COSMEDICO®

Licht zum Wohlfühlen

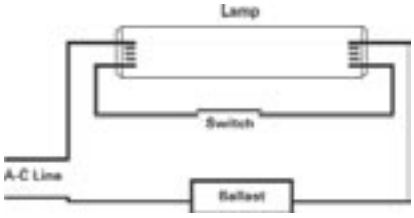
Low Pressure Lamp Starters

There has always been some mystery and confusion associated with fluorescent lamp "starters".

In the simplest terms - fluorescent starters are not much more than automatic "switches". They are used in combination with choke ballasts and their function, as their name implies, is to start fluorescent lamps.

In the diagram on the right (Figure A) you will see that when power is applied to the choke ballast lamp circuit, the starter (labeled "switch") closes. Current will then flow through the lamp and ballast circuit. As this current flows, it passes through the cathode (or coil) at one end of the lamp, through the starter (switch) and through the cathode at the other end of the lamp.

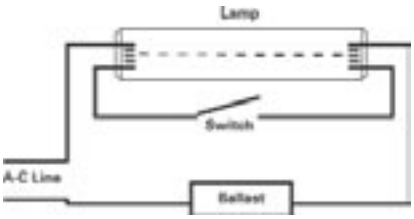
Figure A



When this happens, the cathodes (which look much like the filament in a household light bulb) heat up and glow incandescent, causing the coils to emit a stream of electrons.

These active electrons heat and "ionize" the gas inside the lamp which makes the gas a good conductor. Soon afterward the starter (or switch) opens (shown in Figure B). This induces a kick or spike of voltage from the choke ballast and an arc is struck between the two cathodes of the lamp. This arc was once described as "lightening in a bottle" and the term remains quite appropriate.

Figure B



At this point, the starter has performed its sole function. The contacts now remain open and this component is out of the circuit - standing by - waiting to perform its job the next time the bed is turned on.

What is most important to know is that there are two types of starters: the old "glo-bottle" design and the new electronic design. While both starters perform the same basic function - they do it very differently.

The fluorescent lamp was introduced to the world in 1939 and shortly thereafter, the "glo-bottle" starter was invented. Oddly enough, the original construction has changed very little over the years.

"Glo-bottle" starters (Cosmedico K11's and K12's or Philips S11's and S12's) are mechanical switches. They are constructed using bi-metal contacts housed within a neon filled glass bottle as illustrated in Figure C.

glo-bottle starter with and without polycarbonate cover

Figure C

When power is applied to a glo-bottle starter, the neon within the glass bottle glows. This glow produces heat and the heat causes the bi-metal contacts to bend and come together, closing the circuit.

This (as previously described) causes the cathodes within the lamp to heat. But contact closure also stops the neon glow. When the glow is extinguished, the contacts cool and then snap open. This (also mentioned earlier) precipitates the arc strike within the lamp. If the arc is not struck with this try, the whole process is repeated until there is a successful start. These repeated starts are the major cause of lamp "blink" or "flicker".

Glo-bottle starters are considered "wear parts" with a finite life and will deteriorate with use. As they get older, they begin to fail for different reasons - and some of these reasons can create stress on lamps and cause a lamp to fail prematurely. The inverse is also true - as lamps age they frequently become harder to start (due to the loss of coating on the lamp's cathodes). A "hard-to-start" lamp may require the starter to cycle over and over until the lamp fires. This can age the starter at an accelerated rate.

While many salon owners still replace starters only when they fail - others have adopted a plan to replace them on a scheduled, group basis - usually during a re-lamping of the bed. This practice seems to make great sense because it is protective to the lamps, and it reduces the need to spot replace starters when they fail one at a time.

There have been countless opinions offered as the "best time" to replace starters, but the optimal schedule depends greatly on the lamp type and typical exposure schedule for the piece of equipment.

Simple math allows us to make some recommendations. Starters are (conservatively) life-rated at +6000 start cycles. If a particular bed runs for three (3) 20-minute cycles every hour, we can divide 6000 cycles by 3 and determine that a starter in this application should last about 2000 hours.

continued

Using the same math (and de-rating for higher wattage) we can calculate recommended schedules for different beds as shown in Figure D.

