



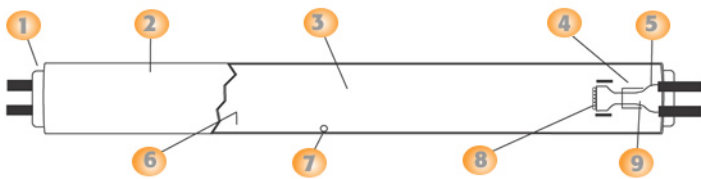
Fluorescent Lamps

Lamp Construction

The fluorescent lamp is a low pressure mercury, electric discharge lamp that consists of a glass tube filled with a mixture of argon gas and mercury vapour at low pressure. When the current flows through the ionized gas, between the electrodes, it emits ultraviolet radiation from the mercury arc which is converted to visible light by phosphor coating on the inside glass of the tube.

To operate, the fluorescent lamp needs a ballast to limit the current and to provide the necessary starting voltages. Each fluorescent lamp requires a ballast designed for its electrical characteristics.

<p>1 Base</p> <p>Several different types used to connect the lamp to the electric circuit and to support the lamp in its lampholder.</p>	<p>2 Glass</p> <p>Usually a straight glass tube. Can also be circular or U-shaped.</p>	<p>3 Gas</p> <p>Usually argon or a mixture of inert gases at low pressure. Krypton is also sometimes used.</p>	<p>4 Stem Press</p> <p>The lead-in wires have an air tight seal and are made of a specific wire to assure a similar coefficient of expansion as that of the glass.</p>	<p>5 Lead-in wires</p> <p>Connect to the base and carry the current to and from the cathodes and the mercury arc.</p>
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Fluorescent lamp construction
Construction de la lampe Fluorescente

<p>6 Phosphor Coating</p> <p>Coating inside the bulb transforms ultra-violet radiation into visible light. The colour of the light reproduced depends on composition of phosphor.</p>	<p>7 Mercury</p> <p>A small quantity of liquid mercury is placed in the bulb to furnish mercury vapour.</p>	<p>8 Cathode</p> <p>"Hot Cathodes" at each end of the lamp are coated with emissive materials which emit electrons.</p>	<p>9 Exhaust tube</p> <p>Ai is exhausted through this tube during manufacturing and inert gas introduced into the bulb.</p>
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Usually made
of coiled-coil
or single-coil
tungsten
wire.

Types of Fluorescent Lamps

Preheat lamps

This type of lamp is a starter type fluorescent where the cathode filament is preheated before any high voltage is applied to start the lamp. When the power supply voltage is applied, the starter begins discharging, the starter contact closes and current begins flowing to both of the fluorescent lamp's cathodes. The cathodes are preheated, and begin emitting electrons. There is no heat generation when the starter's bimetal and fixed electrodes close and a current flows. Therefore the bimetal cools and returns to original position, thus opening the contact. The large kick voltage that is generated in the ballast at this instant lights the lamp.

Rapid Start Lamps

These lamps are used in combination with a rapid start ballast and are lit without the use of a starter. They offer the ability to illuminate a large number of lamps simultaneously and they eliminate starter maintenance. Less voltage is required for starting than instant start lamps which results in the use of smaller and more efficient ballasts. They have a bipin base and can be used for dimming and flashing applications.

Slimline and Instant Start Lamps

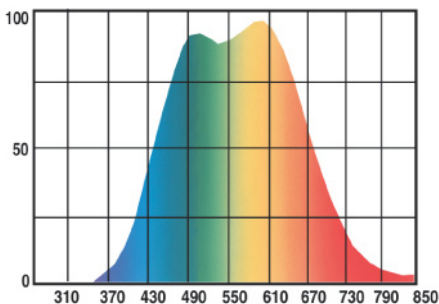
Slimline and Instant Start lamps are single pin based lamps that operate on instant start ballasts which provide sufficient voltage to strike the arc instantly without the need of a starter. Instant start lamps will operate normally only in an instant start circuit.

High Output (HO) / Very High Output Lamps (VHO)

These lamps operate on a rapid start ballast circuit. HO fluorescent lamps designed for indoor applications operate at .800 amperes and produce 45% more light than regular lamps at comparable wattage. For outdoor applications they operate at 1.0 amperes in order to generate a high output even in cold temperatures. The VHO fluorescent lamps operate at 1.5 amperes and feature a pressure regulator to maintain ideal operating temperature in normal operating conditions. All VHO lamps have a recessed double contact base.

