

Typical Engineering Properties of Polypropylene

| General Properties | English Units | SI Units |
|---|--|---|
| CAS Number | 9003-07-0 | 9003-07-0 |
| Density | | |
| Homopolymer | 56.4 - 56.6 Lbs /ft ³ | 0.904 – 0.908 g/cm ³ |
| Random Copolymer | 56.4 - 56.6 Lbs /ft ³ | 0.904 – 0.908 g/cm ³ |
| Impact Copolymer | 56.0 – 56.2 Lbs /ft ³ | 0.898 – 0.900 g/cm ³ |
| TPOs | 54.6 – 56.1 Lbs /ft ³ | 0.875 – 0.880 g/cm ³ |
| Melt Density | 9.5 lbs/in ³ | 0.739 g/cm ³ |
| Bulk Density | | |
| Pellets | 32 – 36 lbs./ft ³ | 513 - 577 kg/m ³ |
| Flake | 29 – 31 lbs./ft ³ | 465 – 497 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 | <0.01% | <0.01% |
| Brittleness Temperature | | |
| Homopolymer | 13 – 32 °F | -10 – 0 °C |
| Random Copolymer | -5 – 20 °F | -20 – -5 °C |
| Impact Copolymer | - 44 – 20 °F | -40 – -5 °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 | 0.42 | 0.42 |
| Hardness | | |
| Shore D Scale | 55 – 65 | 55 – 65 |
| Rockwell R Scale | | |
| Homopolymers | 80 - 110 | 80 - 110 |
| Random and Impact Copolymers | 45 - 95 | 45 - 95 |
| Coefficient of Friction, Plastics to Steel | | |
| Static | 0.30 | 0.30 |
| Dynamic | 0.28 | 0.28 |
| Coefficient of Friction, Plastics to Plastic | | |
| Static | 0.76 | 0.76 |
| Dynamic | 0.44 | 0.44 |
| 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) | | 0.17 – 0.22 W/m °K |

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| | | |
|--|-------------------------------------|--------------------------------------|
| 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 |

| Flammability Properties | English Units | SI Units |
|--|------------------------------------|------------------------------|
| Auto-ignition Temperature | >650 °F | >340 °C |
| Energy Required for Ignition | | >2,500 kJ/m ² |
| 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 | 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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