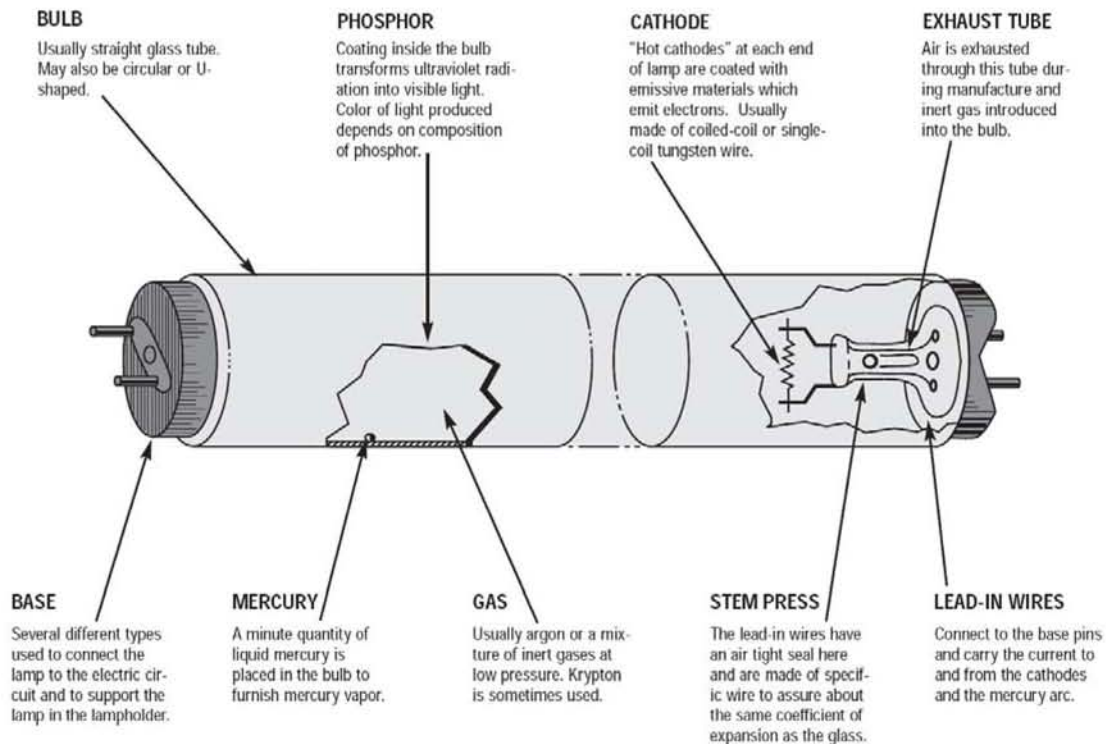


## Technical Questions and Answers

### How does a fluorescent lamp work?

A fluorescent tube is made of many components. Essentially it's a glass tube envelope with a mixture of gasses enclosed. An electrical current passes from one side of the tube to the other via the cathodes. The glass tube is coated on the inside with a phosphor that converts UV into visible light.



### What is a Ballast?

Unlike a traditional light bulb Fluorescent tubes have nothing to limit the current that flows across the electrodes. A traditional incandescent light bulb is limited by the diameter of the wire within the light bulb and is therefore unable to overload. Fluorescent lamps require a ballast to limit or choke the current that flows through the fluorescent tube.

### What is the difference between Magnetic (iron core) Ballasts and Electronic Ballasts?

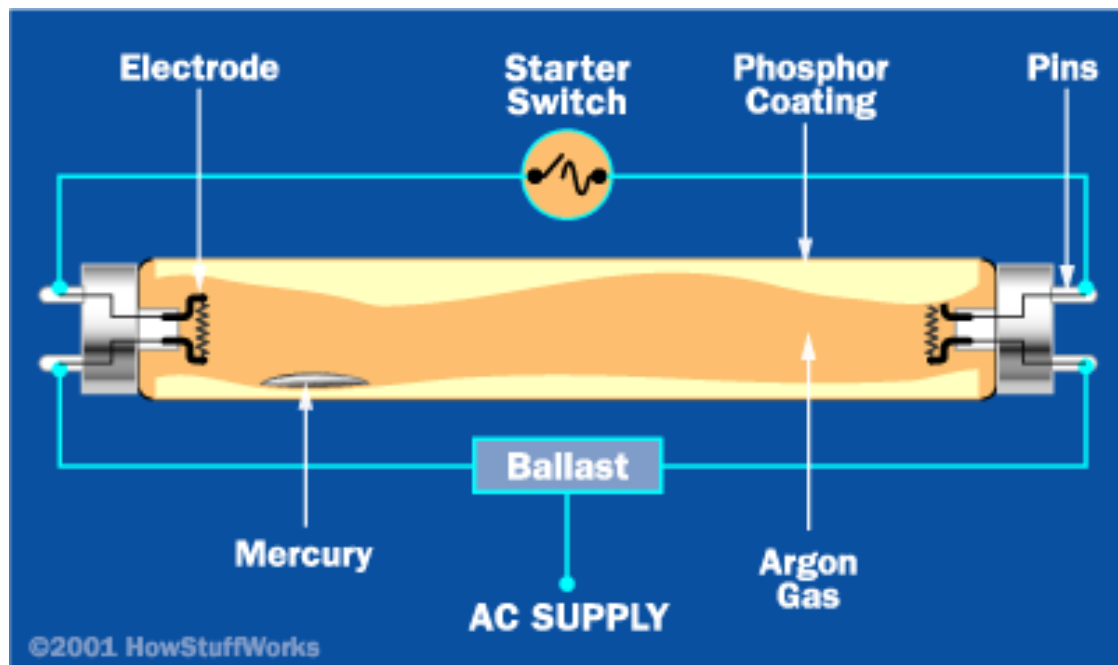
A magnetic ballast is a device that uses a core and coil assembly transformer to perform the minimum functions required to start and operate the lamp. It is old but proven technology and in many light fittings is responsible for considerable energy losses. More modern designs are more energy efficient but still add 15-20% of energy loss to a light fitting. Fittings with magnetic ballast also require a pulse starter to ignite the lamp and may be fitted with compensating capacitors to further improve efficiency.