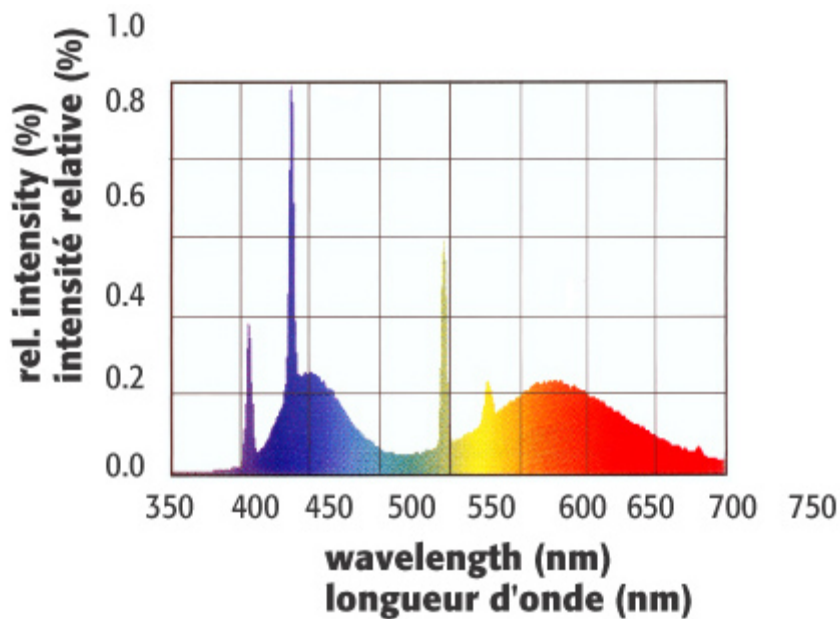
Full Spectrum (FS)

Full Spectrum light is the natural north sky daylight for indoor applications where eye strain is an issue, as well as where color judgments are made such as clothing, furniture, paint and wallpaper stores, graphic arts industry, etc. It offers an excellent colour temperature and very high color rendering index.



Plant Light (PL)

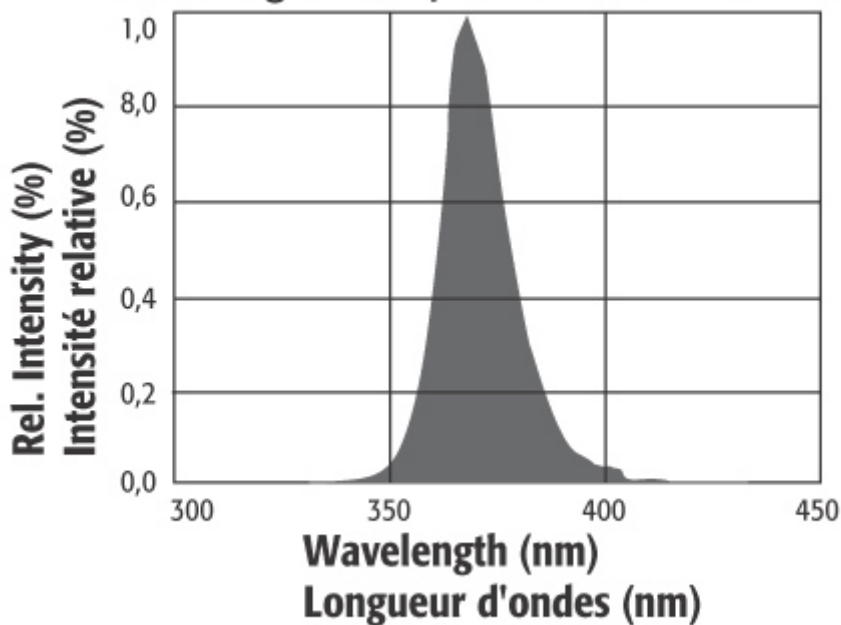
It is designed to help plants grow by emitting the light waves needed for photosynthesis, especially in the blue (400-500nm) and red (600-700nm) ranges. For use in commercial greenhouses, florist displays, home planters, and aquariums. Can also be used in restaurants or cocktail lounges for atmosphere lighting.



