

Capacitance problem

1. What is the capacitance of a parallel plate capacitor with plates of 1 m^2 separated by 1 mm ?

Dielectric and breakdown E

Material	Dielectric constant κ	Dielectric strength (V/m)
Vacuum	1.00000	—
Air	1.00059	3×10^6
Bakelite	4.9	24×10^6
Fused quartz	3.78	8×10^6
Neoprene rubber	6.7	12×10^6
Nylon	3.4	14×10^6
Paper	3.7	16×10^6
Polystyrene	2.56	24×10^6
Pyrex glass	5.6	14×10^6
Silicon oil	2.5	15×10^6
Strontium titanate	233	8×10^6
Teflon	2.1	60×10^6
Water	80	—

Table 19.1 Dielectric Constants and Dielectric Strengths for Various Materials at 20°C

Capacitance problem

2. A capacitor is constructed using 1 m^2 plates separated by a 1 mm gap.
- What is the maximum charge the capacitor can hold if the gap is filled with air?
 - What is the maximum charge if instead teflon is used?

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