Electrical Properties of Plastic Materials

Material	Formula	Dielectric constant @1kHz	Dielectric constant @1MHz	Dielectric strength kV mm^{-1}	Dissipation factor @ 1kHz	Dissipation factor @ 1MHz	Surface resistivity Ohm/sq	Volume resistivity Ohm/cm
Cellulose Acetate	CA	-	~5	11	0.06	-	-	5×10^{12}
Cellulose Acetate Butyrate	CAB	-	2.5-6.2	10	0.04	-	-	10^{11}-10^{15}
Ethylene-Chlorotrifluoroethylene copolymer	E-CTFE	-	2.3-2.5	40	0.002	-	10^{14}-10^{15}	10^{15}-10^{16}
Ethylene-Tetrafluoroethylene Copolymer	ETFE	-	2.6	25	-	0.0005	$>10^{14}$	10^{16}
Fluorinated Ethylene Propylene Copolymer	FEP	-	2.1	20 @ 3.2mm	-	0.0007	10^{16}	10^{18}
Polyacrylonitrile-butadiene-styrene	ABS	-	3.2 - 3.3	20-25	-	0.02	-	$>10^{15}$
Polyamide - Nylon 6	PA 6	-	3.6	25	0.2	-	$5x10^{1O}$	$5x10^{12}$
Polyamide - Nylon 6, 6	PA 6,6	-	3.4	25	0.2	-	10^{11}	10^{13}
Polyamide - Nylon 6, 6 - 30% Carbon Fiber Filled	PA 6, 6 - 30% CFR	-	-	-	-	-	10^{3}	10^{2}

Material	Formula	Dielectric constant @1kHz	Dielectric constant @1MHz	Dielectric strength kV mm^{-1}	Dissipation factor @ 1kHz	Dissipation factor @ 1MHz	Surface resistivity Ohm/sq	Volume resistivity Ohm/cm
Polyamide - Nylon 6, 6 - 30% Glass Fiber Reinforced	PA 6,6 30% GFR	-	3.9-5.7	-	-	-	-	10^{12}-10^{15}
Polyamide - Nylon 12	PA 12	-	3.5 @ 100kHz	26-30 @ 1mm	0.06	-	10^{13}	10^{12}-10^{14}
Polyamide/imide	PAI	-	3.9-5.4	23 at 1mm	-	0.03-0.042	8-50 x 10^{17}	0.08-2 x 10^{17}
Polybenzimidazole	PBI	-	3.2	21	-	-	-	8x10^{14}
Polybutylene terephthalate	PBT	3.2	-	20	0.002	-	-	10^{15}
Polycarbonate	PC	-	2.9	15-67	-	0.01	10^{15}	10^{14}-10^{16}
Polycarbonate - 30% Glass Fiber Filled	PC - 30% GFR	-	3.3	30	-	0.009	10^{14}	10^{16}
Polycarbonate - Conductive	PC	-	-	-	-	-	100-500	1-100
Polychlorotrifluoroethylene	PCTFE	-	2.24-2.8	14	0.023-0.027	0.01	10^{15}	10^{16}
Polyetheretherketone	PEEK	3.2-3.3 @ 50Hz-10Khz	-	190 @ 50µm	-	0.003	-	10^{15}-10^{16}
Polyetherimide	PEI	3.1	-	30 @ 1.6mm	-	0.0013 @ 1KHz	4.10^{13}	7.10^{15}
Polyethersulfone	PES	-	3.7	16	-	0.003	-	10^{17}
Polyethylene - Carbon filled	PE	-	-	-	-	-	10^{3}-10^{4}	<10^{5}

Material	Formula	Dielectric constant @1kHz	Dielectric constant @1MHz	Dielectric strength kV mm^{-1}	Dissipation factor @ 1kHz	Dissipation factor @ 1MHz	Surface resistivity Ohm/sq	Volume resistivity Ohm/cm
Polyethylene - High density	HDPE	-	2.3-2.4	22	-	1-10 x 10^{-4}	10^{13}	10^{15}-10^{18}
Polyethylene - Low Density	LDPE	-	2.2-2.35	27	-	1-10 x 10^{-4}	10^{13}	10^{15}-10^{18}
Polyethylene - U.H.M.W.	UHMW PE	-	2.3	28	-	1-10 x 10^{-4}	10^{13}	10^{18}
Polyethylene terephthalate	Polyester, PET, PETP	-	3.0	17	0.002	-	10^{13}	$>10^{14}$
Polyimide	PI	-	3.4	22	0.0018	-	10^{16}	10^{18}
Polymethylmethacrylate	PMMA, Acrylic	-	2.6	15	-	0.014	10^{14}	2-14 x 10^{15}
Polymethylpentene	TPX®	-	2.12	-	0.0002	-	-	$>10^{16}$
Polyoxymethylene - Copolymer	Acetal - Copolymer POMC	-	3.7 - 4.4	20 @ 2.3mm	-	0.006 - 0.18	10^{15}	10^{15}
Polyoxymethylene - Homopolymer	Acetal - Homopolymer POMH	-	3.7	20	-	0.005	10^{15}	10^{15}
Polyphenyleneoxide	PPO (modified), PPE (modified)	-	2.7	16-20	0.004	-	2x10^{16}	10^{17}
Polyphenyleneoxide (modified), 30% Glass Fiber Reinforced	PPO 30% GFR	-	3.1	15	0.01	-	-	10^{17}
Polyphenylenesulfide - 40% Glass Fiber Reinforced	PPS - 40% GFR	-	3.8 - 4.2	18	-	0.0013-0.004	10^{16}	10^{16}

Material	Formula	Dielectric constant @1kHz	Dielectric constant @1MHz	Dielectric strength kV mm^{-1}	Dissipation factor @ 1kHz	Dissipation factor @ 1MHz	Surface resistivity Ohm/sq	Volume resistivity Ohm/cm
Polyphenylsulfone	PPSu	-	-	-	-	0.005	$>10^{13}$	$>10^{14}$
Polypropylene	PP	-	2.2-2.6	30-40	-	0.0003 - 0.0005	10^{13}	10^{16}-10^{18}
Polystyrene	PS	-	2.4-3.1	20	0.0002	-	-	$>10^{16}$
Polystyrene - Conductive	High Impact Conductive Polystyrene	-	-	-	-	-	10^{2}-10^{7}	10^{2}-10^{7}
Polystyrene - Cross-linked	PS - X - Linked	-	2.5	27-47	-	0.0002	$>10^{15}$	$>10^{15}$
Polysulphone	PSu	3.14	3.10	17	0.0013	0.0050	-	$5x10^{16}$
Polytetrafluoroethylene	PTFE	-	2.0-2.1	50-170	-	0.0003 - 0.0007	10^{17}	10^{18}-10^{19}
Polytetrafluoroethylene filled with Glass	PTFE 25% GF	-	2.2-2.35	40	0.003	-	10^{15}	10^{16}
Polyvinylchloride - Unplasticized	UPVC	-	2.7-3.1	14	0.025	-	-	10^{16}
Polyvinylidenefluoride	PVDF	-	8.4	13	0.06	-	10^{13}	10^{14}
Tetrafluoroethylene-perfluoro(alkoxy vinyl ether) - Copolymer	PFA. Teflon PFA.	2.05-2.06	2.05-2.06	-	0.0001-0.0002	0.0008	-	-