



MANUFACTURERS OF
ELECTRICAL INSULATION MATERIALS

INSULATING COMPONENTS FOR
POWER SYSTEMS EQUIPMENT

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ELECTRONICS COMPARATIVE MATERIAL DATA SHEET

Product Grades	TGC	FR4	G-11	ESD 930	G-9	G-7	Mica M	Mica P	Arboron	XXX	CE	APO-1	APO-2	GPO-3	N155	N220	Polycarbonate	PolyPro FR™	Nomex®	Mylar®	Vulcanized Fibre(FishPaper)
	NEMA	FR4	G-11	--	G-5 / G-9	G-7	--	--		XXX	C	GPO-1	GPO-2	GPO-3	GPO-1	GPO-1	--	--	--	--	--
	IEC	EPGC 202	EPGC 203	--	MFGC 201	SIGC 201	--	--		PFCP 201	PFCC 203	UPGM 201	UPGM 202	UPGM 203	UPGM 201	UPGM 201	--	--	--	--	--
Construction		Glass Epoxy	Glass Epoxy	Glass Epoxy	Glass Melamine	Glass Silicone	Silicone Bonded Mica Paper, Muscovite	Silicone Bonded Mica Paper, Phlogopite	Cellulose based laminate	Paper Phenolic	Canvas Phenolic	Glass Polyester	Glass Polyester	Glass Polyester	High-Temp Glass Polyester	High-Temp Glass Polyester	Standard and Flame Retardant polycarbonate resin	Flame Retardant Polypropylene	Aramid Paper	Polyester Film	Laminated Cellulose
Sheet Sizes		36" x 48" 39" x 48" 48" x 48" 36" x 72" 48" x 96" 48" x 108"	48" x 96" 48" x 118"	48"x60"	36" x 48" 39" x 48" 48" x 48" 36" x 72" 48" x 96" 48" x 108"	36" x 48" 39" x 48" 48" x 48" 36" x 72" 48" x 96" 48" x 108"	48" x 120"	48" x 120"	48" x 96" 60" x 96" 60"x120" 60"x144"	36" x 48" 39" x 48" 48" x 48" 36" x 72" 48" x 96"	36" x 48" 39" x 48" 48" x 48" 36" x 72" 48" x 96" 48" x 108"	36" x 72" 48" x 96"	36" x 72" 48" x 96"	36" x 72" 48" x 96"	37" x 73"	36" x 72" 48" x 96"	48" x 96" 60" x 96"	24" x 24" 48" x 96" Also avail: 24" Rolls 48" Rolls	36" wide rolls	Slit to Width	52" x 79" 51" x 84"
Thickness Range		0.006" - 50.000"	0.010" - 6.000"	0.118" - 0.472"	0.008" - 4.000"	0.008" - 4.000"	0.004" - 3.000"	0.004" - 3.000"	0.125" - 1.250"	0.008" - 4.000"	0.008" - 4.000"	0.031" - 2.000"	0.031" - 2.000"	0.118" - 2.000"	0.031" - 2.000"	0.031" - 2.000"	0.125"+	0.010"-0.125"	up to 0.020" mils	up to 4.910 mils	up to 3.000"
Mechanical Properties	Units																				
Rockwell Hardness	M Scale	98	110	--	115	100	--	--	--	101	100	100	100	--	--	--	125	--	--	--	--
Tensile Strength, LW CW	psi	40,000 32,000	41,000 --	17,000 --	44,000 34,000	37,000 30,000	21,755 --	15,955 --	22,000 --	14,000 12,000	11,000 9,000	9,500 --	9,000 --	9,000 --	11,000 --	12,000 --	-- --	4,400 --	-- --	25,600 --	8,000 --
Compressive Strength	psi	66,000	50,000	50,000	70,000	45,000	58,015	47,862	22,700	30,000	34,000	35,000	37,000	37,000	38,000	37,000	--	--	--	--	12,000
Flexural Strength, LW CW	psi	65,000 52,000	57,000 --	13,600 11,500	61,600 51,100	18,000 15,000	24,100 --	-- --	23,000 --	20,000 15,000	17,500 15,000	19,000 20,000	20,000 22,000	20,000 22,000	23,000 28,000	24,000 26,000	14,500 --	5,900 --	-- --	-- --	17,000 13,000
Shear Strength	psi	21,500	21,000	--	--	--	--	--	--	12,800	14,000	16,000	12,500	13,000	--	13,000	--	--	--	--	--
IZOD Impact Strength, LW	ft.-lbs./in.	7.9	10.0	4.50	12.5	17.0	--	--	0.6	0.55	1.95	8.5	9.0	9.0	8.5	11.0	-- --	1.2 --	-- --	-- --	1.6
Bonding Strength	lbs.	2,300	2,200	--	--	1,570	--	--	659	1,000	1,700	1,200	1,080	1,080	--	1,080	--	--	--	--	--
Electrical Properties	Units																				
Arc Resistance	Seconds	130	185	--	185	200	≥ 420	≥ 420	135	110	15	130	192	192	150	180	--	--	--	--	--
Dielectric Strength	V/mil	800	550	--	450	350	625	625	250	700	550	450	540	550	450	550	1,500	1,000	700	1,400	215
Breakdown Voltage	kV	66	65	--	65	55	--	--	66	40	40	> 40	50	50	30	50	--	22	--	--	--
Comparative Tracking Index	Minutes	300	--	--	600+	--	500	525	600	--	--	--	--	1,000	--	--	--	600+	--	--	--
Physical Properties	Units																				
Water Absorption	%	0.10	0.09	0.07	0.60	0.19	< 1.0	< 1.0	0.9	1.30	2.0	0.25	0.55	0.25	0.25	0.25	0.28	0.01	20.0	0.01	66.0
Specific Gravity	lb./in. ³	0.067	0.069	0.0668	--	--	0.077	0.077	1.39	--	0.050	0.066	0.065	0.065	0.066	0.061	0.043	0.037	--	--	0.043
Thermal Properties	Units																				
Relative Temperature Index (Electrical/Mechanical) ¹	°C	130/140	170/180	--	130	170/220	500	750	95	130	125	130	130	130	155	220	140	110	220	130	110
Flame Resistance	Class	UL 94 V-0	UL 94 HB	--	UL 94 V-0	UL 94-V-0	UL 94 V-0	UL 94 V-0	UL94V-O	UL 94 HB	UL 94 HB	UL 94 HB	UL 94 V-0	UL 94 V-0	UL 94 HB	UL 94 HB	UL 94 V-0	UL 94 V-0	UL 94 V-0	UL 94 HB	UL 94 HB
Thermal Class	Class	B	F	--	B	C	C	C	--	B	A	B	B	B	F	R	B	A	R	B	A

¹ Relative Temperature Index (RTI) pertains to Electrical and Mechanical, respectively. If one value is shown, then RTI is the same for both Electrical and Mechanical.