Lamp/Ballast Combination Testing for Dimming Impact

Objective
LRC researchers are working with the National Electrical Manufacturers Association (NEMA) to gain a sufficient understanding of the relationship between cathode voltage and discharge current in order for a standard to be written for fluorescent systems.

Test method
- Range of lamp current: $20 \text{ mA} \leq I_L \leq 110 \text{ mA}$
- Range of cathode 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.

Experiment design
- Each data point:
  - 4 ballast manufacturers
  - 3 lamp manufacturers
  - 4 samples of each system
  - Total = 48 systems

- Total data points:
  - 16 data points
  - 2 control points
    - 180 mA, 3 V (RS)
    - 180 mA, 0 V (IS)
  - Total = 864 systems

Simulated results
- Expect lines of constant life within the design space
- Need to determine what life is good in order for a standard to be written

Experiments
The LRC is examining products from multiple ballast manufacturers and multiple lamp manufacturers. Products include 32 W T8 lamps with different cathode designs. Only cathode voltage and discharge current, the major factors that impact lamp life, are being considered. The products are being tested under continuous operation (minimal cycling once every two weeks).

Researchers will conduct a rigorous analysis of data to obtain useful, reliable, and statistically significant results.

Schedule
Life testing began in June 2005 and will continue to at least 2007.

Sponsors
Advance Transformer Co.
GE Lighting
Lutron Electronics
OSRAM SYLVANIA
Philips Lighting
Universal Lighting Technologies
U.S. Department of Energy