ENERGY STAR® Criteria for Reflector CFLs

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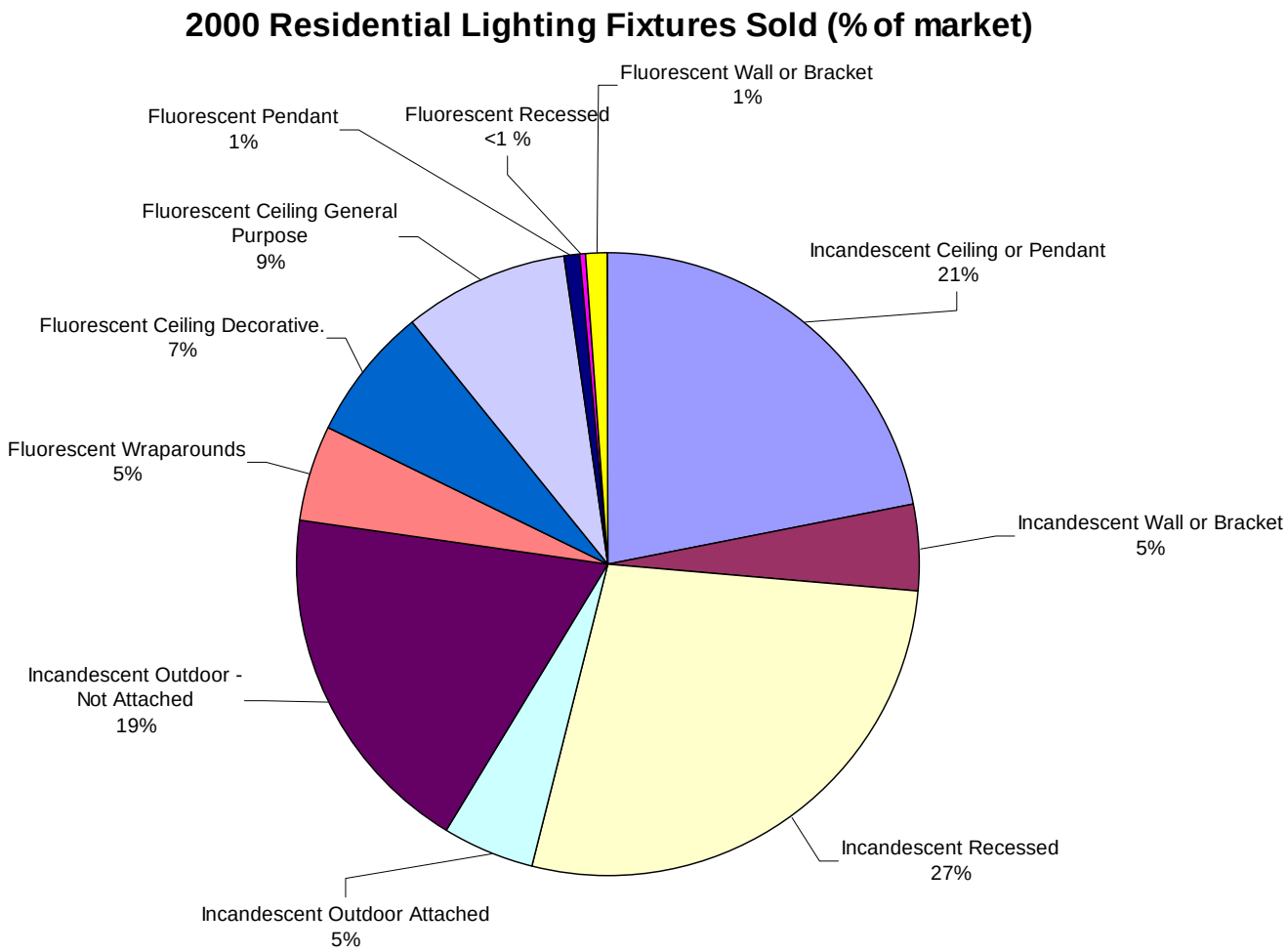
ENERGY STAR® Criteria Meeting
Sept. 20, 2005

