

# Capacitors



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## Capacitors

A device for storing an electrical charge is called a capacitor or electrical condenser. Capacitors in their simplest form consist of two metal plates, which are separated by a nonconducting layer called the dielectric. As one plate gets charged with a direct-current such as a positive charge, the other plate will be charged with the opposite sign such as a negative charge. The larger the capacitor, the more electrically charge it can absorb. Capacitors are limited to the amount of electrical charge, but they function well as conductors in alternating-current circuits. One example of this is called the Leyden jar, which has the two plates that are coated with a metal-foil on both sides. The coated plates sit in a glass jar, which then acts as a dielectric.

Capacitors are produced in a wide variety of forms. Each form has a different purpose, but they all seem to do the same thing. Capacitors are generally classified according to the kind of dielectric used in them. The capacitance of a capacitor is measured in farads. A farad retains one coulomb of charge with one-volt difference of potential. Capacitors that use vacuum, air, or other gases are used in applications where values of capacitance required do not have to be large, but the energy loss in the dielectric must be very small. Some applications for these capacitors are in radio-frequency circuits and low-frequency measuring circuits where great precision is required. Another type of capacitor uses castor or mineral oil for the dielectric. Oil insulated capacitors are used in applications where larger values of the capacitance are required. Capacitors also use solid dielectrics such as films of synthetic materials, paper, glass, and mica. Mica has excellent properties as a

dielectric. It is both high in its dielectric constant and insulation resistance. It is affected little by time and temperature. This type of capacitor is used in laboratories because of their stability and the relatively high values of capacitance for a given volume.

A type of capacitor that doesn't fall into one of those groups is an electrolytic capacitor, which has an oxide film formed on aluminum. This film is the dielectric and is very thin. This form of capacitors has a certain limitation. The electrolyte makes up one of the plates, which has to be the negative electrode. The other plate is the aluminum, which is the positive charge.

Capacitors that are running on direct current are used in a variety of applications. One of the applications is a D- C power supply filter, which consist of X- rays, nuclear research, and radar equipment. Another group is intermittent duty pulse forming such as linear accelerators and small surge generators. Energy storage capacitors using high amounts of energy are used in electric plasma research, nuclear fission studies, and hydraulic metal forming. In these applications energy is needed to be released in microseconds.

There are many uses for capacitors and forms. If we didn't have capacitors a lot of our electric equipment wouldn't exist. I learned what capacitors are and what they are used for.