Black Light (BL) / Black Light Blue Lamps (BLB)

These lamps produce energy in the near ultra violet or UVA range (Peaking at 370 nanometers) and are available in BL (Black Light) and BLB (Black Light Blue). BL lamps must be used with external glass filters that transmits near ultra violet but absorbs the visible light produced. BLB lamps do not require the use of external filters since they have tubes made of filter glass which absorbs light but transmits ultra violet. Electrical and physical characteristics are identical to regular fluorescent lamps.

Black Light Blue / Lumière noir bleutée



Butcher Display Light (RBG)

It is the best light available for meat displays. It is designed to optimize and accent the red colour spectrum, thereby adding vitality to the appearance of red meat. It is also excellent for produce and merchandise displays.

Actinic

This fluorescent lamp is designed to emit light waves in the blue-violet and near ultra violet with intense emission spectrum between 300 & 400 nm. For use in aquariums, reprographic applications, photochemical reactors and insect traps.

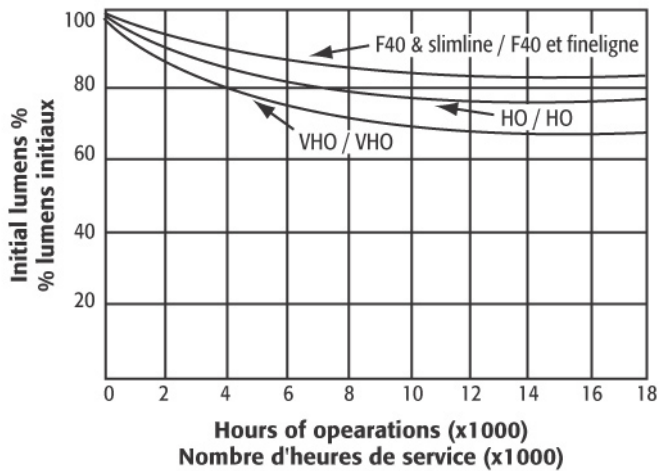
Germicidal

UV transmitting glass tubes allow germicidal to produce ultraviolet radiation that is strong enough to be used in both air and water purification applications. The wavelength of ultraviolet light prevents DNA replication and therefore reproduction of various bacteria, viruses, and moulds.

Glossary

Initial Lumens

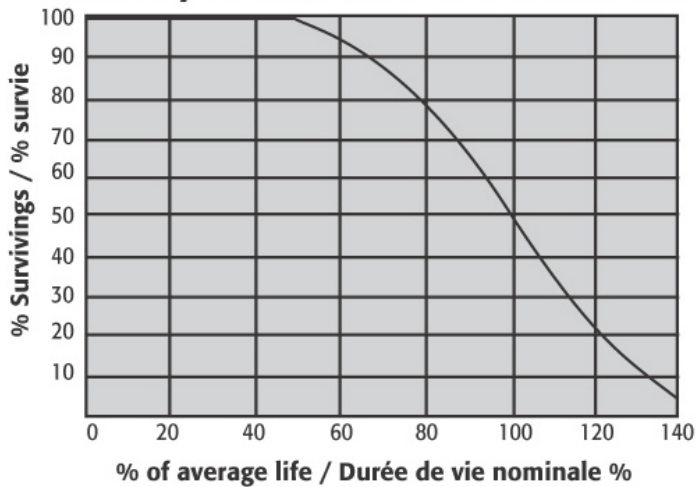
Initial lumen ratings of fluorescent lamps gradually decline as the lamp gets older. The main cause for lumen depreciation is the degradation of the phosphor material due to ultra violet radiation. Also, the formation of compounds from the mercury presents in the tube, and traces of impure gases, result in decreased tube transparency. The rate of this decline is rapid in the first 100 hours of lamp operation and slows down to a more gradual depreciation throughout the life of the lamp. For these reasons, initial lumen ratings are based on lamp performance after 100 hours of operation, under laboratory test conditions with ballasts meeting ANSI specifications.



Life

The rated average life is based on 3 hours operating cycle under laboratory conditions, and with proper auxiliary equipments meeting ANSI (American National Standard Institute) specifications. If the burning cycle is increased average life hours will decrease accordingly.