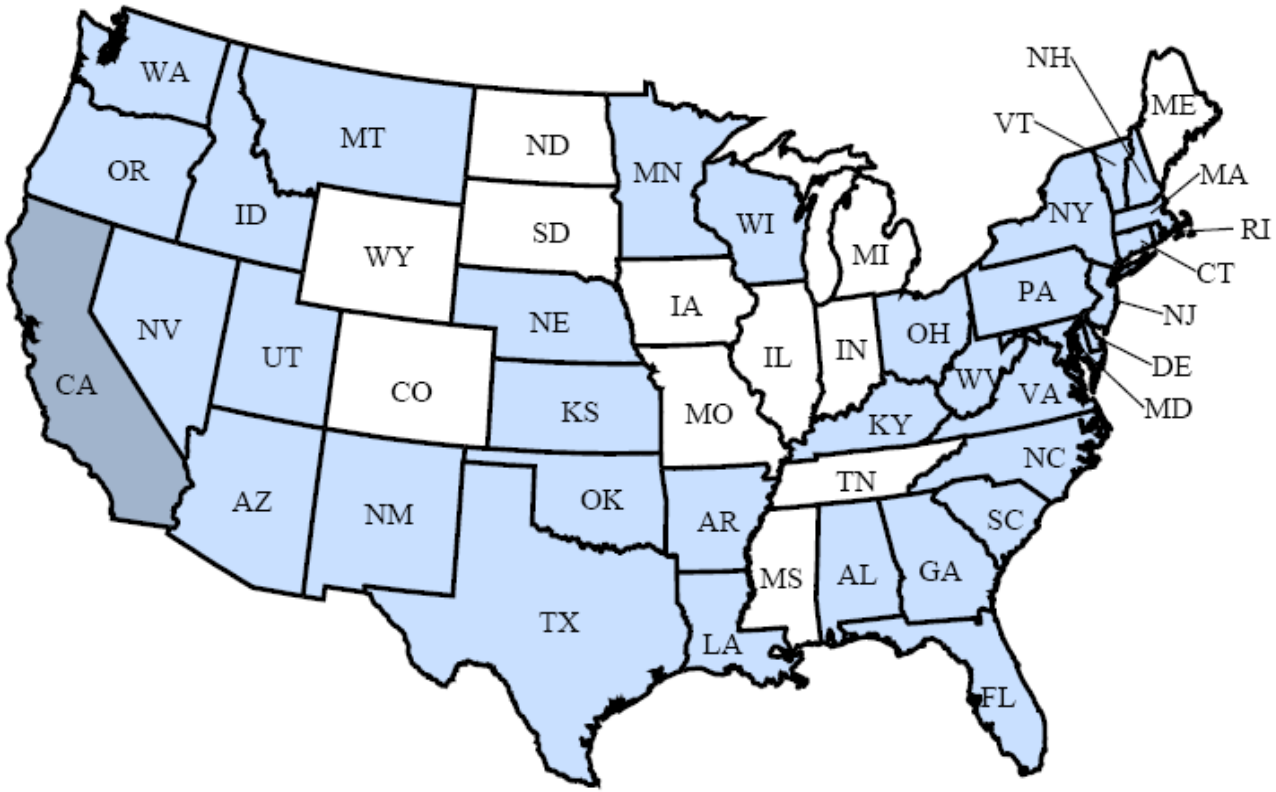
Today's Topics

- The market for R-CFLs
- The need for in-situ testing
- Key changes specific to R-CFLs in version 4.0
- Description of elevated temperature test apparatuses and procedures

