

TYPICAL PROPERTIES OF FILLED AMINO COMPOUNDS

ASTM or UL Test	Property	UREA	MELAMINE COMPOUNDS			Glass Fiber
		Alpha Cellulose	Filler		Asbestos	
		Alpha Cellulose	Alpha Cellulose	Macerated Fabric	Asbestos	
PHYSICAL						
D792	Specific gravity	1.47-1.52	1.47-1.52	1.5	1.7-2.0	1.8-2.0
D792	Specific volume (in ³ /lb)	18.8-18.2	18.8-18.2	18.5	16.3-13.8	13.8-10.0
D570	Water absorption, 24 h, 1/8-in thk (%)	0.4-0.8	0.1-0.6	0.3-0.6	0.08-0.14	0.09-0.21
MECHANICAL						
D638	Tensile strength (psi)	5,500-7,000	7,000-13,000	8,000-10,000	5,500-6,500	5,000-10,000
D638	Elongation (%)	0.5-1.0	0.6-0.9	0.6-0.8	0.3-0.45	—
D638	Tensile modulus (10 ⁵ psi)	13-14	13.5	14-16	19.5	24
D790	Flexural strength (psi)	11,000-18,000	12,000-15,000	12,000-15,000	7,400-10,000	13,000-24,000
D790	Flexural modulus (10 ⁵ psi)	14-15	11	14	18	24
D256	Impact strength, Izod (ft-lb/in of notch)	0.27-0.34	0.24-0.35	0.6-1.0	0.3-0.4	0.6-1.8
D785	Hardness, Rockwell M	110-120	120	120	110	115
THERMAL						
C177	Thermal conductivity (10 ⁻⁴ cal-cm/sec-cm ² -°C)	10.1	7.0-10.1	10.6	13-17	11.5
D696	Coefficient of thermal expansion (10 ⁻⁵ in/in-°C)	2.2-3.6	2.0-5.7	2.5-2.8	2.0-4.5	1.5-1.7
D648	Deflection temperature (°F)					
	At 264 psi	266	360	310	265	400
UL 94	Flammability rating	V-0*	V-0†	—	—	V-0
ELECTRICAL						
D149	Dielectric strength (V/mil)					
	Short time, 1/8-in thk	330-370	270-300	250-350	410-430	170-300
	Step by step	220-250	240-270	200-300	280-320	170-240
D150	Dielectric constant					
	At 1 kHz	—	7.8-9.2	7.1-7.8	9.0	—
D150	Dissipation factor					
	At 1 kHz	—	0.015-0.036	0.03-0.05	0.07	—
D257	Volume resistivity (ohm-cm)					
	At 73°F, 50% RH	0.5-5.0×10 ¹¹	0.8-2.0×10 ¹²	1.0-3.0×10 ¹¹	1.2×10 ¹²	0.9-2.0×10 ¹¹
D495	Arc resistance (s)	100-135	125-136	122-128	20-180	180-186

*Applies to specimens thicker than 1/16-in †1/16-in

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ISO or UL Test	Property	UREA		MELAMINE COMPOUNDS		
		Alpha Cellulose	Alpha Cellulose	Filler		Glass Fiber
				Macerated Fabric	Asbestos	
PHYSICAL						
ISO1183	Specific gravity	1.47-1.52	1.47-1.52	1.5	1.7-2.0	1.8-2.0
ISO1183	Specific volume (cm ³ /g)	0.68-0.66	0.68-0.66	0.66	0.59-0.50	0.50-0.36
ISO62	Water absorption , 24 h, 3 mm thk (%)	0.4-0.8	0.1-0.6	0.3-0.6	0.08-0.14	0.09-0.21
MECHANICAL						
ISO527	Tensile strength (MPa)	37-48	48-90	55-69	38-45	34-69
ISO527	Tensile modulus (10 ³ MPa)	8.96-9.65	9.31	9.65-11.03	13.44	16.55
ISO178	Flexural strength (MPa)	76-124	83-103	83-103	51-69	89-165
ISO178	Flexural modulus (10 ³ MPa)	9.65-10.34	7.58	9.65	12.40	16.55
ISO180	Notched Izod impact strength (J/m)	14-18	13-19	32-53	16-21	32-961
ISO2039	Hardness , Rockwell M	110-120	120	120	110	115
THERMAL						
ISO8302	Thermal conductivity (W/mK)					
ISO11359	Coefficient of thermal expansion (10 ⁻⁴ m/m/°C)	0.39-0.65	1.3-1.8	1.9	2.3-3.0	2.0
ISO75	Deflection temperature (°C)					
	At 1.80 MPa	130	182	154	129	204
UL 94	Flammability rating	V-0*	V-0†	—	—	V-0
ELECTRICAL						
IEC243	Dielectric strength (kV/mm)					
	Short time, 3 mm thk	12.9-14.5	10.6-11.8	98.4-13.7	16.1-16.9	6.6-11.8
	Step by step	8.6-9.8	9.4-10.6	7.8-11.8	11.0-12.6	6.7-9.4
IEC250	Dielectric constant					
	At 1 kHz	—	7.8-9.2	7.1-7.8	9.0	—
IEC250	Dissipation factor					
	At 1 kHz	—	0.015-0.036	0.03-0.05	0.07	—
IEC93	Volume resistivity (ohm-cm)					
	At 23°C, 50% RH	0.5-5.0×10 ¹¹	0.8-2.0×10 ¹²	1.0-3.0×10 ¹¹	1.2×10 ¹²	0.9- 2.0×10 ¹¹
ASTM D495	Arc resistance (s)	100-135	125-136	122-128	20-180	180-186

*Applies to specimens thicker than 25 mm †25 mm