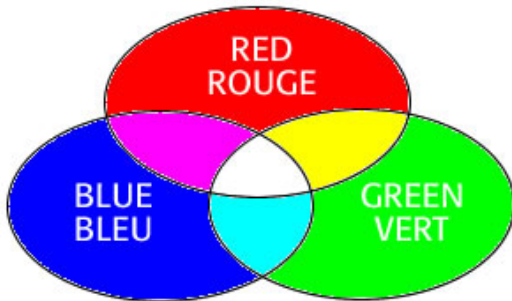
Mortality Curve / Courbe de mortalité



[Fluorescent Lamp Colours](#)

The Three Primary Colours of Light

Artificial light can be created by combining Red, Green, and Blue light emitting phosphors.



The Three Primary Colors of Light



Changes in the RGB ratios of the white portion change the characteristics of the light, and therefore the mixture ratios of RGB fluorescent substances is an important point to take into consideration when creating artificial lights.

The intensity of light is perceived as brightness or darkness and is the basis for the brain's judgement of light level.

Phosphors

The colour of light radiated from a fluorescent lamp is influenced by the chemical composition of the phosphor coating on the inside wall of the lamp tube.

Presently, cool white (CW) and daylight (D) are the most common types of fluorescent lamps, but many different colours are now obtained through a mixture of phosphors offering bright illumination and excellent colour rendering.

Kelvin & CRI Ratings

	°K	CRI
Gold	2100	38
Pink	2200	67
Reprographic Gold	2250	31
Display Pink	2800	74
Warm White	3000	52
Natural	3700	90
Butcher	3900	77
Market Lite Plus	4075	77
Lite White	4150	48
Cool White	4100	62
Cool White Deluxe	4175	89
Full Spectrum	5700	92
Daylight	6500	84

Colour

Cool White (CW)

Cool White is deficient in red and blue compared to natural sunlight. For use where colour rendition is not important (general lighting).

Cool White Deluxe (CWX)

Cool White Deluxe offers similar kelvin temperature to cool white lamps with a higher colour rendering index and a lower light output. For use in cool white applications where a better appearance is desired and where decrease in light output is acceptable.

Daylight (D)

Daylight is bluer than cool white with better colour rendition. For use in general lighting.

Daylight Delux (DX)

Daylight Delux offers a higher CRI than daylight lamps which allows it to render colours more accurately. For use in general lighting.

Warm White (WW)

Warm white is richer in reds and yellows than cool white, therefore making skin tones more flattering. For use in general lighting.

Natural (N)

Natural is a warm and pleasant light, cooler than warm white but warmer than cool white with higher colour rendering index. It is often used in restaurants, lobbies and cafeterias.

Blue, Green, Pink & Red (B,G,P,&R)

Colour fluorescent lamps are particularly adapted to create special effects and atmosphere.

Bili Blue (BBY)

Due to a special phosphor blend, this blue light is extremely effective in the treatment of hyperbilirubinemia in newborn infants.

Cool Green (CG)

Cool Green light peaks in the yellow-green region of the spectrum (555 nm) at which the human eye responds

with maximum sensitivity. It is used in applications where visual acuity is a must such as drafting, machinery and quality control departments, inspections, schools, laboratories, etc.

Display Pink (DP)

It is a warm white light similar to warm white but much better in spectral distribution. For use where flesh tones are to be complemented such as beauty parlors, restaurants, and cocktail lounges. Also ideal for use in deli counters and bread displays in bakeries.

Gold (GO)

For use where Yellow/Gold light is desired, and for outdoor applications for reduction of flying insects. Also ideal for atmosphere lighting as well as colour correction when used with Bili Blue lamps.

Lite White (LW)

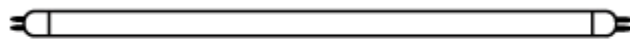
Similar to Cool White, but slightly more light output.

Reprographic Gold (RGO)

For use in the reprographic industry to provide short blue filtered light in the development process.

