



POLYETHYLENE (PE)

1. Common trade names: Low Density-Petrothene, High Density-Marlex, Hostalen

| | UNITS | Low Density | High Density | |
|---|--|-------------|--------------|---|
| 2. Density | g/cm ³ | 0.91 | 0.94 | Mass per unit volume |
| 3. Mold Shrinkage | in./in. | 0.02 | 0.02 | Size of part versus mold cavity |
| 4. Continuous Service Temp | °F | 180 | | Highest temp material can perform reliably for the long term |
| 5. Melting Point | °F | 325 | 275 | Temperature material begins to melt |
| 6. Processing Temp | °F | 400-500 | | Recommended temperature for molding |
| 7. Tensile Strength | $\frac{lb}{in.^2}$ | 600 | 3600 | Maximum stress without yielding to a stretching mold |
| 8. Izod Impact Strength | $\frac{ft-lb}{in.}$ | No Break | 0.5 | Energy required to break at a v-notch |
| 9. Compressive Strength | $\frac{10^3 lb.}{in.^2}$ | 2 | 6 | Resist a crushing force |
| 10. Flexural Strength, yeild | $\frac{10^3 lb.}{in.^2}$ | 0.3 | 6 | Resistance to fracture during bending |
| 11. Elongation, tensile break | % | 600 | 20 | Stretching ability before breaking |
| 12. Dielectric Strength | $\frac{V}{10^{-3} in.}$ | 559-686 | | Voltage material can withstand before dielectric breakdown * = aluminum oxide |
| 13. Water Absorption, 24 hours | % | 0.01 | 0.05 | % Water absorbed when immersed in water for 24 hours |
| 14. Coefficient of Lin. Thermal Expansion | $10^{-5} \frac{in.}{in. \text{ } ^\circ F}$ | 10 | 12 | Change in length per change in temperature |
| 15. Crystalline or Amorphous | C = Crystalline A = Amorphous | C or A | | Crystalline: arranged polymer, sharp melting point Amorphous: random polymer, broad melt) |
| 16. Clarity | O = Opaque TP = Transparent TL = Translucent | TL | | Opaque = no light passes through it Transparent = some light passes through it Translucent = light passes directly through it |
| 17. Flammability | Flame Resistance High ← Low 5VA 5VB V-0 V-1 V-2 HB | HB | | Reference standard UL 94 |
| 18. Process: Drying Required | | No | | Is it recommended to dry the material prior to molding? |
| 19. Hot Stamp | | No | | Does the material hot stamp? |
| 20. Machining Qualities | | Fair | | How does the material machine? |
| 21. Creep Resistance | | Fair | Good | Can this material keep it's shape under load? * = with additive or co-polymer |
| 22. Ultrasonic Welding | | Poor | | Does the material weld via ultrasonics? |
| 23. Low Friction | | Fair | | Surface lubricity |
| 24. Abrasion Resistance | | Good | | How well does the material withstand wear? * = with additive or co-polymer |
| 25. Solvent Resistance | | Good | | How well does the material withstand chemicals? |
| 26. UV Resistance | | Poor | | How well does the material withstand UV rays? * = with UV additive |
| 27. Environmental Stress Crack Resistance | | Poor | | Can this material resist environmental stress cracking? * = with additive or co-polymer |
| 28. FDA | | Yes | | Are there FDA grades available? |
| 29. Living Hinge | | Yes | | Can this material be used in a living hinge application? |
| 30. Year Developed | | 1933 | 1954 | |
| 31. Cost: year 2006 | \$/lb. @ 5,000 lbs. | \$1.05 | \$0.97 | Natural/Black Year 2006 |

**Qualitative
 Scale:
 Excellent,
 Good,
 Fair,
 Poor**

32. Applications: Toys, Bottles, Utensils, Containers, Shotgun Shells, Milk Bottle Caps