Figure D

BED/BOOTH	TIMER	REPLACE AT
80-100w	20 minute	2,000 hrs.
80-100w	15 minute	1,500 hrs.
140-160w	12 minute	1,200 hrs.
180w	12 minute	1,200 hrs.
200+ w	9 minute	600 hrs.

In the interest of streamlining maintenance schedules, these hourly numbers can easily be converted so that starters are group-replaced at the same time re-lamping occurs.

For the 80 - 100W bed with a 20 minute timer, the 2,000 hour mark means that you can replace all of your starters with every third re-lamp. And so on . . . . .

The technology used in glo-bottle starters is very simple. Unfortunately the simplicity of the technology is the cause of imperfect operating conditions. The root of the problem is that glo-bottle starters can not exercise precise control of the "preheat" time - nor can they choose the precise moment in the current cycle to open. This means that lamp starting is always attempted under random conditions where there may be any of the following: too much preheat, too little preheat, or without good impulse. Thus, starting under optimal conditions is best described as a "lottery".

This is important because it is starting and conditions attending starting that determine the electrical or physical life of a fluorescent lamp. Starting under adverse conditions has a very detrimental effect upon lamps and is the most common cause of rapid end-blackening and early failure.

(NOTE: This process is fully examined in our Technical Advisory regarding Lamp Life.)

Electronic Starters (COSMOSTART/E™) are relatively new to the market. They were designed to be a direct replacement for the glo-bottle style in that they have identical physical dimensions. Thus they can be substituted for glo-bottle starters in most beds and booths.

Although on the surface, glo-bottle and electronic starters have a similar look, they use very different technology.

First and foremost, they are not mechanical - they employ electronic components mounted on a printed circuit board. See Figure E.

electronic starter with and without polycarbonate cover

Figure E

When power is applied to the COSMOSTART/E™, the starter senses the "power on" condition and immediately allows current to flow through the lamp cathodes at low voltage until the coils reach full electrode emission temperature.

The preheat time is automatically adjusted by the E-starter to accommodate existing conditions, and at a precise and opportune moment in the current cycle, a low energy impulse is delivered to the lamp, causing ignition.

Additionally, the E-starter monitors the lamp and disconnects if an abnormality exists. This protects the associated components in the lamp circuit. This precise control is immediately recognized by the instant, flicker-free start that occurs with every start up.

The most publicized benefit of the E-starter is its exceptionally long service life. Under normal operating conditions the E-starter will operate for 10 or more years. (Like any other electronic device, there are certain abnormal conditions, like excessive heat, that can negatively effect life.)

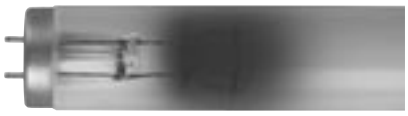
However, there is another feature of the E-starter that results in an equally impressive benefit. The soft, controlled and programmed start greatly reduces the amount and rate of "coil sputter" that occurs to the lamp during normal operation. Lamp coils are coated with an electron emissive material that is evaporated and deposited on the lamp glass with each and every start. This results in what is referred to as lamp-end-blackening (illustrated below in Figure F).

Most end-blackening occurs at the ends of the lamp where little UV is produced. Thus, early and excessive discoloration has little effect on the lamp's UV efficiency. Yet it is unsightly and often results in tanning clients believing that the lamps are old and UV depleted. In other words, they perceive they are not getting full value from their tanning salon!

Extensive testing and field experience show that an E-starter (COSMOSTART/E™) will eliminate or greatly reduce this persistent problem.

While the technical superiority of the COSMOSTART/E™ over glo-bottle designs is readily apparent, what is surprising is that the E-starter is available at a modest premium. Standard glo-bottle starters will cost the salon owner anywhere from $1.00 to $2.00 each depending upon wattage and the quantity purchased. COSMOSTART/E™ has a suggested user price of only $2.95. With this modest price differential the economics are clearly in favor of the COSMOSTART/E™

Figure F



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