

General Properties of NEMA Grades*

Laminated Plastic Sheet Material (Average Test Values)

Grade Designation	X	XX	XXX	CE	LE	G-5	G-7	G-9	G-10	G-11	GPO-1	GPO-3
Mechanical												
Density, GM/CC	1.35	1.34	1.30	1.32	1.32	1.90	1.70	1.95	1.85	1.85	1.90	1.88
Specific volume, CUIN/LB	20.5	20.6	21.3	21.0	21.0	14.6	16.3	14.3	15.0	15.0	14.6	14.7
Lbs. per Sq. Ft., 1/8" Thick	.87	.87	.84	.86	.86	1.23	1.10	1.26	1.20	1.20	1.19	1.22
Tensile Strength, PSI, Lengthwise	20,000	16,000	15,000	12,000	13,500	37,000	20,000	41,000	48,000	48,000	12,000	14,000
Tensile Strength, PSI, Crosswise	16,000	13,000	12,000	9,000	9,500	30,000	17,000	32,000	44,000	44,000	10,500	12,000
Compressive Strength, PSI, Flatwise	36,000	34,000	32,000	39,000	37,000	70,000	45,000	70,000	60,000	75,000	30,000	30,000
Flexural Strength, PSI, Lengthwise	28,000	18,000	18,000	22,000	18,000	65,000	26,000	82,000	72,000	70,000	24,000	23,000
Flexural Strength, PSI, Crosswise	23,000	14,000	14,000	17,000	15,000	50,000	24,000	58,000	63,800	62,000	21,000	22,000
Modulus of Elasticity in Flexure x 10 ⁵												
Lengthwise	18	14	13	9	10	17	9	16	15	17	10	—
Crosswise	13	11	10	8	8	15	8	13	12	15	8	—
Impact Strength, IZOD Edgewise												
Lengthwise	.9	.55	.5	1.6	1.3	12	10	16	14.4	13.2	8.3	8.6
Crosswise	.7	.5	.45	1.4	1.2	9.0	9.3	9.0	10.6	9.8	8.3	8.4
Rockwell Hardness, M Scale	110	105	110	105	105	120	100	120	10.9	110	98	97
Bond Strength, lbs.	900	1,100	1,200	2,200	1,800	1,700	800	2,300	2,500	2,100	2,000	—
Electrical												
Dielectric Strength—Perpendicular to laminations short time, volts/mil, 1/16"												
	700	700	700	500	500	600	400	695	810	710	500	—
1/8"	500	500	500	360	360	500	350	550	570	530	390	450
Dielectric Strength—Parallel to laminations kilovolts, step by step 1/8"—Cond. A												
Condition D 48/50	50	50	65	45	50	35	50	87	55	43	50	60
	5	10	15	5	6	12	47	78	60	45	40	50
Dissipation Factor, 10 ⁶ cycles—Cond. A												
Condition D 24/23	.045	.040	.034	.055	.048	.16	.001	.012	.0119	.015	.012	.023
	.05	.046	.038	.070	.058	.03	.015	.012	.0126	.015	.047	.04
Dielectric Constant, 10 ⁶ cycles—Cond. A												
	6	5.3	4.7	5.3	5.3	6.8	3.65	6.5	4.80	4.9	4.78	4.96
Insulation Resistance, Megohms, Condition C 96/35/90												
	—	60	1,000	—	30	100	200,000	1,000	100,000	100,000	—	—
Arc Resistance, seconds												
	—	—	—	—	—	200	220	192	100	127	150	183
Physical												
Thermal Conductivity, CAL/SEC/CM ² /°C/CM												
			7x10 ⁻⁴			12x10 ⁻⁴	7x10 ⁻⁴	12x10 ⁻⁴	7x10 ⁻⁴			
Specific Heat CAL/GM/°C												
			.35 to .40			.26	.25	.26	.35 to .40		.25	.25
Heat Resistance °F, Short Time												
Continuous	275	300	300	300	300	425	500	425	350	400	425	425
	250	250	250	250	250	300	400	300	250	300	300	300
Thermal Expansion in / in °F x 10 ⁻⁵												
Lengthwise	1.1	.94	.94	1.04	1.04	.55	—	.55	.83	.85	—	—
Crosswise	1.39	1.33	1.28	1.22	1.44	.61	—	.61	.61	.67	—	6
Water Absorption % 24 hours 1/16"												
	4.0	1.3	.8	1.3	1.3	1	.09	.28	.09	.15	.80	.75
1/8"	2.3	.9	.5	.9	.8	.6	.07	.2	.06	.09	.40	.35
1/2"	.9	.5	.3	.5	.5	.4	.04	.1	.03	.05	.25	.14

Values shown are for test samples made from production materials and are believed to be representative. There is no warranty, expressed or implied. The purchaser/end user assumes all responsibility for testing and determining the suitability of all material for its intended use.