

Electrical Terms

Energy can take many forms; like heat energy, for example. Electricity is simply the name given to electrical energy and, as with heat, there needs to be a difference in potential for it to travel from one point to another. But how does electricity travel?

All matter is made up of *atoms* bonded together in some way. At the center of the atom is the *nucleus*, made up of positively charged *protons* and *neutrons* (which have no charge). Negatively charged *electrons* orbit around the nucleus.

Basically, if the number of electrons and protons is equal then the atom is said to be stable and has no charge. Atoms can be made unstable by rubbing two materials together so that electrons transfer from one material to the other, leaving the atoms effectively with a positive or negative charge. You can see this *electrostatic* effect when pulling an item of clothing on or off over your head and it crackles or causes your hair to stand on end!

This movement of electrons from one point to another is seen as the flow of electricity. Below is some electrical terminology:

Charge (C)

All protons and electrons have a tiny amount of electrostatic charge. This charge is measured in *coulombs* (Q).

Current (I)

This is the movement of electrons around an electrical circuit and is defined as the rate of flow of charge. Its unit is the *ampere* (A).

Voltage (V)

Electromotive force (emf) is what creates the flow of current in a circuit and is measured in *volts*. The potential difference (pd) is the voltage difference or voltage drop between any two points.

Power (P)

This is a measure of the rate at which energy is transferred. Power is measured in *watts* (W).

Conductor

A material with lots of charge-carrying free electrons, such as metal.

Insulator

A material where the electrons are firmly bound to the nucleus of its atoms so that they cannot move and hence conduct charge.



Where an atom has more electrons than protons it is negatively charged, and positively charged if it has fewer electrons than protons.



One ampere of current is calculated by:

$$I = Q/t$$

(t is the time in seconds and Q is the charge.)



The effects of the flow of an electric current can be detected in many different ways – for example, as heat, light, magnetism, etc.