Typical Engineering Properties of High Density Polyethylene

General Properties	English Units	SI Units
CAS Number		
Ethylene homopolymer	9002-88-4	
1-butene-ethylene copolymer	25087-34-7	
1-hexene-ethylene copolymer	25213-02-9	
Molecular Weight	0.062 lbs	28.0 g
Density	0.0336-0.0349 lbs/in^3	0.930-0.965 g/cm^3
Melt Density	0.027 lbs/in^3	0.764 g/cm^3
Bulk Density		
Pellets	35 – 38 lbs./ft^3	561 - 609 kg/m^3
Flake	31 – 34 lbs./ft^3	497 – 545 kg/m^3
Permeability Coefficients:		
Water (@ 25°C)	1.7x10^{-12}in^2/sec^2-atm	1.3x10^{-10}cm^2/(sec-cm Hg)
Oxygen (@ 30°C)	1.4x10^{-12}in^2/sec^2-atm	1.06x10^{-10}cm^2/(sec-cm Hg)
Carbon Dioxide (@ 30°C)	4.6x10^{-12}in^2/sec^2-atm	3.5x10^{-10}cm^2/(sec-cm Hg)
Nitrogen (@ 30°C)	0.35x10^{-12}in^2/sec^2-atm	0.27x10^{-10}cm^2/(sec-cm Hg)
Water Absorption @ 24 h Immersion	0.03%	0.03%
Mechanical Properties		
Modulus of Elasticity (Young's Modulus)		
Homopolymer	150,000 psi	1,035 N/mm^2
Copolymer	60,000 – 145,000 psi	400 – 1,000 N/mm^2
Poisson's Ratio	0.40 - 0.45	0.40 - 0.45
Hardness, Shore D Scale	55 – 70	55 – 70
Coefficient of Friction	0.29	0.29
Thermal Properties		
DSC Melting Point		
Homopolymer	275 °F	135 °C
Copolymer	230 – 273 °F	110 – 134 °C
Specific Heat (@ 23°C)		2.25 kJ/kg °K
Heat of Fusion		
Homopolymer		245 kJ/kg
Copolymer		140 – 232 kJ/kg
Thermal conductivity		
Homopolymer		0.49 W / m °K
Copolymer		0.40 – 0.47 W / m °K
Vicat Softening Temperature		
Homopolymer	270 °F	132 °C
Copolymer	233 – 266 °F	112 – 130 °C

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Coefficient of Linear Thermal Expansion	6.7 x 10^{-5} in/(in °F)	12 x 10^{-5} cm/(cm °C)
Shrinkage	0.018 -0.020 in/in	0.018 – 0.020 cm/cm

Product inquiries:

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Flammability Properties	English Units	SI Units
Auto-ignition Temperature	>650 °F	>340 °C
Energy Required for Ignition		>2,500 kj/m2
Fuel Value Content	19,900 BTU/lb.	
Ignition Temperature – Cloud	790 °F	420 ° C
Minimum Radiant Flux for Ignition		20 kW/m^2
Smoke Specific Extension Area	1,855 – 3,320 ft^2/lb.	380 – 610 m^2/kg
Soot Yield	0.06–0.09 lbs. soot/lb polymer	0.03–0.04 kg soot/kg polymer

Electrical Properties	English Units	SI Units
Volume Resistivity	6 x 10^{15} Ohm-cm	6 x 10^{15} Ohm-cm
Dielectric Constant @1 MHz	2.35	2.35
Dielectric Strength	500 – 600 Volts/mil	19 – 23 kV/mm
Power Factor	<0.0001 kHz	<0.0001 kHz
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 temperature.

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