Residential Lighting Market



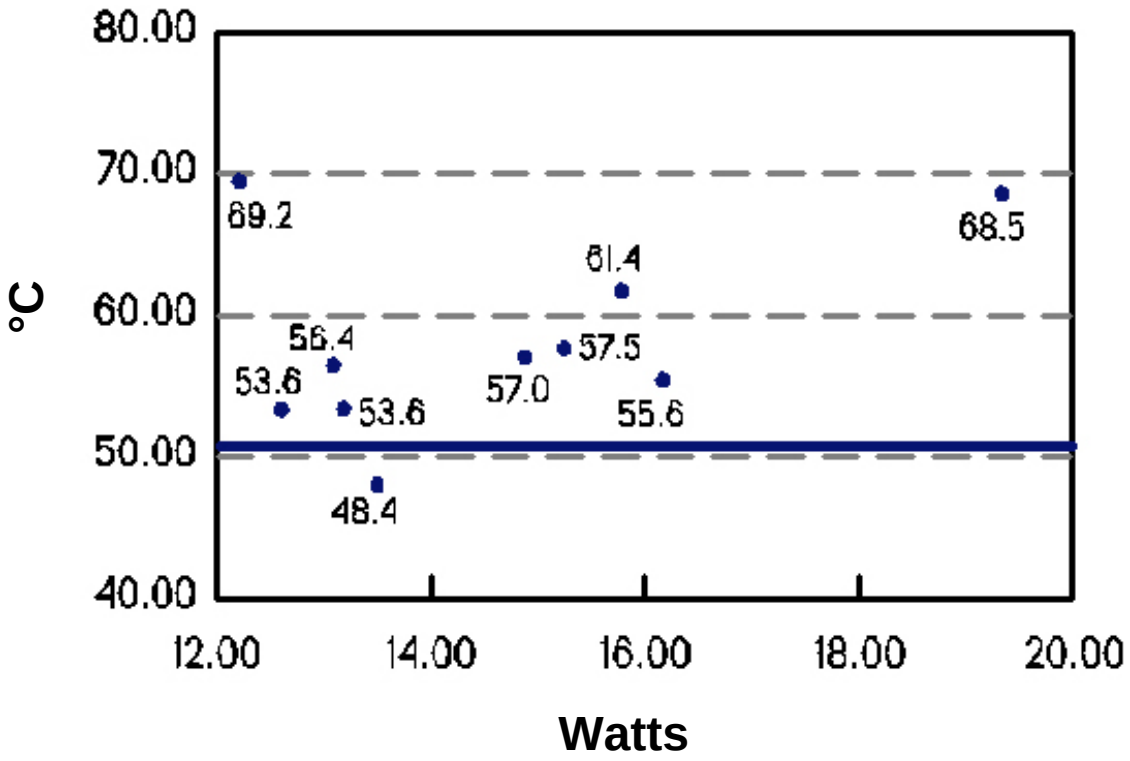
States Requiring ICAT Downlights



IC only
ICAT
ICAT & CFL
Tue Sep 13 11:57:21 PDT 2005

Initial Test Results Emphasized Heat Issue

Ambient Temperature vs. Rated Wattage



Results of 10 R-CFLs tested by PNNL in a simulated ICAT environment showed that most operated at above manufacturer maximum operating temperature guidelines (typically 50°C).

