LOVELY PROFESSIONAL UNIVERSITY

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Project Name:

Tube light working and white color emission and compared it with white LED

Submitted To:
Dr. Amit Bindra

Tubelight

LED Bulb

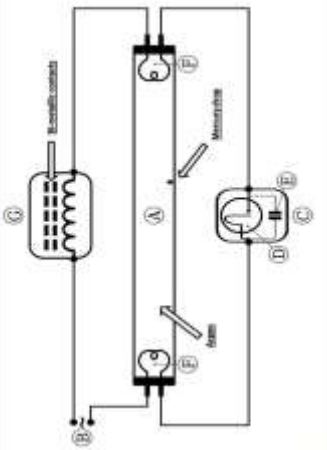
Content

Introduction to Tubelight

1.What is Tube Light?
Tube shaped fluorescent lamp is termed as tubelight.
Tube light is a lamp that works on low pressure mercury vapor discharge phenomenon and converts ultra violate ray into visible ray with the help of phosphor coated inside glass tube.
2.it was invented by peter cooper hewitt in the year 1903.

Material Used Inside the Tube Light

A.Phosphor coated glass tube:
The inner surface of the lamp is coated with a fluorescent coating made of varying blends of metallic and rare-earth phosphor salt
B: Power supplier
C: Starter:
Starters are devices that control the use of electrical power to equipment.
D: Switch (bi-metallic thermostat)
E: Capacitor:
device for storing electrical energy
G: Ballast:
a ballast regulates the current to the lamps and provides sufficient voltage to start the lamps.
F.Filament coils:
The lamp's electrodes are typically made of coiled tungsten and are coated with a mixture of barium, strontium and calcium oxides to improve thermionic emission.
H.Mercury drop
I.Inert gases ('argon' in glass tube & 'neon' in starter)



Working Principle of Tube Light

A. When the switch is ON, full voltage will come across the tube light through ballast and fluorescent lamp starter.No discharge happens initially i.e. no lumen output from the lamp.

B. At that full voltage first the glow discharge is established in the starter. This is because the electrodes gap in the neon bulb of starter is much lesser than that of inside the fluorescent lamp.

C. Then gas inside the starter gets ionized due to this full voltage and heats the bimetallic strip that is caused to be bent to connect to the fixed contact.Current starts flowing through the starter. Although the ionization potential of the neon is little bit more than that of the argon still due to small electrode gap high voltage gradient appears in the neon bulb and hence glow discharge is started first in starter.

D. As voltage gets reduced due to the current causing a voltage drop across the inductor, the strip cools and breaks away from the fixed contact.
At that moment a large L di/dt voltage surge comes across the inductor at the time of breaking.

e.This high valued surge comes across the tube light electrodes and strike penning mixture (mixture argon gas and mercury vapor).
f.Gas discharge process continues and current gets path to flow through the tube light gas only due to low resistance as compared to resistance of starter.
g.The discharge of mercury atoms produces ultra violet radiation which in turn excites the phosphor powder coating to radiate visible light.
h.Starter gets inactive during operation of tube light.

Emission of ColorS in Tubelight

Tube light is a discharge tube. It can emit light of different colors.
This color depends upon the nature of the gas filled inside the tube and the nature of the glass with which the tube is made.
The gas inside the tube contains vapour of metals. We know, in metallic atoms, the electronic transition occurs due to which light of a particular wavelength is emitted. the emission of light is due to electronic transition in atoms.
This emission takes place at low pressure and not at a high temperature.

For neon gas in the tube, the color of the light which is emitted is bright red. For carbon-dioxide, the color is blue.
The fluorescent glow looks yellowish green for soda glass. If argon gas is filled inside a tube light then the color of light is white.
Hydrogen gas emits pinkish orange color while the neon gas in the tube emits red color. Water vapour in the tube emits pink color

Emission of White Color in Tubelight is due to:

A. discharge of mercury vapour produces UV light

B. UV light strikes on the phosphorent coating & exites the phosphorent.

then it gives white light

LED Bulb vs. Tubelight (Fluorescent Tube) Quality of Light:

a glass tube which radiates light when phosphor on its inside surface is made to fluoresce by ultraviolet radiation from mercury vapour called as Fluorescent Tubes

tubelight is a Fluorescent Tube

When it comes to the expected quality of LED vs fluorescent tubes, experts again recommend LEDs for all our lighting needs.
Why?

Performance:

We have already discussed how robust an LED light is when compared to a fluorescent lamp. However, the spectrum of light that is available from LEDs far exceeds what is available through its fluorescent counterpart.
Because of its inherent design, the entire color wheel is represented through the diodes used in an LED.
This allows it to produce all shades of color, including even the slightest variations between bright white and natural light.
Fluorescent lighting, however, utilizes the blue, green and red color wheel.
This gives the lighting an extremely artificial feel and has been known to increase the likelihood of headaches and eye problems.
Furthermore, it can skew the colors of objects under them. Depending on what your business does, this can be an issue.

