COMPARISON OF LUMINOUS FLUX MAINTENANCE METHODS, CONTINOUS VS. ON/OFF CYCLES

Abstract

1. Motivation, specific objective

The high energy efficacy and long lifetime of LED products provide significant energy savings. Products don't always meet their rated lifetime and fail prematurely, negating the expected energy savings. In the presented project the lifetime of different LED products will be investigated, using the new endurance test required by EU in the eco-design regulation from September 2021. Endurance testing is time consuming so ensuring the most efficient test method is important. This work will investigate the relationship between the test methods available, to find possible ways of increasing the speed of maintenance testing of LED products.

2. Methods

A monitoring system has been developed and is currently being used to monitor the performance on six of the LED products under test. The project is ongoing and will finish in 2022.

In this article we will present preliminary data from 16 LED tubes and 30 LED lamps, all of the products will not have completed the two types of tests. But as much data from the continuous testing will be presented together with the on/off endurance test.

In the project two methods was used to estimate the lifetime of LED products. The new endurance test and the IES LM-84 luminous flux maintenance test. The new endurance test runs for 1200 cycles of 2½ hour on and ½ hour off time, giving a total run time of 3600 hours (or 5 months). The total spectral power distribution of light sources are tested at time = 0 h and time = 3600 h. The luminous flux maintenance test runs for 6000 hours with the light source turned on continuous, and the total spectral power distribution is measured every 1000 hours. In addition to the test at the different time periods for the two methods, the project have developed a monitoring system that monitors the light output of the light sources continuously. In case of critical failures, these sensors will help giving a more accurate estimation of the life time of the products.

3. Results

The LED tubes have been running since the end of December 2020, at this time 16th of March the tubes have been running for 2000 hours. Preliminary results shows a slight increase of the luminous flux and small color shift. More data from the test will be presented in the final article and at the conference. The LED lamps have been tested at time = 0, and plan is to start the endurance and maintenance test on them in March 2021, preliminary data from these measurements will also be presented in the article.

4. Conclusions

It is too early to come with the final conclusions from the project as the test are still ongoing. Conclusions will be given for at least one endurance and luminous flux maintenance test on one product type, and preliminary results will be given for sources still undergoing test, in the article and at the conference.