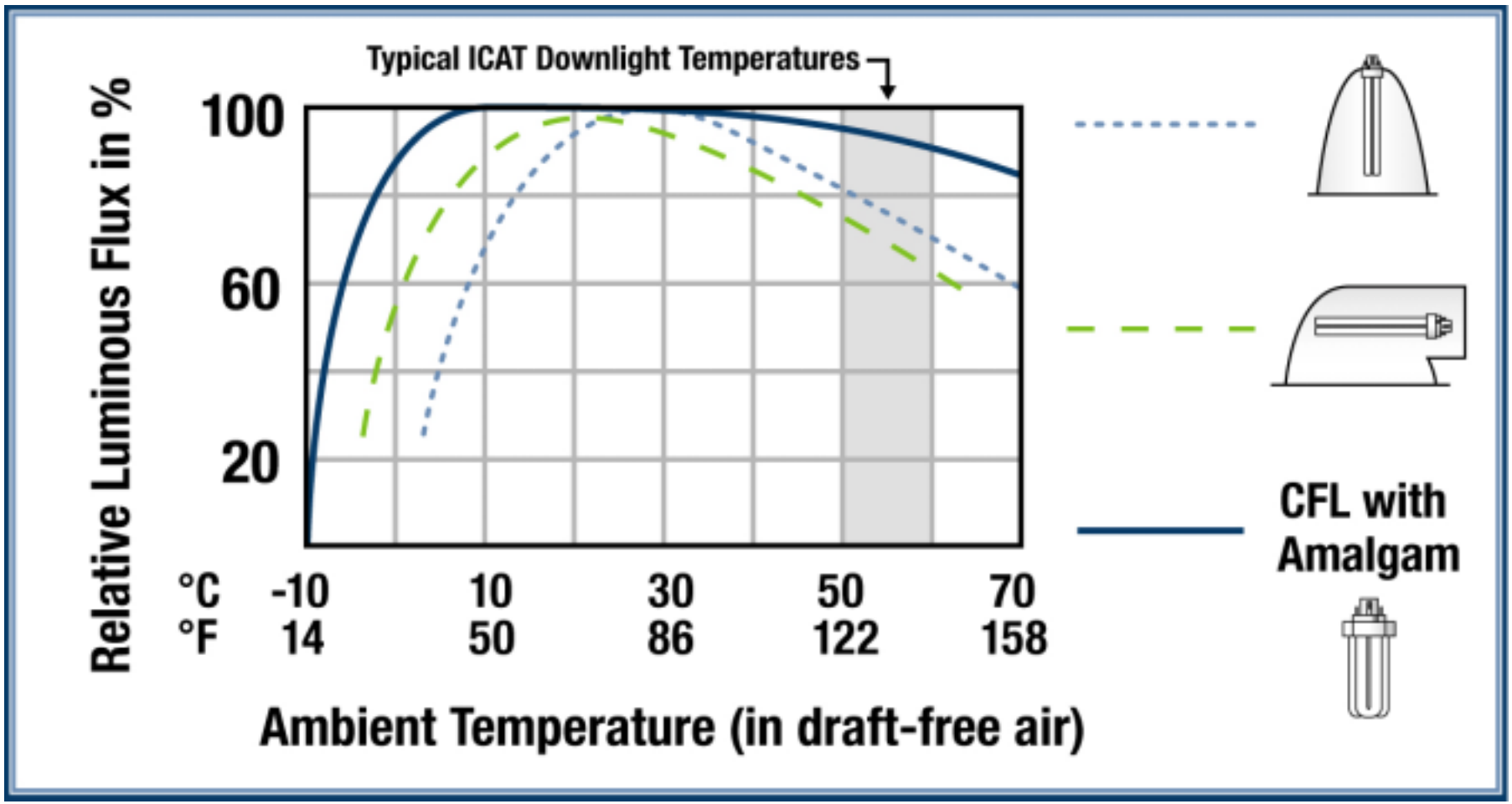
Key Changes in Version 4.0

- All R-CFLs tested base-up
- 50°C “Maximum Ambient Temperature Rating”
- Requirement for “Elevated Temperature” Testing
  - Initial Light Output
  - 1000-hour Lumen Maintenance
  - Lumen Maintenance at 40% of Rated Life
  - Rated Life Testing
- May use non-NVLAP facility if testing begins prior to Oct. 1, 2006

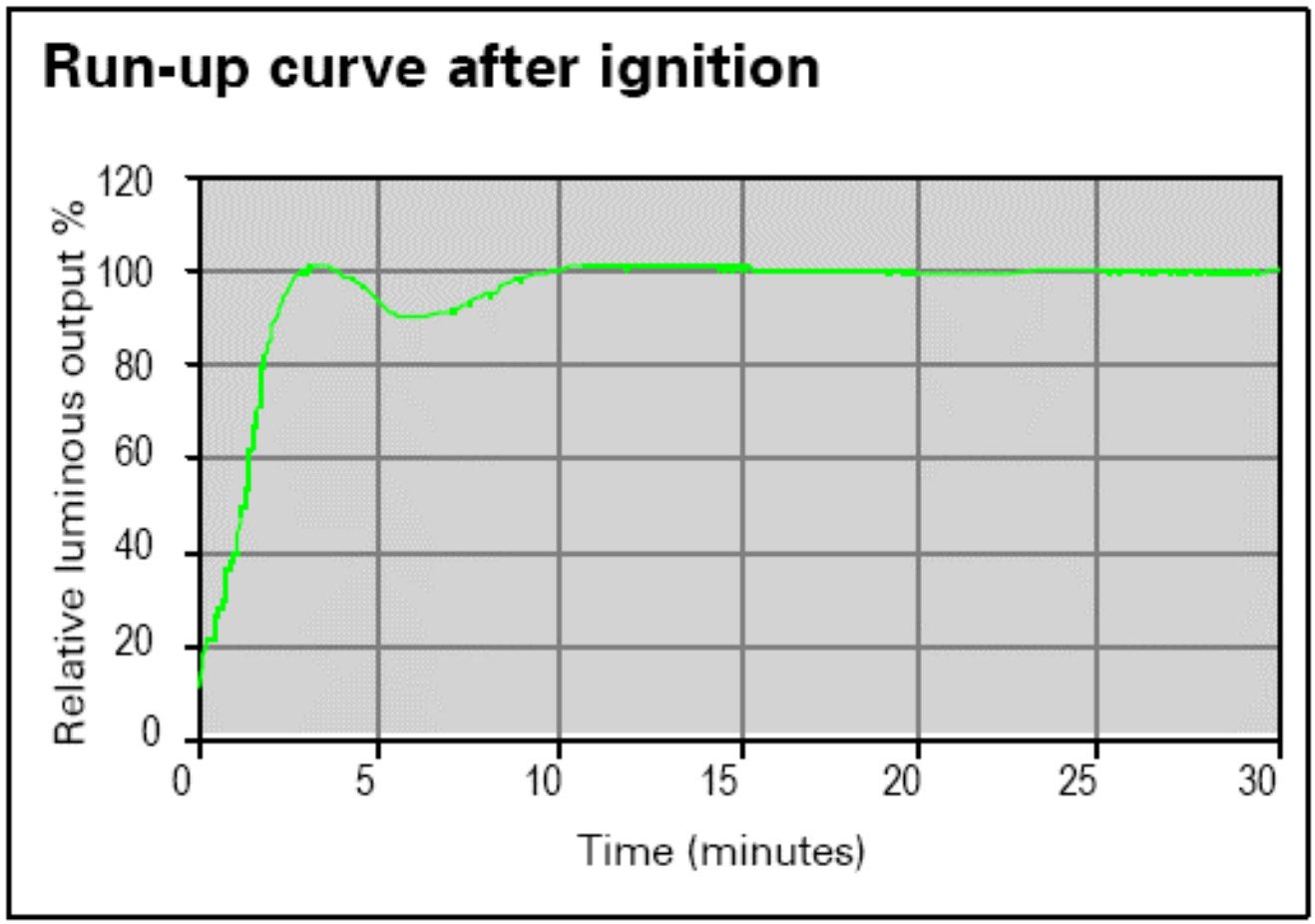
Initial Elevated Temperature Light Output

