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MOPLAY 63 (10A) 1-886 (1986)

Resins and compounds (Cont'd)

| Materials | Properties | ASTM test method | Polystyrene and styrene copolymers (Cont'd) | | Polyurethane (see also Thermoplastic elastomers) | | | | |
|---|---|-------------------------|---|--|---|--|---|---|--|
| | | | Styrene methyl methacrylate | EMI shielding (conductive); 20% PAN carbon fiber | Thermoset | | | Thermoplastic | |
| | | | | | Casting resins | | 50-65% mineral-filled potting and casting compounds | 10-20% glass fiber-reinforced molding compounds | EMI shielding (conductive); 30% PAN carbon fiber |
| | | | | | Liquid | Unsaturated | | | |
| Processing | 1. Melting temperature, °C. T _m (crystalline) T _g (amorphous) | | | | Thermoset | Thermoset | Thermoset | | |
| | 2. Processing temperature range, °F. (C = compression; T = transfer; I = injection; E = extrusion) | | I: 375-475 | I: 430-500 | C: 185-250 | | 25 (casting) | I: 360-410 | I: 410-450 |
| | 3. Molding pressure range, 10 ³ p.s.i. | | 5-20 | | 0.1-5 | | | 8-11 | |
| | 4. Compression ratio | | 2.5-3.5 | | | | | | |
| | 5. Mold (linear) shrinkage, in./in. | D955 | 0.002-0.006 | 0.0005-0.003 | 0.020 | | | 0.001-0.002 | 0.007-0.010 |
| Mechanical | 6. Tensile strength at break, p.s.i. | D638 ^b | 8100-9700 | 14,000 | 175-10,000 | 10,000-11,000 | 1000-7000 | 4800-6500 | 13,000 |
| | 7. Elongation at break, % | D638 ^b | 2.1-3.0 | 1 | 100-1000 | 3-6 | 5-55 | 3-48 | 20 |
| | 8. Tensile yield strength, p.s.i. | D638 ^b | | | | | | | |
| | 9. Compressive strength (rupture or yield), p.s.i. | D695 | | | 20,000 | | | 5000 | |
| | 10. Flexural strength (rupture or yield), p.s.i. | D790 | 14,500-15,800 | 20,700 | 700-4500 | 19,000 | | 5500-6200 | 9000 |
| | 11. Tensile modulus, 10 ³ p.s.i. | D638 ^b | 440-500 | 2000 | 10-100 | | | 0.95-1.40 | 500 |
| | 12. Compressive modulus, 10 ³ p.s.i. | D695 | 440-480 | | 10-100 | | | | |
| | 13. Flexural modulus, 10 ³ p.s.i. | D790 | | 1900 | 10-100 | 610 | | 90 | 500 |
| | | 73° F. | D790 | | | | | | |
| | | 200° F. | D790 | | | | | | |
| | 250° F. | D790 | | | | | | | |
| | 300° F. | D790 | | | | | | | |
| 14. Izod impact, ft.-lb./in. of notch (1/8-in. thick specimen) | D256A | 0.2-0.3 | 0.7 | 25 to flexible | 0.4 | | 14-No break | 10 | |
| 15. Hardness | Rockwell Shore/Barcol | D785 D2240/ D2583 | M72-80 | | | | R45-55 | | |
| 16. Coef. of linear thermal expansion, 10 ⁻⁶ in./in./°C. | D696 | 40-72 | | 100-200 | | 71-100 | 34 | | |
| 17. Deflection temperature under flexural load, °F. | D648 | 205-210 | 220 | Varies over wide range | 190-200 | | 115-130 | 180 | |
| | 264 p.s.i. | D648 | | | | | 140-145 | | |
| | 66 p.s.i. | D648 | 230 | | | | | | |
| 18. Thermal conductivity, 10 ⁻⁴ cal.-cm./sec.-cm. ² -°C. | C177 | | | 5 | | 6.8-10 | | | |
| 19. Specific gravity | D792 | 1.09-1.13 | 1.14 | 1.03-1.5 | 1.05 | 1.37-2.1 | 1.22-1.36 | 1.33 | |
| 20. Water absorption (1/8-in. thick specimen), % | D570 | 0.11-0.15 | 0.1 | 0.2-1.5 | 0.1-0.2 | 0.06-0.52 | 0.4-0.55 | | |
| | 24 hr. | D570 | | | | | 1.5 | | |
| | Saturation | D570 | | | | | | | |
| 21. Dielectric strength (1/8-in. thick specimen), short time, v./mil | D149 | | | 300-500 | | 500-750 @ 1/16 in. | 600 | | |
| Design and performance properties For more information on performance and design properties of plastics, see the following charts: Dielectric loss properties p. 552 Dimensional stability p. 585 Environmental stress-crack resistance p. 597 Fatigue p. 614 Film and sheet p. 547 Optical properties p. 611 Outdoor exposure resistance p. 620 Poisson's ratio p. 609 Stress relaxation p. 634 In the 1985-1986 edition of MPE, see: Creep p. 492 Electromagnetic shielding p. 528 Foams p. 486 Impact resistance p. 513 Laminates, by NEMA grades p. 489 In the 1984-1985 edition of MPE, see: Chemical resistance p. 482 In the 1981-1982 edition of MPE, see: Flammability p. 564 In the 1980-1981 edition of MPE, see: Specifications/materials p. 597 Temperature index p. 632 | | SUPPLIERS | Richardson | Wilson-Fiberfil | Dow Chem. (see ad, p. 53); Conap; Emerson & Cuming; Hexcel; Hysol; Thermoset Plastics; Union Carbide | Dow Chem. (see ad, p. 53); Emerson & Cuming; Thermoset Plastics | Conap; Emerson & Cuming; Thermoset Plastics | LNP; RTP; Thermofil; Union Carbide; Wilson-Fiberfil | Wilson-Fiberfil |

a—Boldface listings identify advertisers in this issue. Where advertisements relate to the particular materials described, reference to the page number is included. See the Directory

b—Tensile test method varies with material: D638 is standard for thermoplastics; D638 for rigid thermosetting plastics; D412 for elastomeric plastics; D882 for thin plastics