Cross Reference Chart			
Cobotex / Standard	Philips	G.E.	OSRAM SYLVANIA
Bili Blue (BBY)	Special Blue	-	-
Butcher (RBG)	F40 Hi Accent	-	-
Color 50 (C50)	Colortone 50 (C50)	Chroma 50 (C50)	Design 50 (Dsgn50)
Cool Green (CG)	Cool Green (CG)	Cool Green (CG)	Cool Green (CG)
Display Pink (DP)	-	-	-
Energy \$ (ES)	Econo-Watt (EW-II)	Watt Miser (WM)	Super Saver (SS)
Full Spectrum (FS)	-	-	-
Natural (N)	Natural	Natural	Natural White
Plant Grow & Aquarium (PL)	Agro Life	Plant Light "Gro & Sho"	Gro-Lux
30K	30U	SPX30	D830
35K	35U	SPX35	D835
41K	41U	SPX41	D841
50K	50U	SPX50	-

[Lamp shapes](#)



T-5 Miniature Bipin / Miniature 2 broches



**T-5 Black Lite Blue / Lumière noire bleutée
Miniature Bipin / Miniature 2 broches**



T-6 Single pin slimline / Broche unique fineligne



T-8 Medium Bipin / Moyenne 2 broches



**T-8 Black Lite Blue / Lumière noire bleutée
Medium Bipin / Moyenne 2 broches**



T-8 Single pin slimline / Broche unique fineligne



T-8 Recessed double contact / 2 plots en retrait



T-10 Medium Bipin / Moyenne 2 broches



**T-10 Black Lite Blue / Lumière noire bleutée
Medium Bipin / Moyenne 2 broches**



T-10 Recessed double contact / 2 plots en retrait



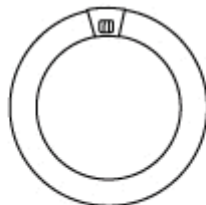
T-12 Single pin slimline / Broche unique fineligne



**T-12 Black Lite Blue / Lumière noire bleutée
Medium Bipin / Moyenne 2 broches**



T-12 Recessed double contact / 2 plots en retrait



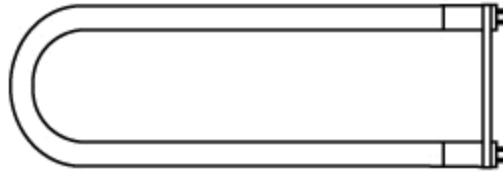
T-9

Circline 4 pins / Circulaire 4 broches



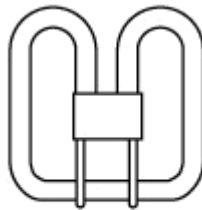
T-9

**Black Lite Blue / Lumière noire bleutée
Circline 4 pins / Circulaire 4 broches**



T-8, T-12

**Medium bi-pin U-bent
Moyenne 2 broches en forme de « U »**



2D

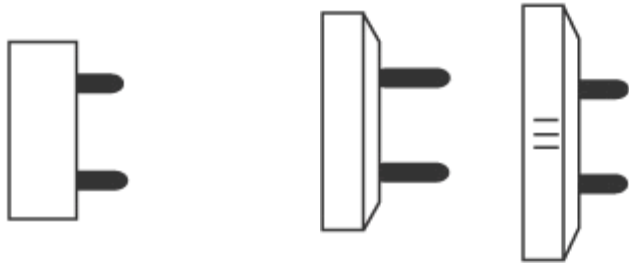
4 pin / 4 broches

NOTE: Drawings are not to scale.

Bases



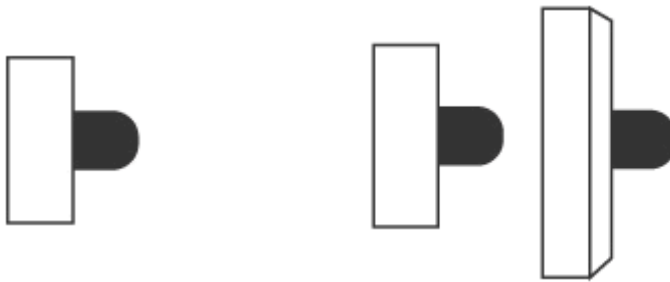
**T5, T8
Miniature Bipin**



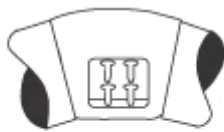
**T8, T10, T12
Medium Bipin**



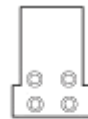
**T8, T10, T12
Recessed Double Contact**



**T8, T10, T12
Slimline Single Pin**



**Circline 4 Pin
Circulaire 4 broches**



**2D 4 Pin
2D 4 broches**

NOTE: Drawings are not to scale.