- Lamps must maintain 90% of their 25°± 5°C rated light output in the ICAT environment
- Determines a “Thermal Factor” for the lamp
- Uses a relative approach

Effect of Amalgam

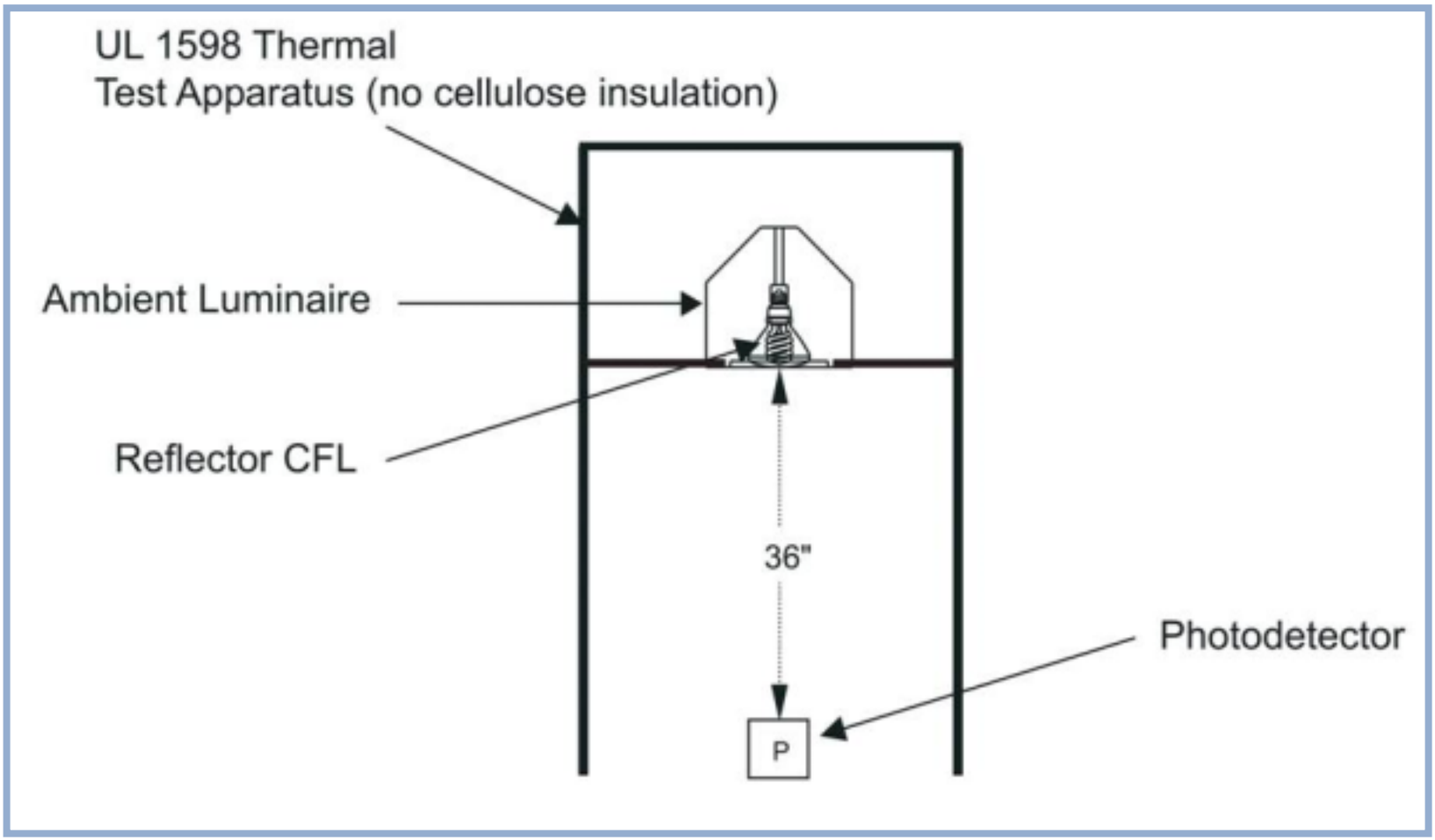


Amalgam Lamp Ramp-up

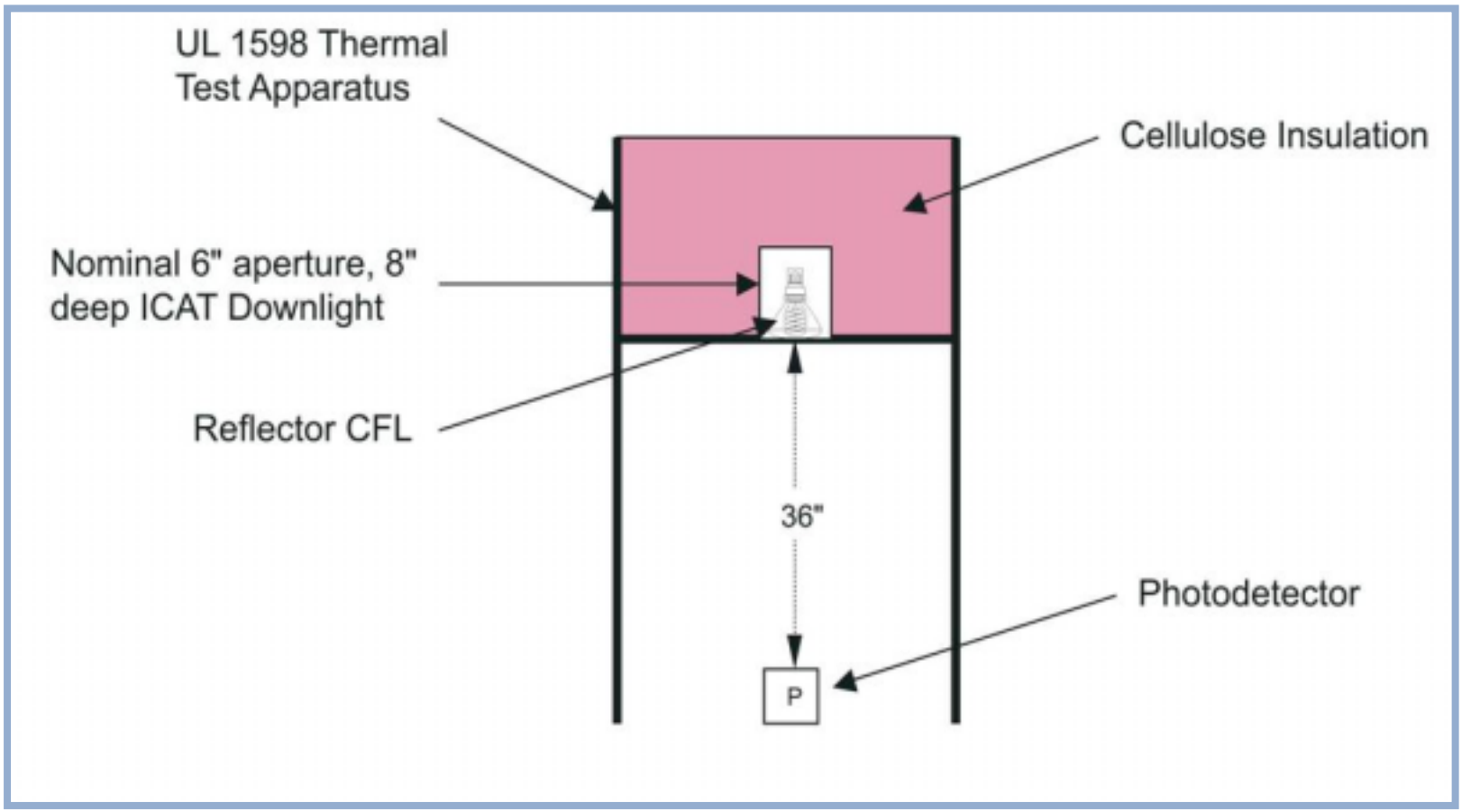


Courtesy of GE Lighting

The “Ambient” Luminaire Apparatus



The “IC-rated” Luminaire Apparatus



UL 1598 Standard for IC Rated Recessed Luminaires

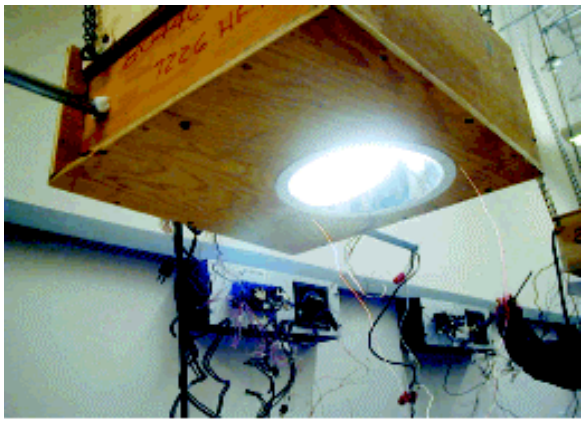


Photo 1. During UL 1598 luminary tests, temperatures are measured by means of thermocouples and suitable indicating devices.

