Typical Engineering Properties of Polypropylene

General Properties	English Units	SI Units
CAS Number	9003-07-0	9003-07-0
Density	56.1 – 57.4 lbs/ft^3	0.898-0.920 g/cm^3
Melt Density	46.1 lbs/ft^3	0.739 g/cm^3
Bulk Density		
Pellets	31 – 43 lbs/ft^3	497 - 529 kg/m^3
Flake	30 – 32 lbs/ft^3	481 – 513 kg/m^3
Permeability Coefficients:		
Water (@25°C)	6.0x10^{-9} in^2/sec^2-atm	5.1x10^{-10}cm^2/(sec-cm Hg)
Oxygen (@ 30°C)	2.7x10^{-9} in^2/sec^2-atm	2.3x10^{-10}cm^2/(sec-cm Hg)
Carbon Dioxide (@30°C)	10.8x10^{-9} in^2/sec^2-atm	3.5x10^{-10}cm^2/(sec-cm Hg)
Hydrogen (@ 20°C)	48.3x10^{-9} in^2/sec^2-atm	41.0x10^{-10}cm^2/(sec-cm Hg)
Nitrogen (@30°C)	0.52x10^{-9} in^2/sec^2-atm	0.27x10^{-10}cm^2/(sec-cm Hg)
Water Absorption @24 h Immersion	0.03%	0.03%
Brittleness Temperature		
Homopolymer	32 – 60 °F	0 – 15 °C
Random Copolymer	13 – 40 °F	-10 – 5 °C
Impact Copolymer	- 44 – 50 °F	- 40 – 10 °C
Mechanical Properties		
Modulus of Elasticity (Young's Modulus)		
Homopolymer	183,000 psi	1,300 MPa
Copolymer	155,000 psi	1,100 MPa
Poisson's Ratio	0.45	0.45
Hardness, Shore D Scale	55 – 65	55 – 65
Coefficient of Friction	0.3	0.3
Thermal Properties		
DSC Melting Point		
Homopolymer	320 - 329 °F	160 - 165 °C
Copolymer	275 – 318 °F	135 – 159 °C
Specific Heat (@ 23°C)		70 -80 J/°K/mol
Heat of Fusion	37.8 Btu/lb	88 kJ/kg
Thermal conductivity (solid)		
Homopolymer	0.7 (Btu in.)/(ft.^{2} hr °F)	0.1 W/m °K
Copolymer	0.12 – 0.17 (Btu in.)/(ft.^{2} hr °F)	0.8 – 1.2 W /m /°K
Thermal conductivity (melt)		0.16 W/m /°K
Coefficient of Linear Thermal Expansion		
Homopolymer	4 - 6 x 10^{-5} in/(in °F)	8 - 10 x 10^{-5} cm/(cm °C)
Copolymer	3 - 5 x 10^{-5} in/(in °F)	6 - 9 x 10^{-5} cm/(cm °C)
Shrinkage		
Homopolymer	0.018 – 0.020 in/in	0.046 – 0.051 cm/cm
Copolymer	0.015 – 0.019 in/in	0.038 – 0.048 cm/cm
Vicat Softening Temperature		
Homopolymer	305 °F	152 °C
Copolymer	289 – 304 °F	143 – 151 °C

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Typical Engineering Properties of Polypropylene

Flammability Properties	English Units	SI Units
Auto-ignition Temperature	>650 °F	>340 °C
Energy Required for Ignition		>2,500 kJ/m2
Ignition Temperature – Cloud	790 °F	420 ° C
Minimum Radiant Flux for Ignition		20 kW/m2
Smoke Specific Extension Area	1,855 – 3,320 ft2/lb.	380 – 610 m2/kg
Soot Yield	0.06–0.09 lbs. soot/lb	0.06–0.09 kg. soot/kg
Electrical Properties		
Volume Resistivity		$>10^{16}$ Ohm-cm
Conductivity		1 – 3 mhos/cm
Dielectric Constant @ 1MHz	2.1 – 2.3	2.1 – 2.3
Dielectric Strength	500 – 600 Volts/mil	0.23 – 0.25 V/cm
Power Factor		300 Hz
Dissipation Factor		
@ 10 kHz	<0.0005 h	<0.0005 h
@ 1 MHz	<0.0005 h	<0.0005 h
@ 1 GHz	<0.0005 – 0.002 h	<0.0005 – 0.002 h
Arc Resistance	136 – 185 s	136 – 185 s

Data gathered from numerous literature sources over a number of years and is presented as obtained with no guarantees as to the accuracy of the data. Unless otherwise noted, all properties are those of the bulk material at ambient room temperature.

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