

TYPICAL PROPERTIES OF PHENOLICS

ASTM or UL Test	Property	TYPE OF COMPOUND						
		General Purpose	Impact	Non- bleeding	Electrical	Heat Resistant	Glass Reinforced	Special Purpose*
PHYSICAL								
D792	Specific gravity	1.35-1.46	1.36-1.41	1.37-1.38	1.36-1.75	1.41-1.84	1.7-2.0	1.37-1.75
D570	Water absorption, 24 h, 1/8-in thk (%)	0.6-0.7	0.6-0.9	0.8-0.9	0.05-0.20	0.30-0.35	0.05-0.20	0.20-0.40
MECHANICAL								
D651	Tensile strength (psi)	6,500-7,000	6,000-7,000	6,000-7,000	5,000-7,000	5,000-6,000	6,000-12,000	7,000-9,000
D790	Flexural modulus (10⁵ psi)	11-13	12	10	17-25	14	20-30	10
D790	Flexural strength (psi)	9,000-11,000	10,000	10,000	9,000-11,000	10,000	12,000-24,000	9,500
D256	Impact strength, Izod (ft-lb/in of notch)	0.30-0.35	0.6-1.05	0.28	0.28-0.45	0.26	0.4-1.5	0.50
D785	Hardness, Rockwell E	70-95	82	82	75-88	94	92-104	76
THERMAL								
C177	Thermal conductivity (10⁻⁴ cal-cm/sec-cm²-°C)	7.1	7.9	—	16.0	—	—	8.8
D696	Coefficient of thermal expansion (10⁻⁵ in/in-°C)	3.95	3.56	4.40	2.60	2.80	1.80	3.60
D648	Deflection temperature (°F) At 264 psi	275-360	270-500	370	310-400	330-380	370-550	360-430
UL 94	Flammability rating, 1/8 in	V-1	HB	—	V-0	V-0	V-0	HB
ELECTRICAL								
D149	Dielectric strength (V/mil) Short time, 1/8-in thk	350	350-400	200	400	170	400	175
D150	Dielectric constant At 1 kHz	5.2-5.3	5.2-5.4	—	4.9-6.5	11.7	4.4	7.8
D150	Dissipation factor At 1 kHz	0.04-0.05	0.04-0.06	—	0.025-0.10	0.15	0.03	0.12
D257	Volume resistivity (ohm-cm) At 73°F, 50% RH	10 ¹¹ -10 ¹²	10 ¹¹ -10 ¹²	10 ¹²	10 ¹¹ -10 ¹³	10 ¹²	10 ¹²	10 ¹¹
D495	Arc resistance (s)	100	50	—	184	181	181	—

*Chemical-resistant compound.

Ref: Machine Design – 1985

TYPICAL PROPERTIES OF PHENOLICS

ISO or UL Test	Property	TYPE OF COMPOUND						
		General Purpose	Impact	Non- bleeding	Electrical	Heat Resistant	Glass Reinforced	Special Purpose*
PHYSICAL								
ISO1183	Specific gravity	1.35-1.46	1.36-1.41	1.37-1.38	1.36-1.75	1.41-1.84	1.7-2.0	1.37-1.75
ISO62	Water absorption, 24 h, 3 mm thk (%)	0.6-0.7	0.6-0.9	0.8-0.9	0.05-0.20	0.30-0.35	0.05-0.20	0.20-0.40
MECHANICAL								
ISO527	Tensile strength (MPa)	44.82-48.26	41.37-48.26	41.37-48.26	34.47-48.26	34.47-41.37	41.37-82.74	48.26-62.05
ISO178	Flexural modulus (MPa)	7584-8963	8273	6894	11721-17236	9652	13789-20684	6894
ISO178	Flexural strength (MPa)	62.05-75.84	68.95	68.95	62.05-75.84	68.95	82.74-165.47	65.50
ISO180	Notched Izod impact strength (J/m)	16-19	32-56	15	15-24	14	21-80	27
ISO2039	Hardness, Rockwell E	70-95	82	82	75-88	94	92-104	76
THERMAL								
ASTM C177	Thermal conductivity (W/mK)	—	—	—	—	—	—	—
ISO11359	Coefficient of thermal expansion (10⁻⁴ m/m-°C)	0.71	0.64	0.79	0.47	0.50	0.32	0.65
ISO75	Deflection temperature (°C) At 1.80 MPa	135-182	132-260	188	154-204	166-193	188-288	182-221
UL 94	Flammability rating, 3 mm	V-1	HB	—	V-0	V-0	V-0	HB
ELECTRICAL								
IEC243	Dielectric strength (kV/mm) Short time, 3 mm thk	13.8	13.8-15.7	7.8	15.7	6.7	15.7	6.9
IEC250	Dielectric constant At 1 kHz	5.2-5.3	5.2-5.4	—	4.9-6.5	11.7	4.4	7.8
IEC250	Dissipation factor At 1 kHz	0.04-0.05	0.04-0.06	—	0.025-0.10	0.15	0.03	0.12
IEC93	Volume resistivity (ohm-cm) At 23°C, 50% RH	10 ¹¹ -10 ¹²	10 ¹¹ -10 ¹²	10 ¹²	10 ¹¹ -10 ¹³	10 ¹²	10 ¹²	10 ¹¹
ASTM D495	Arc resistance (s)	100	50	—	184	181	181	—

*Chemical-resistant compound.

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