The lamps are made from the following main components.

The tube: this is made from a glass with a high iron content so that any short wave UV radiation that gets through the phosphor coating is absorbed by the glass

The phosphor coating: there are a wide variety of phosphors available. Each produces a different spectrum of light and by careful blending of the various phosphors lamp makers can tailor a wide range of lamp colours. The lumen output of the lamp also depends on the choice of phosphor mix. It is also important to control the particle size of the phosphor powders and the thickness of the coating.

There are three main types of phosphor mixes currently used in fluorescent lamps:

- Halophosphates: this range of phosphors tend to emit light in a relatively wide band and it is normal to use only one phosphor of this type at any one time. Halophosphates are only reasonably efficient as phosphors and generally have poor colour rendering.

- Tri-phosphors: are mixes of three narrow band phosphors. They generally achieve CIE general colour rendering indices greater than 80 and have a high efficacy and good lumen maintenance.

- Multi-phosphors: are mixes of a number, usually five, phosphors. These mixes usually give a CIE general colour rending index higher than 90, however the efficacy is normally lower than a tri-phosphor mix.

The electrodes: generally coils of tungsten wire that are coated in a material that when heated will give off electrons readily. To start the lamp a current is passed through the coil to heat the emissive coating. However, once the lamp is running the ionised gas atoms hitting the electrode provide enough energy to keep the cathode hot. The electrodes are generally surrounded by a shield as some of the material used to coat the electrode evaporates during the life of the lamp. If the shield was not there the material would be deposited on the wall of the lamp causing a black ring and reducing the light output.

The gas fill: the lamp fill is made up of two components; a noble gas mixture and the mercury vapour. The noble gas in the lamp has three main functions. First, it reduces the mobility of the free electrons in the lamp and by careful control of the pressure; it optimises the number of electrons with the right amount of energy to excite the mercury atoms.

Secondly, the gas reduces the rate at which the coatings on the electrodes evaporate and thus prolongs the life of the lamp. Finally it lowers the breakdown voltage of the lamp and thus makes starting easier. Most lamps use either a mixture of argon and krypton or neon and argon. The use of the heaver krypton gas makes the lamps slightly more efficient but it is significantly more expensive. The vapour pressure of mercury in the lamp is significantly lower than the pressure of the noble gas mixture and it is controlled by the temperature of the coolest part of the lamp. At the cold spot of the lamp the mercury condenses to form liquid mercury. At this point the liquid and gaseous mercury are in equilibrium and the vapour pressure is determined by the temperature. As the vapour pressure of mercury is critical to the operation of the lamp, the light output of the lamp varies with temperature. Most lamps are optimised to run in an environment with an ambient temperature of 25 °C.