	Average value: 0.00133 Grade Count:4
Arc Resistance	0.000 - 180 sec	0.000 - 180 sec	Average value: 118 sec Grade Count:166
Comparative Tracking	0.000 - 250 V	0.000 - 250 V	Average value: 133 V Grade Count:217

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Hot Wire Ignition, HWI	7.00 - 120 sec	7.00 - 120 sec	Average value: 66.9 sec Grade Count:185
High Amp Arc Ignition, HAI	0.000 - 120 arcs	0.000 - 120 arcs	Average value: 21.7 arcs Grade Count:184
High Voltage Arc-Tracking Rate, HVTR	0.000 - 150 mm/min	0.000 - 5.91 in/min	Average value: 86.5 mm/min Grade Count:162

Thermal Properties	**Metric**	**English**	**Comments**
CTE, linear	2.70 - 120 µm/m-°C	1.50 - 66.7 µin/in-°F	Average value: 36.4 µm/m-°C Grade Count:378
	5.00 - 60.0 µm/m-°C @Temperature 40.0 - 205 °C	2.78 - 33.3 µin/in-°F @Temperature 104 - 401 °F	Average value: 34.3 µm/m-°C Grade Count:8
CTE, linear, Transverse to Flow	5.00 - 130 µm/m-°C	2.78 - 72.2 µin/in-°F	Average value: 49.3 µm/m-°C Grade Count:262
	62.5 - 62.5 µm/m-°C @Temperature 40.0 - 120 °C	34.7 - 34.7 µin/in-°F @Temperature 104 - 248 °F	Average value: 62.5 µm/m-°C Grade Count:1
Specific Heat Capacity	1.10 - 6.28 J/g-°C	0.263 - 1.50 BTU/lb-°F	Average value: 3.00 J/g-°C Grade Count:6
Thermal Conductivity	0.0360 - 11.0 W/m-K	0.250 - 76.3 BTU-in/hr-ft²-°F	Average value: 0.321 W/m-K Grade Count:176
Melting Point	171 - 254 °C	340 - 490 °F	Average value: 222 °C Grade Count:10
Maximum Service Temperature, Air	70.0 - 300 °C	158 - 572 °F	Average value: 181 °C Grade Count:51
Hot Ball Pressure Test	75.0 - 125 °C	167 - 257 °F	Average value: 125 °C Grade Count:105
Transformation Temperature, Tg	168 - 200 °C	334 - 392 °F	Average value: 192 °C Grade Count:5
Deflection Temperature at 0.46 MPa (66 psi)	116 - 237 °C	240 - 459 °F	Average value: 208 °C Grade Count:310
Deflection Temperature at 1.8 MPa (264 psi)	47.2 - 393 °C	117 - 739 °F	Average value: 200 °C Grade Count:587
Vicat Softening Point	75.0 - 242 °C	167 - 468 °F	Average value: 214 °C Grade Count:242
Minimum Service Temperature, Air	-50.0 - 0.000 °C	-58.0 - 32.0 °F	Average value: -30.0 °C Grade Count:11
Glass Transition Temp, Tg	180 - 220 °C	356 - 428 °F	Average value: 212 °C Grade Count:50
UL RTI, Electrical	105 - 180 °C	221 - 356 °F	Average value: 145 °C Grade Count:225
UL RTI, Mechanical with Impact	105 - 180 °C	221 - 356 °F	Average value: 143 °C Grade Count:228
UL RTI, Mechanical without Impact	105 - 180 °C	221 - 356 °F	Average value: 145 °C Grade Count:228

Flammability, UL94	HB - 5VA	HB - 5VA	Grade Count:375
Smoke Density	0.000 - 10.0	0.000 - 10.0	Average value: 2.63 Grade Count:56
Oxygen Index	44.0 - 54.0 %	44.0 - 54.0 %	Average value: 47.3 % Grade Count:127
Glow Wire Test	825 - 960 °C	1520 - 1760 °F	Average value: 930 °C Grade Count:73

Optical Properties	**Metric**	**English**	**Comments**
Transmission, Visible	58.0 - 90.0 %	58.0 - 90.0 %	Average value: 84.3 % Grade Count:6

Processing Properties	**Metric**	**English**	**Comments**
Processing Temperature	60.0 - 410 °C	140 - 770 °F	Average value: 295 °C Grade Count:69
Nozzle Temperature	173 - 421 °C	343 - 790 °F	Average value: 374 °C Grade Count:356
Adapter Temperature	270 - 335 °C	518 - 635 °F	Average value: 303 °C Grade Count:7
Die Temperature	260 - 360 °C	500 - 680 °F	Average value: 327 °C Grade Count:26
Melt Temperature	107 - 427 °C	225 - 801 °F	Average value: 312 °C Grade Count:483
Head Temperature	290 - 360 °C	554 - 680 °F	Average value: 341 °C Grade Count:19
Mold Temperature	37.8 - 399 °C	100 - 750 °F	Average value: 151 °C Grade Count:510
Drying Temperature	60.0 - 152 °C	140 - 305 °F	Average value: 146 °C Grade Count:491
Moisture Content	0.0200 - 0.0400 %	0.0200 - 0.0400 %	Average value: 0.0332 % Grade Count:110
Dew Point	-28.9 °C	-20.0 °F	Average value: -28.9 °C Grade Count:70
Injection Pressure	82.7 - 124 MPa	12000 - 18000 psi	Average value: 103 MPa Grade Count:111
Vent Depth	0.00250 - 0.00760 cm	0.000984 - 0.00299 in	Average value: 0.00500 cm Grade Count:275
Precipitation Temperature	60.0 - 120 °C	140 - 248 °F	Average value: 95.6 °C Grade Count:65

Some of the values displayed above may have been converted from their original units and/or rounded in order to display the information in a consistent format. Users requiring more precise data for scientific or engineering calculations can click on the property value to see the original value as well as raw conversions to equivalent units. We advise that you only use the original value or one of its raw conversions in your calculations to minimize rounding error. We also ask that you refer to MatWeb's terms of use regarding this information. Click here to view all the property values for this datasheet as they were originally entered into MatWeb.