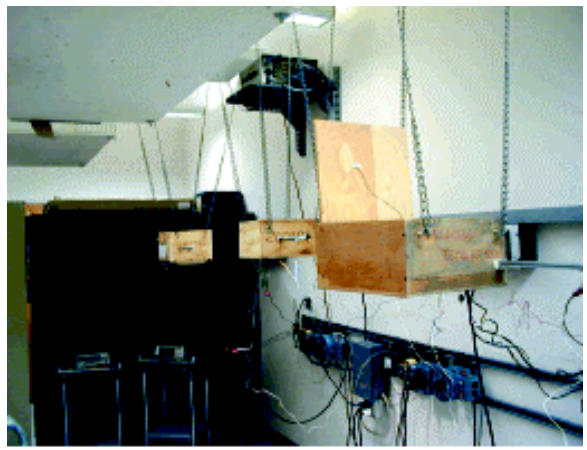


Photo 2. UL 1598 requires recessed luminaire to be tested in wood boxes having dimensions based on installation clearances allowed by National Electrical Code.

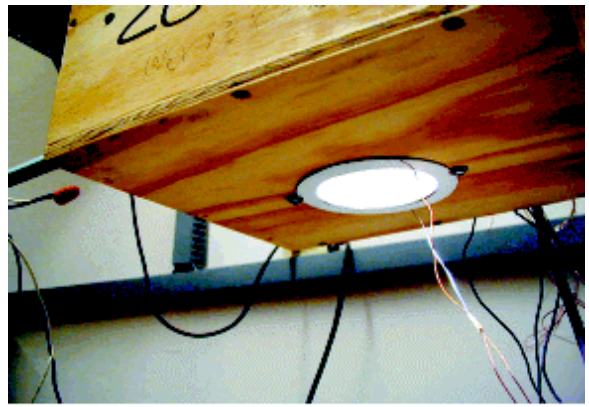
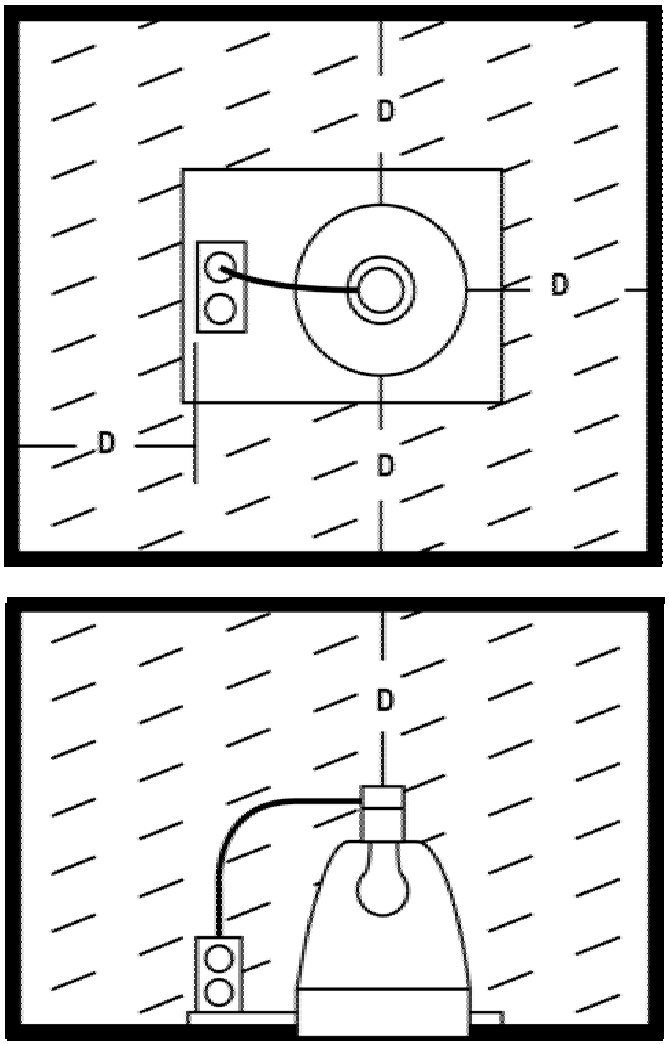