Lumens

Fluorescent lights produce between 50 and 100 lumens per watt. By comparison, LEDs can produce roughly 130 lumens per watt.
For example, a T5HO Commercial LED tube light uses only 25 watts to produce an output of 3334 lumens.
In other words, LEDs require fewer watts to produce a brighter light.

Efficiency Makes a Difference

Fluorescent lights are indeed more efficient than incandescent bulbs.
However, when it comes to the LED vs fluorescent debate, experts agree that fluorescents pale in comparison.

Conclusion:

so,When it comes to the expected quality of LED vs fluorescent tubes, experts again recommend LEDs for all our lighting needs.

LED bulbs are more beneficiary than Tube light in any aspect.

Bibliography:

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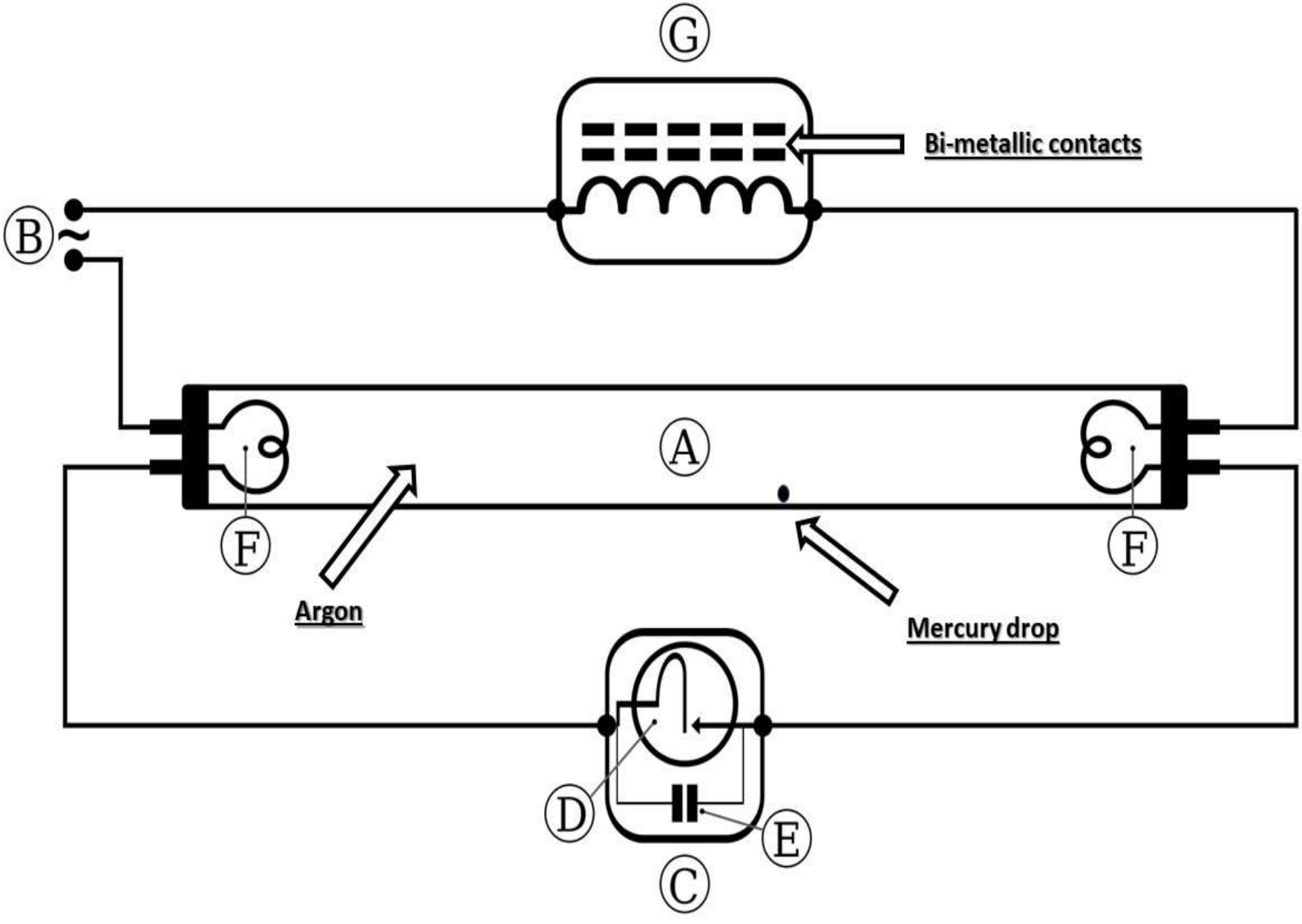
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