Polyethylene (PE)

TYPICAL PROPERTIES OF POLYETHYLENE (PE)

ASTM Test	Property	Low-Density	Medium-Density	High-Density	Ultra-High Molecular Weight
	PHYSICAL				
D792	Specific gravity	0.910-0.925	0.926-0.940	0.941-0.965	0.928-0.941
D792	Specific volume (in^3/lb)	30.4-29.9	29.9-29.4	29.4-28.7	29.4
D570	Water absorption, 24 h, 1/8-in thk (%)	<0.01	<0.01	<0.01	<0.01
	MECHANICAL				
D638	Tensile strength (psi)	600-2,300	1,200-3,500	3,100-5,500	4,000-6,000
D638	Elongation (%)	90-800	50-600	20-1,000	200-500
D638	Tensile modulus (10^5 psi)	0.14-0.38	0.25-0.55	0.6-1.8	0.20-1.10
D790	Flexural modulus (10^5 psi)	0.08-0.60	0.60-1.15	1.0-2.0	1.0-1.7
D256	Impact strength, Izod (ft-lb/in of notch)	No break	0.5-16	0.5-20	No break
D785	Hardness, Rockwell R	10	15	65	67
	THERMAL				
C177	Thermal conductivity (10^{-4} cal-cm/sec-cm^2-°C)	8.0	8.0-10.0	11.0-12.4	11.0
D696	Coefficient of thermal expansion (10^{-5} in/in-°F)	5.6-12.2	7.8-8.9	6.1-7.2	7.8
D648	Deflection temperature (°F)				
	At 264 psi	90-105	105-120	110-130	118
	At 66 psi	100-121	120-165	140-190	170
	ELECTRICAL				
D149	Dielectric strength (V/mil)				
	Short time, 1/8-in thk	460-700	460-650	450-500	900*
D150	Dielectric constant				
	At 1 kHz	2.25-2.35	2.25-2.35	2.30-2.35	2.30-2.35
D150	Dissipation factor				
	At 1 kHz	0.0002	0.0002	0.0003	0.0002
D257	Volume resistivity (ohm-cm)				
	At 73°F, 50% RH	10^{15}	10^{15}	10^{15}	10^{18}
D495	Arc resistance (s)	135-160	200-235	—	—
	OPTICAL				
D542	Refractive index	1.51	1.52	1.54	—
D1003	Transmittance (%)	4-50	4-50	10-50	—

*kV/cm.

Polyethylene (PE)

TYPICAL PROPERTIES OF POLYETHYLENE (PE)

ISO Test	Property	Low-Density	Medium-Density	High-Density	Ultra-High Molecular Weight
	PHYSICAL				
ISO1183	Specific gravity	0.910-0.925	0.926-0.940	0.941-0.965	0.928-0.941
ISO1183	Specific volume (cm^3/g)	1.094-1.076	1.076-1.058	1.058-1.033	1.058
ISO62	Water absorption, 24 h, 3.1 mm thk (%)	<0.01	<0.01	<0.01	<0.01
	MECHANICAL				
ISO527	Tensile strength (MPa)	4.14-15.86	8.27-24.13	21.37-37.92	27.58-41.37
ISO527	Elongation (%)	90-800	50-600	20-1,000	200-500
ISO527	Tensile modulus (MPa)	96.53-262	172-379	413-1241	137-758
ISO178	Flexural modulus (MPa)	55.16-413	413-793	689-1378	689-1172
ISO180	Notched izod impact strength (J/m)	No break	27-854	27-1068	No break
ISO2039	Hardness, Rockwell R	10	15	65	67
	THERMAL				
ISO8302	Thermal conductivity ((W/(mK))	0.35	—	0.43	—
ISO11359	Coefficient of thermal expansion (10^{-4} m/m-°C)	0.90-1.99	1.70-1.82	1.65-1.79	2
ISO75	Deflection temperature (°C)				
	At 1.8 MPa	32-41	41-49	43-54	48
	At 0.45 MPa	38-49	49-74	60-88	77
	ELECTRICAL				
IEC243	Dielectric strength (kV/mm)				
	Short time, 3.1 mm thk	18.1-27.5	18.1-25.6	17.7-19.7	35.4-45
IEC250	Dielectric constant				
	At 1 kHz	2.25-2.35	2.25-2.35	2.30-2.35	2.30-2.35
IEC250	Dissipation factor				
	At 1 kHz	0.0002	0.0002	0.0003	0.0002
IEC93	Volume resistivity (ohm-cm)				
	At 23°C, 50% RH	10^{15}	10^{15}	10^{15}	10^{18}
ASTM D495	Arc resistance (s)	135-160	200-235	—	—
	OPTICAL				
ISO489	Refractive index	1.51	1.52	1.54	—
ISO489	Transmittance (%)	4-50	4-50	10-50	—

*kV/cm.