

Specifications of Capacitance

While ordering capacitors, one has to indicate the specifications needed to ensure that the desired capacitor is received. These minimum specifications to be indicated while purchasing/ordering capacitors for general use

- i. Type of capacitor
- ii. Capacitance value
- iii. DC working voltage rating
- iv. Tolerance
- v. Temperature coefficient

Factors that Determine the value of Capacitance

The capacitance of a capacitor is determined by the following three main factors

1. Area of the plates
2. Distance between the plates
3. Type of dielectric material

In addition to the above factors affecting the value of capacitance, the temperature of the capacitor also affects the capacitance although not very significantly. Some dielectrics cause an increase in capacitance as temperature increases. These are called positive temperature coefficients, abbreviated as P.

Working Voltage or Voltage rating of Capacitor

The dielectric strength of the insulating material used between the plates of a capacitor gives the capacitor the ability to withstand potential differences between the plates without causing arcing. Therefore, a specific capacitor using a specific type of dielectric can withstand only up to a specific voltage across it. If the voltage is further increased, the dielectric breaks down or gets punctured. This causes a burn out or a hole in the dielectric material permanently damaging the capacitor.

Function of a Dielectric in a Capacitor

1. Solves the mechanical problem of keeping two metal plates separated by a very small distance.
2. Increases the maximum voltage that can be applied before causing a breakdown, compared with air as dielectric.
3. Increases the amount of capacitance, compared with air, for a given dimension of plates and the distance between them.

A capacitor has limited use as a primary storage device of energy for two reasons

1. For its weight and size, the amount of energy it can store is very small when compared with that of a battery.
2. The voltage available from the capacitor diminishes rapidly as energy is removed from the capacitor.

Unit of Capacitance

The ability of capacitor to store electrical energy in the form of electrostatic field is known capacitance. The unit used to measure capacitance is Farad abbreviated as F. A capacitor is said to have a capacitance (C) of 1 Farad, if it store a charge (Q) of 1 coulomb when a voltage (V) of 1V is applied across its plates.

Therefore, capacitance can be mathematically expressed as.

Capacitance = Charge/Voltage

$C = Q / V$ Farads