An Electronic ballast is a ballast that operates lamps at frequencies above 20,000 Hz rather than at a frequency supplied by the electrical mains. It electronically combines the function of "choking" the current and starting the lamp. Some electronic ballasts also preheat the cathodes and have dimming functions. By operating a lamp at higher frequencies lamps are

able to supply the same light level at lower energy consumption levels and provide instant start and flicker free operation.

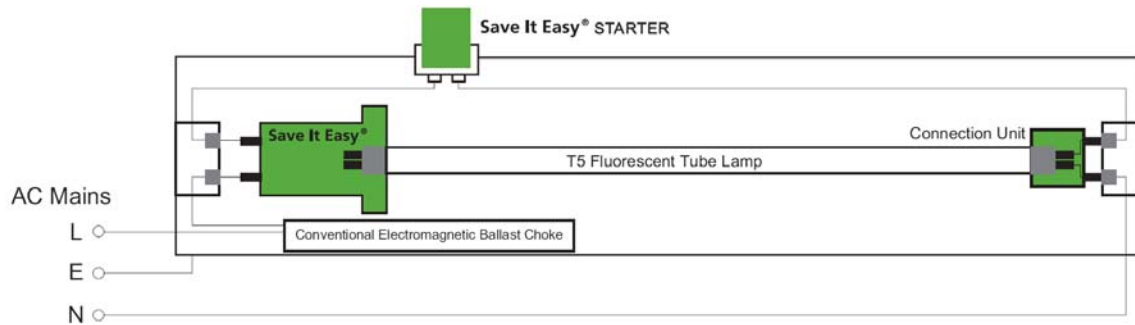
### What does the starter do?

The classic fluorescent lamp design uses a special starter switch mechanism to light up the tube. You can see how this system works in the diagram below. When the lamp first turns on, the path of least resistance is through the bypass circuit, and across the starter switch. In this circuit, the current passes through the electrodes on both ends of the tube. These electrodes are simple filaments, like you would find in an incandescent light bulb. When the current runs through the bypass circuit, electricity heats up the filaments. Once the filaments have been heated up the current's path of least resistance becomes between the two electrodes and current then flows between them. During this time the starter switch opens due to a loss of heat in the bimetallic switch and stops the current flow in the bypass circuit.



## How does the Save it Easy T5 retro fit work

The Save it Easy system is shown in the diagram below. The Save it Easy system is a retro fit electronic ballast that allows you to easily retro fit a magnetic ballast luminaire. This is done by utilizing the space difference between the T8 tube and a T5 tube. This system allows the old magnetic ballast to stay with in the system but is rendered ineffective as a conductor of electricity. The magnetic ballast is effectively bypassed as a conductor as the high frequency ballast only draws 2W not 6W – 10W.



## What is the cold spot

The cold spot of the lamp is the location on the lamp surface where the temperature is coolest. Normally, cold spot temperature of a lamp rises or falls in lock-step with the ambient temperature of the lamp. For T5 and T5HO lamps, the cold spot temperature is 10C higher than the ambient temperature. Hence, the 35C optimal ambient temperature will translate to 45C optimal cold spot temperature.

Lamps operate most efficiently when the cold spot temperature is maintained close to the design optimum.

Unlike a T8 or T12 fluorescent lamp where the cold spot is in the middle of the lamp, for T5 or T5HO lamps, the cold spot is at end of the lamp where the company's label is printed on the glass, and is located on the metallic end cap about 2 mm from the glass envelope.

As T5 lamps become more popular there is concern that the cold spot may not be maintained at optimum temperature

The Save it Easy system addresses this issue by covering the cold spot with a built in sleeve to surround the cold spot and create a cushion of air around the cold spot to keep it at a uniform temperature.

