

In Search of a Lamp/Ballast Dimming Standard

2007 Project Update

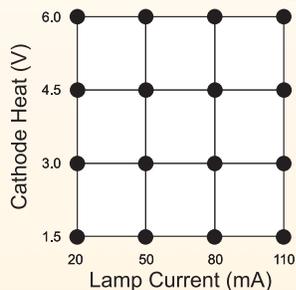
Researchers at the LRC are working with the National Electrical Manufacturers Association (NEMA) to gain a sufficient understanding of the relationship between electrode voltage and discharge current to write a lamp and/or ballast dimming standard.

Experiments

The LRC is examining products from multiple ballast manufacturers and multiple lamp manufacturers. Products include 32 W T8 lamps with different electrode designs. Only electrode voltage and discharge current, the major factors that impact lamp life, are being considered. The products are being tested under continuous operation (no cycling on and off).

Researchers are conducting a rigorous analysis of data to get useful, reliable, and statistically significant results.

Experiment design



Each data point:

- 4 ballast manufacturers
- 3 lamp manufacturers
- 4 samples from each
- Total = 48 systems

Total data points:

- 16 data points
- 2 control points
 - 180 mA, 3 V
 - 180 mA, 0 V
- Total = 864 systems

Sponsors

Advance Transformer Co.
GE Lighting
Lutron Electronics
National Electrical Manufacturers Association
OSRAM SYLVANIA
OSRAM SYLVANIA Electronic Control Systems
Philips Lighting
Universal Lighting Technologies
U.S. Department of Energy



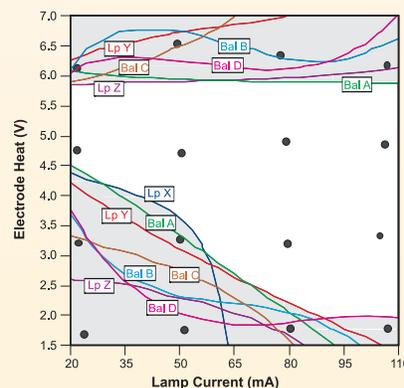
Test method

- Range of lamp current: $20 \text{ mA} \leq I_L \leq 110 \text{ mA}$
- Range of electrode heat: $1.5 \text{ V} \leq V_H \leq 6.0 \text{ V}$

This range was chosen due to previous publications and engineering experience and is expected to include space with both long and short lamp life.

Interim results (at 11,620 hours)

This ongoing experiment has found that electrode heating voltage and lamp current look promising for defining a region of satisfactory operation for many lamp and ballast designs. The experiment identified a relatively large region in the experimental design space that has satisfactory performance. This information is being used to develop a new standard for dimming systems.



Lamps X, Y, and Z were combined with ballasts A, B, C, and D in these tests. The graph is a stacked plot of individual graphs for each lamp and each ballast. The lines are the boundaries of good and bad performance for each, plotted against lamp current and electrode heat. The white area represents the region in which all of the tested lamp/ballast combinations performed satisfactorily.