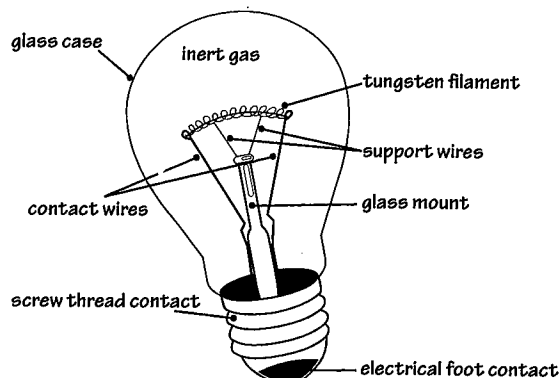


# How do light globes work? – I

There are two types of globes we can buy for our lights at home: the traditional incandescent globe and the more energy-efficient fluorescent globe.

## Incandescent globe



The components of an incandescent globe are housed in a sealed glass case containing a gas called argon. The metal filament coil is about 2.5 cm long. It is made from two metres of extremely thin tungsten wire. To fit into the space, the fine strip of wire is wound into a tight coil which is then wound around itself to make an even tighter coil.

The filament is supported by two wires connected to a glass mount, and two stiff contact wires that form part of the circuit.

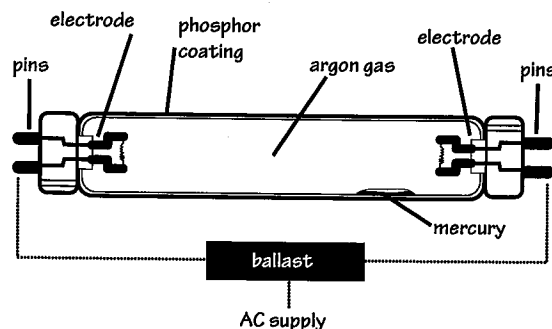
The globe is connected to the circuit by two metal contacts, one at the foot of the globe and the other at the side.

Current flows from the circuit through one contact, up the stiff wire to the filament, then down the stiff wire to the other contact and back into the circuit.

As the electrons flow through the filament and crash into the tungsten atoms, they release energy so the filament gets hot. The resistance of the coiled thin wire slows the flow of electrons and the energy that is released by the bombardment of atoms increases.

Only a little of the energy given off is light energy; 90% of it is released as heat. This is why incandescent globes get very hot. This is very inefficient and wastes a lot of energy.

## Fluorescent tube



A fluorescent light globe is a sealed glass tube filled with argon and containing a small amount of mercury, a poisonous metal that is a liquid at room temperature. The glass tube can be a long strip, circular or coiled to fit in standard lamp fittings.

There is an electrode at each end of the tube. When the globe is switched on, a large force between the two electrodes attracts electrons through the gas, from one electrode to the other. As the current flows, heat is produced which turns the mercury into a gas. When electrons and argon atoms collide with the atoms of mercury gas, energy is released in the form of ultraviolet light which the human eye can not see.

However, the inside of the tube is coated with a layer of phosphor, a substance which can store energy and release it as light. The phosphor absorbs the invisible ultraviolet light and emits a bright visible light. The colour of the light can be varied by using different amounts of phosphor.

Most of the energy released in a fluorescent globe is converted to visible light energy.

A ballast controls the flow of electrons through the gas. When a current flows through gas, there is not much resistance to the flow of electrons and the current can build up. This would cause the globe to blow; however, the ballast corrects this problem.