

Polystyrene (PS)

TYPICAL PROPERTIES OF POLYSTYRENE (PS)						
ASTM or UL Test	Property	POLYMERS		COPOLYMERS		
		General Purpose	Impact Modified	Crystal Clear	Impact Modified	Glass Reinforced*
PHYSICAL						
D792	Specific gravity	1.04-10.9	1.03-1.10	1.08-1.10	1.05-10.8	1.13-1.22
D792	Specific volume (in ³ /lb)	26.0-25.6	28.1-25.2	—	—	—
D570	Water absorption, 24 h, 1/8-in thk (%)	0.03-0.10	0.05-0.60	0.1	0.1	0.08
MECHANICAL						
D638	Tensile strength (psi)	5,000-12,000	1,500-7,000	7,000-7,600	4,800-7,200	10,500-12,500
D638	Elongation (%)	0.5-2.0	2-60	1.4-1.7	2.0-20.0	1.3-2.0
D638	Tensile modulus (10 ⁵ psi)	4.0-6.0	1.4-5.0	4.4-4.7	2.8-4.2	6.3-10.0
D790	Flexural strength (psi)	8,000-17,000	3,000-12,000	12,000-12,600	8,500-12,200	12,200-19,700
D790	Flexural modulus (10 ⁵ psi)	4.0-4.7	1.5-4.6	4.6-4.9	3.2-4.5	5.5-9.8
D256	Impact strength, Izod (ft-lb/in of notch)	0.2-0.45	0.5-4.0	0.3-0.5	0.5-4.4	1.8-2.6
D785	Hardness, Rockwell M	65-80	10-90	108	80	101
THERMAL						
C177	Thermal conductivity (Btu-in/hr-ft ² -°F)	2.4-3.3	1.0-3.0	2.4-3.3	1.0-3.0	—
D696	Coefficient of thermal expansion (10 ⁻⁵ in/in-°F)	3.3-4.4	1.9	3.5-3.7	3.5-3.7	2.0-2.2
D648	Deflection temperature (°F)					
	At 264 psi	190-220	160-200	235-249	235-249	235-260
	At 66 psi	180-230	180-220	—	—	—
UL 94	Flammability rating†	HB	HB	HB	HB	HB
ELECTRICAL						
D149	Dielectric strength (V/mil)					
	Short time, 1/8-in thk	500-700	300-600	500-700	300-600	—
D150	Dielectric constant					
	At 1 kHz	2.40-2.65	2.4-4.5	—	—	—
D150	Dissipation factor					
	At 1 kHz	0.0001-0.0003	0.0004-0.0020	—	—	—
D257	Volume resistivity (ohm-cm)					
	At 73°F, 50% RH	10 ¹⁷ -10 ¹⁹	10 ¹⁶	—	—	—
D495	Arc resistance (s)	60-135	20-100	95	95	—
OPTICAL						
D542	Refractive index	1.60	—	1.59	—	—
D1003	Transmittance (%)	87-92	35-57	92	—	—
*10-20%	†V-2, V-1, and V-0 grades are also available.					

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ISO or UL Test	Property	POLYMERS		COPOLYMERS		
		General Purpose	Impact Modified	Crystal Clear	Impact Modified	Glass Reinforced*
PHYSICAL						
ISO1183	Specific gravity	1.04-10.9	1.03-1.10	1.08-1.10	1.05-10.8	1.13-1.22
ISO1183	Specific volume (cm ³ /g)	0.936-0.922	1.011-0.907	—	—	—
ISO62	Water absorption, 24 h, 3.1 mm thk (%)	0.03-0.10	0.05-0.60	0.1	0.1	0.08
MECHANICAL						
ISO527	Tensile strength (MPa)	34.47-82.74	10.34-48.26	48.26-52.40	33.09-49.64	72.39-86.18
ISO527	Elongation (%)	0.5-2.0	2-60	1.4-1.7	2.0-20.0	1.3-2.0
ISO527	Tensile modulus (10 ³ MPa)	2.76-4.14	0.97-3.54	3.09-3.24	1.93-2.9	4.35-6.9
ISO178	Flexural strength (MPa)	55.16-117.21	20.7-82.74	82.74-86.87	58.61-84.12	84.12-135.83
ISO178	Flexural modulus (10 ³ MPa)	2.75-3.24	1.03-3.17	3.17-3.38	2.21-3.10	3.79-6.76
ISO180	Notched izod impact strength (J/m)	11-24	27-214	16-27	27-235	96-139
ISO2039	Hardness, Rockwell M	65-80	10-90	108	80	101
THERMAL						
ISO8302	Thermal conductivity (W/(mK))	0.18	0.18	0.18	0.18	—
ISO11359	Coefficient of thermal expansion (10 ⁻⁴ m/m-°C)	0.59-0.79	0.34	0.63-0.66	0.63-0.66	0.36-0.39
ISO75	Deflection temperature (°C)					
	At 1.80 MPa	88-104	71-93	113-121	113-121	113-127
	At 0.45 MPa	82-110	82-104	—	—	—
UL 94	Flammability rating†	HB	HB	HB	HB	HB
ELECTRICAL						
IEC243	Dielectric strength (kV/mm)					
	Short time, 3.1 mm thk	19.7-27.6	11.8-23.6	19.7-27.6	11.8-23.6	—
IEC250	Dielectric constant					
	At 1 kHz	2.40-2.65	2.4-4.5	—	—	—
IEC250	Dissipation factor					
	At 1 kHz	0.0001-0.0003	0.0004-0.0020	—	—	—
IEC93	Volume resistivity (ohm-cm)					
	At 23°C, 50% RH	10 ¹⁷ -10 ¹⁹	10 ¹⁶	—	—	—
ASTM D495	Arc resistance (s)	60-135	20-100	95	95	—
OPTICAL						
ISO489	Refractive index	1.60	—	1.59	—	—
ASTM D1003	Transmittance (%)	87-92	35-57	92	—	—
*10-20%	†V-2, V-1, and V-0 grades are also available.					