



# MODERN PLASTICS ENCYCLOPEDIA

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# MODERN PLASTICS ENCYCLOPEDIA

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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 <sub>m</sub> (crystalline) T <sub>g</sub> (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 <sup>3</sup> 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 <sup>b</sup>	8100-9700	14,000	175-10,000	10,000-11,000	1000-7000	4800-6500	13,000
	7. Elongation at break, %	D638 <sup>b</sup>	2.1-3.0	1	100-1000	3-6	5-55	3-48	20
	8. Tensile yield strength, p.s.i.	D638 <sup>b</sup>							
	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 <sup>3</sup> p.s.i.	D638 <sup>b</sup>	440-500	2000	10-100			0.95-1.40	500
	12. Compressive modulus, 10 <sup>3</sup> p.s.i.	D695	440-480		10-100				
	13. Flexural modulus, 10 <sup>3</sup> p.s.i.	73° F. D790 200° F. D790 250° F. D790 300° F. D790		1900	10-100	610		90	500
	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 D785 Shore/Barcol D2240/D2583	M72-80					R45-55	
Thermal	16. Coef. of linear thermal expansion, 10 <sup>-6</sup> in./in./°C.	D696	40-72		100-200		71-100	34	
	17. Deflection temperature under flexural load, °F.	264 p.s.i. D648 66 p.s.i. D648	205-210	220	Varies over wide range	190-200		115-130	180
	18. Thermal conductivity, 10 <sup>-4</sup> cal.-cm./sec.-cm. <sup>2</sup> -°C.	C177			5		6.8-10		
Physical	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), %	24 hr. D570 Saturation D570	0.11-0.15	0.1	0.2-1.5	0.1-0.2	0.06-0.52	0.4-0.55	1.5
	21. Dielectric strength (1/8-in. thick specimen), short time, v./mil	D149			300-500		500-750 @ 1/8 in.	600	
<b>Design and performance properties</b> 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