

Overview of materials for High Density Polyethylene (HDPE), Pipe Grade

Category : Polymer , Thermoplastic , Polyethylene (PE) , HDPE , High Density Polyethylene (HDPE), Pipe Grade

Material Notes:

This property data is a summary of similar materials in the MatWeb database for the category "High Density Polyethylene (HDPE), Pipe Grade". 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.

Order this product through the following link:

http://www.lookpolymers.com/polymer_Overview-of-materials-for-High-Density-Polyethylene-HDPE-Pipe-Grade.php

Physical Properties	Metric	English	Comments
Density	0.939 - 0.970 g/cc	0.0339 - 0.0350 lb/in ³	Average value: 0.951 g/cc Grade Count:130
Viscosity	270000 - 2.10e+6 cP	270000 - 2.10e+6 cP	Average value: 1.26e+6 cP Grade Count:7
	@Temperature 190 - 190 °C	@Temperature 374 - 374 °F	
	270000 - 2.10e+6 cP	270000 - 2.10e+6 cP	Average value: 1.26e+6 cP Grade Count:7
	@Shear Rate 100 - 1000 1/s	@Shear Rate 100 - 1000 1/s	
Environmental Stress Crack Resistance	10.0 - 10000 hour	10.0 - 10000 hour	Average value: 3150 hour Grade Count:44
	15.5 - 15.5 hour	15.5 - 15.5 hour	Average value: 1290 hour Grade Count:17
	@Temperature 50.0 - 100 °C	@Temperature 122 - 212 °F	
	>= 5.00 hour	>= 5.00 hour	Average value: 1290 hour Grade Count:2
	@Temperature 80.0 - 80.0 °C	@Temperature 176 - 176 °F	
	>= 5.00 hour	>= 5.00 hour	Average value: 1290 hour Grade Count:2
	@Pressure 0.920 - 0.920 MPa	@Pressure 133 - 133 psi	
	530 - 530 hour	530 - 530 hour	Average value: 1290 hour Grade Count:8
	@Temperature 50.0 - 100 °C	@Temperature 122 - 212 °F	
	530 - 530 hour	530 - 530 hour	Average value: 1290 hour Grade Count:8
	@Thickness 1.90 - 2.00 mm	@Thickness 0.0748 - 0.0787 in	
Oxidative Induction Time (OIT)	10.0 - 40.0 min	10.0 - 40.0 min	Average value: 22.3 min Grade Count:23

Physical Properties	≥ 20.0 min Metric	≥ 20.0 min English	Comments
	@Temperature 200 - 210 °C	@Temperature 392 - 410 °F	Average value: 44.4 min Grade Count:18
Melt Flow	0.0290 - 47.0 g/10 min	0.0290 - 47.0 g/10 min	Average value: 5.03 g/10 min Grade Count:138
Base Resin Melt Index	0.400 - 0.400 g/10 min @Temperature 190 - 190 °C	0.400 - 0.400 g/10 min @Temperature 374 - 374 °F	Average value: 0.400 g/10 min Grade Count:1
	0.400 - 0.400 g/10 min @Load 5.00 - 5.00 kg	0.400 - 0.400 g/10 min @Load 11.0 - 11.0 lb	Average value: 0.400 g/10 min Grade Count:1

Mechanical Properties	Metric	English	Comments
Hardness, Shore D	57.0 - 68.0	57.0 - 68.0	Average value: 63.6 Grade Count:65
Tensile Strength, Ultimate	18.0 - 38.0 MPa	2610 - 5510 psi	Average value: 32.9 MPa Grade Count:59
Tensile Strength, Yield	16.5 - 31.0 MPa	2390 - 4500 psi	Average value: 23.3 MPa Grade Count:116
Elongation at Break	195 - 1000 %	195 - 1000 %	Average value: 699 % Grade Count:105
Elongation at Yield	7.30 - 600 %	7.30 - 600 %	Average value: 27.5 % Grade Count:32
Modulus of Elasticity	0.700 - 1.34 GPa	102 - 195 ksi	Average value: 0.961 GPa Grade Count:20
Flexural Modulus	0.621 - 1.65 GPa	90.0 - 240 ksi	Average value: 0.990 GPa Grade Count:88
Secant Modulus	0.786 - 1.25 GPa	114 - 181 ksi	Average value: 0.999 GPa Grade Count:6
Izod Impact, Notched	0.785 - 6.00 J/cm	1.47 - 11.2 ft-lb/in	Average value: 3.05 J/cm Grade Count:40
	0.490332 - 3.43233 J/cm @Temperature -20.0 - 0.000 °C	0.918594 - 6.43016 ft-lb/in @Temperature -4.00 - 32.0 °F	Average value: 1.91 J/cm Grade Count:9
Izod Impact, Notched (ISO)	10.0 - 20.0 kJ/m ²	4.76 - 9.52 ft-lb/in ²	Average value: 16.6 kJ/m ² Grade Count:7
Charpy Impact, Notched	1.00 - 1000 J/cm ²	4.76 - 4760 ft-lb/in ²	Average value: 2.00 J/cm ² Grade Count:7
	0.800 - 1.60 J/cm ² @Temperature -30.0 - 0.000 °C	3.81 - 7.61 ft-lb/in ² @Temperature -22.0 - 32.0 °F	Average value: 1.23 J/cm ² Grade Count:3
			Average value: 10.1 MPa Grade

