

# MAINS POWER VERSUS BATTERIES

## Mains Power

Before electricity reaches your home it has travelled from the power station, through the power lines to the meter box and then through a series of wires and circuits to the power point in the wall, waiting for an appliance to be turned on. This stored electricity is called mains power.

**Voltage** is a kind of electrical force that makes electricity move through a wire. Imagine a water hose connected to a tap - the tap is the voltage which controls the amount of flow. The bigger the voltage, the more current will flow. Electricity travels at 240 **volts** around your home.

**Electric current** is the flow of electrons through the wire, it is measured in **amperes** or **amps**.

For safety reasons, electricians sometimes need to measure the flow of electrons through a wire. Since the electrons are so small and are moving so fast they use a tool called an ammeter to measure the flow.

## Batteries

Batteries are a great way to provide electricity when mains power is not available, like when you are camping or there is a blackout. These devices store electrical energy in chemical form. There are many different shapes and sizes of batteries as they are used for many purposes, from storing solar electricity to powering your toys.



**AA 1.5V**

Used in torches and toys



**PP3 9V**

Used in smoke alarms and radio-controlled toy cars



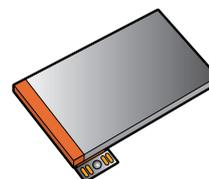
**Button Cell 1.5V**

Used in watches, clocks and calculators



**Car Battery 12V**

Used in cars, trucks, tractors and other vehicles



**Lithium ion 3.6V**

Used in mobile phones and cameras

If you look at any battery you will notice it has two ends or terminals. One end is marked positive (+) while the other end is marked negative (-).

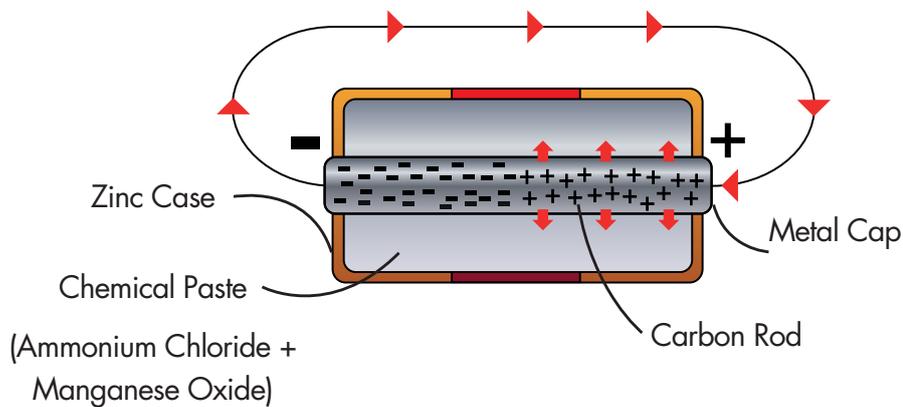
Inside the battery is a rod of metal or carbon that runs between these two ends. A chemical paste (made up of ammonium chloride and manganese dioxide) surrounds the rod and this is where electricity flows. This chemical paste is very harmful to your skin so if a battery is damaged throw it away at once.

Have you ever noticed that when batteries are being used they get hot? This is because heat energy is created when the electricity is flowing. If you notice the battery warming up, turn it off and let it cool down before you keep using it.

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Have you ever put a new battery in a torch or remote and it hasn't worked but when you put it in the other way it works? This is because electrons like to flow in the same direction, so the positive end and the negative end need to line up.

The two chemicals in the paste react together and produce electrons. These collect at the negative end of the battery. The positive end, negative end, metal rod and chemical paste form a circuit in batteries and as you probably know, electricity flows in circuits. Electrons will flow from the negative end through the chemical paste and metal rod, back to the positive end, completing a circuit. This continual flow of electrons is an electric current.



**Cross section of a battery**