

## Acrylic/Polymethyl Methacrylate (PMMA)

TYPICAL PROPERTIES OF ACRYLICS				
ASTM Test	Property	---- MOLDING GRADE ----		
		Cast Sheet	Standard	High Impact
PHYSICAL				
D792	Specific gravity	1.19	1.19	1.15-1.17
D792	Specific volume (in <sup>3</sup> /lb)	23.3	23.3	24.1
D570	Water absorption, 24 h, 1/8-in thk (%)	0.2	0.3	0.3
MECHANICAL				
D638	Tensile strength (psi)	10,500	10,500	5,400-7,000
D638	Elongation (%)	5	5	50
D638	Tensile modulus (10 <sup>5</sup> psi)	4.5	4.3	2.2-3.2
D790	Flexural strength (psi)	16,500	16,000	7,000-10,500
D790	Flexural modulus (10 <sup>5</sup> psi)	4.5	4.5	2.3-3.2
D256	Impact strength, Izod (ft-lb/in of notch)	0.4	0.4	0.6-1.2
D785	Hardness, Rockwell	M100-102	M95	R99-M68
THERMAL				
D696	Coefficient of thermal expansion (10 <sup>-5</sup> in/in-°C)	3.9	3.6	3.8
D648	Deflection temperature (°F)	At 264 psi	200-215	198
		At 66 psi	225	214
			170-190	187
ELECTRICAL				
D149	Dielectric strength (V/mil) Short time, 1/8-in thk	500	500	383-450
D150	Dielectric constant	At 1 kHz	3.3	3.3
		At 1 MHz	2.5	2.3
D150	Dissipation factor	At 1 kHz	0.04	0.04
		At 1 MHz	0.02-0.03	0.02-0.03
			0.01-0.02	0.01-0.02
D257	Volume resistivity (ohm-cm) At 73°F, 50% RH	>10 <sup>17</sup>	>10 <sup>17</sup>	>10 <sup>15</sup>
D495	Arc resistance (s)	No track	No track	No track
OPTICAL				
D542	Refractive index	1.49	1.49	1.49
D1003	Transmittance (%)	92	92	90

Ref: Machine Design – 1985

TYPICAL PROPERTIES OF ACRYLICS				
ISO Test	Property	MOLDING GRADE ----		
		Cast Sheet	Standard	High Impact
PHYSICAL				
ISO1183	Specific gravity	1.19	1.19	1.15-1.17
ISO1183	Specific volume (cm <sup>3</sup> /g)	0.84	0.84	0.86
ISO62	Water absorption, 24 h, 3 mm thk (%)	0.2	0.3	0.3
MECHANICAL				
ISO527	Tensile strength (MPa)	72.39	72.39	37.23-48.26
ISO527	Elongation (%)	5	5	50
ISO527	Tensile modulus (MPa)	3,102	2,964	1,516-2,206
ISO178	Flexural strength (MPa)	113	110	48-72
ISO178	Flexural modulus (MPa)	3,102	3,102	1,516-2,206
ISO179	Impact strength, Izod (J/m)	21	21	32-64
ISO2039	Hardness, Rockwell	M100-102	M95	R99-M68
THERMAL				
ISO11359	Coefficient of thermal expansion (10 <sup>-4</sup> m/m°C)	0.7	0.65	0.68
ISO527	Deflection temperature (°C)	At 1.80 MPa	93-102	92
		At 0.45 MPa	107	101
			77-88	86
ELECTRICAL				
IEC243	Dielectric strength (kV/mm) Short time, 3mm thk	19.6	19.6	15.0-17.7
IEC250	Dielectric constant	At 1 kHz	3.3	3.3
		At 1 MHz	2.5	2.3
IEC250	Dissipation factor	At 1 kHz	0.04	0.04
		At 1 MHz	0.02-0.03	0.02-0.03
			0.01-0.02	0.01-0.02
IEC93	Volume resistivity (ohm-cm) At 23°C, 50% RH	>10 <sup>17</sup>	>10 <sup>17</sup>	>10 <sup>15</sup>
ASTM D495	Arc resistance (s)	No track	No track	No track
OPTICAL				
ISO489	Refractive index	1.49	1.49	1.49
ASTM D1003	Transmittance (%)	92	92	90

Ref: Machine Design – 1985