Hydrostatic Design Basis Mechanical Properties	Metric	English	Count:20 Comments
	6.89476 - 6.90 MPa	1000.00 - 1000 psi	Average value: 6.90 MPa Grade Count:8
	@Temperature 60.0 - 60.0 °C	@Temperature 140 - 140 °F	

Thermal Properties	Metric	English	Comments
CTE, linear	120 - 216 µm/m-°C	66.7 - 120 µin/in-°F	Average value: 161 µm/m-°C Grade Count:12
	90.0 - 500 µm/m-°C	50.0 - 278 µin/in-°F	Average value: 295 µm/m-°C Grade Count:1
	@Temperature -20.0 - 100 °C	@Temperature -4.00 - 212 °F	
Specific Heat Capacity	2.00 - 2.10 J/g-°C	0.478 - 0.502 BTU/lb-°F	Average value: 2.01 J/g-°C Grade Count:9
	2.60 - 2.60 J/g-°C	0.621 - 0.621 BTU/lb-°F	Average value: 2.60 J/g-°C Grade Count:8
	@Temperature 150 - 150 °C	@Temperature 302 - 302 °F	
Thermal Conductivity	0.400 W/m-K	2.78 BTU-in/hr-ft ² -°F	Average value: 0.400 W/m-K Grade Count:7
	0.200 - 0.200 W/m-K	1.39 - 1.39 BTU-in/hr- ft ² -°F	Average value: 0.200 W/m-K Grade Count:8
	@Temperature 150 - 150 °C	@Temperature 302 - 302 °F	
Melting Point	56.7 - 138 °C	134 - 280 °F	Average value: 125 °C Grade Count:31
Maximum Service Temperature, Air	200 - 264 °C	392 - 507 °F	Average value: 213 °C Grade Count:7
Deflection Temperature at 0.46 MPa (66 psi)	57.0 - 99.0 °C	135 - 210 °F	Average value: 73.1 °C Grade Count:15
Vicat Softening Point	67.0 - 132 °C	153 - 270 °F	Average value: 120 °C Grade Count:54
Brittleness Temperature	-118 - -59.0 °C	-180 - -74.2 °F	Average value: -81.5 °C Grade Count:55
DSC Induction Temperature	250 °C	482 °F	Average value: 250 °C Grade Count:3

Component Elements Properties	Metric	English	Comments
Carbon, C	2.00 - 2.50 %	2.00 - 2.50 %	Average value: 2.30 % Grade Count:3

Electrical Properties	Metric	English	Comments
Electrical Resistivity	1.00e+16 - 1.00e+17 ohm-cm	1.00e+16 - 1.00e+17 ohm-cm	Average value: 2.80e+16 ohm-cm Grade Count:5

Surface Resistance Electrical Properties	1.00e+16 ohm Metric	1.00e+16 ohm English	Average value: 1.00e+16 ohm Grade Count:4
Dielectric Constant	2.35 - 2.45	2.35 - 2.45	Average value: 2.38 Grade Count:5
Dielectric Strength	16.0 - 18.0 kV/mm	406 - 457 kV/in	Average value: 16.6 kV/mm Grade Count:5
Dissipation Factor	0.000200 - 0.0200	0.000200 - 0.0200	Average value: 0.00683 Grade Count:4

Processing Properties	Metric	English	Comments
Die Temperature	200 - 210 °C	392 - 410 °F	Average value: 205 °C Grade Count:7
Melt Temperature	136 - 260 °C	277 - 500 °F	Average value: 205 °C Grade Count:17
Head Temperature	200 - 210 °C	392 - 410 °F	Average value: 205 °C Grade Count:6

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