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## Topic 1

The regular test method for the compact fluorescent light is under strict environment conditions and open & close time, but this traditional test method requires a long period. It is a long time question whether there is a "Speed up" test method to replace the traditional method, or evaluate the light's average life with shorter time. We are going to discuss it now.

### **Compact Fluorescent Light Open & Close Test Speed up "Life" Test**

#### Preface

The traditional incandescent light can be opened and closed frequently without influence to its life. But the compact fluorescent light's life is in close relations with frequent open & close condition, so we impose the frequent open & close test to the compact fluorescent light, and precisely evaluate its average life by the test results.

#### **Some problems of the standard life test methods.**

According to the light life test method in IEC969 files, the life test for compact fluorescent light is under the following conditions:

- (1) Minimum 20 lights for each model.
- (2) The light head should be vertically upward.
- (3) Rating electric source, voltage and frequency (national standards 220V, 50Hz)
- (4) Environment temperature at 25+1°C
- (5) Comparative maximum temperature 65%
- (6) Lighting period: 165 minutes open, 15 minutes close.

As for the lights with average 8000h life, at least 50% lights can pass 2910 open & close test. So according to this theory, we can assure that the light's life is concerned with the open & close times, though this relation cannot be explained and recognized in theory by now.

In the real use of light, the intervals between open and close are far from the test conditions. During the use, if we require the intervals to be shorter than the test condition, what will happen to the light's life? Or further speaking, is there some relation between the frequent open & close condition life and that of normal test condition? The answer is positive. So use the reasonable frequent open & close method and period to conclude the light's life is some how with foundation. We can call this method as "Speed up" life test method.

#### **The principle and method of "Speed up" life test method.**

One of the pre-condition for "Speed up" life test method is to set the intervals of frequent open & close. The discussion to this issue has already reported in abroad; generally speaking the time of "open" and "close should satisfy the following conditions:

- (1) The open time should be long enough so as to ensure the plenty heating of the light's electrode, and reduce the wastage of the electrode's missile. We define this time to be **T open**.
- (2) The close time should be long enough, so as to ensure the plenty cooling down of the light's startup and en-blaze devices, and guarantee the normal working status. We define this time to be **T close**.

With the above conditions, we can carry out the "Speed up" life test as follows:

- (1) Conclude the reasonable open time **T open** and close time **T close** via a series of tests and methods.
- (2) Use the "Speed up" method to test a batch of samples with the average life of **L level**, when 50% lights' life terminate, record the open & close time as **N**.

It is noticeable that in order to guarantee the reliability of test data, the lights used in the above (1) and (2) procedures should be already proved and with reliable quality, which means the average life **L level** is tested and in long-time batch production. So we can presume the other lights' life. Generally speaking, the life **L** test result for other lights is some function among **N**, **L level**, **T open**, **T close**, and the open & close time **N** in the test procedures:

**Life  $L = f(N, L \text{ level}, T \text{ open}, T \text{ close} \dots)$**

The parameters of **N**, **L level**, **T open**, **T close** etc are fixed according to the above formula, so when estimate the "life" of unknown lights, we only need to sample test and record the open & close time **N** when 50% lights die, and put **N** into the above formula to deduce the average life of sample lights. This test can be finished in very short time. Generally speaking, for the lights with average life of 8000-10000 hours, the life test can be finished within 3-4 months, so this method shows its superiority completely.

It need to point out that when testing the "life **L**" of other lights, the testing methods except the open and close intervals should be strictly in accordance with IEC 969 files.

It should be declared that by now this test method is only a supplemental mean, cannot completely substitute the regular life test and the evaluation from quality department.

#### **Conclusion.**

Now though the "Speed up" life test method cannot be well explained in theory, but this test method is taken as a supplemental means in the quality control procedure by some famous lighting company abroad, meanwhile accepted by some foreign governmental test organizations. Based on this, some famous foreign lighting company and quality test organizations take this "Speed up" life test as an important means to examine the energy saving lights, and used in the presumption and estimation in the new products development. This method has draw the attention of International Electrician Committee, but there is still no authorized parameters of **N**, **L level**, **T open**, and **T close** etc, so the famous factories can only proceed according to their own regulations. This is the reason that the CFL may last only a few hundred hours in actual operation instead of the claim by manufacturers that the life of 8000 – 12000 hours.