Photo 3. Temperatures of combustible building materials may not exceed 90°C

UL 1598 Test Apparatus Clearances



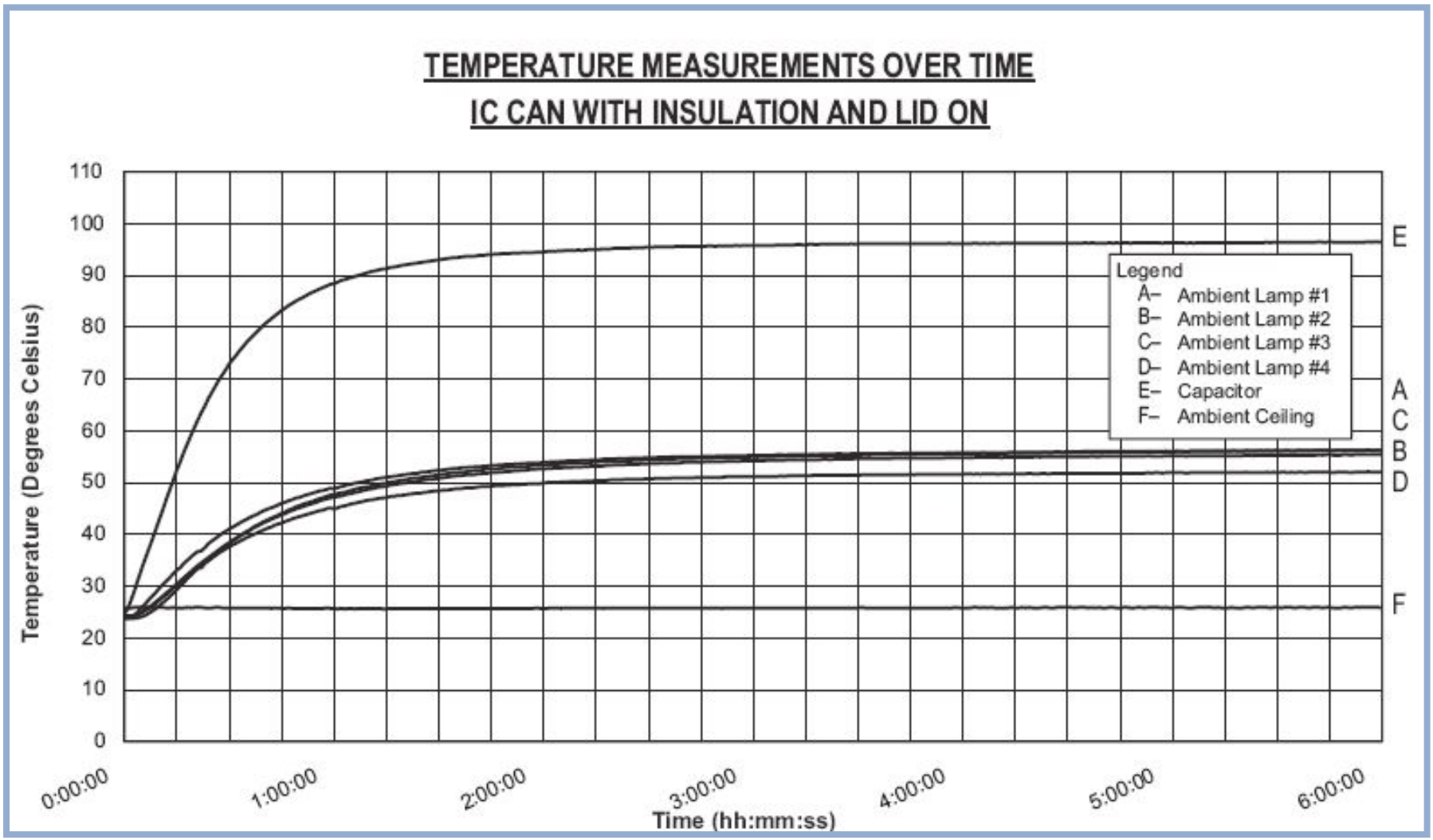
- D = height of housing
- Filled with cellulose insulation

Initial Elevated Temperature Light Output Apparatus

Initial Elevated Temperature Light Output Procedure

1. Install the lamp in the “ambient luminaire within the UL 1598 apparatus.
2. Apply the lamp’s nominal rated voltage to the system.
3. Allow the system to reach stabilization (60 minute period with less than 0.5 percent fluctuation.)
4. Record the photometric measurement at nadir.
5. Remove power from the system.
6. Install the IC Rated Luminaire and fill the apparatus with loose fill cellulose insulation to the levels specified in UL 1598.
7. Apply the lamp’s nominal rated voltage to the system.
8. After six hours, record the photometric measurement at nadir.
9. Record the operating temperature within the luminaire.
10. Remove power from the system

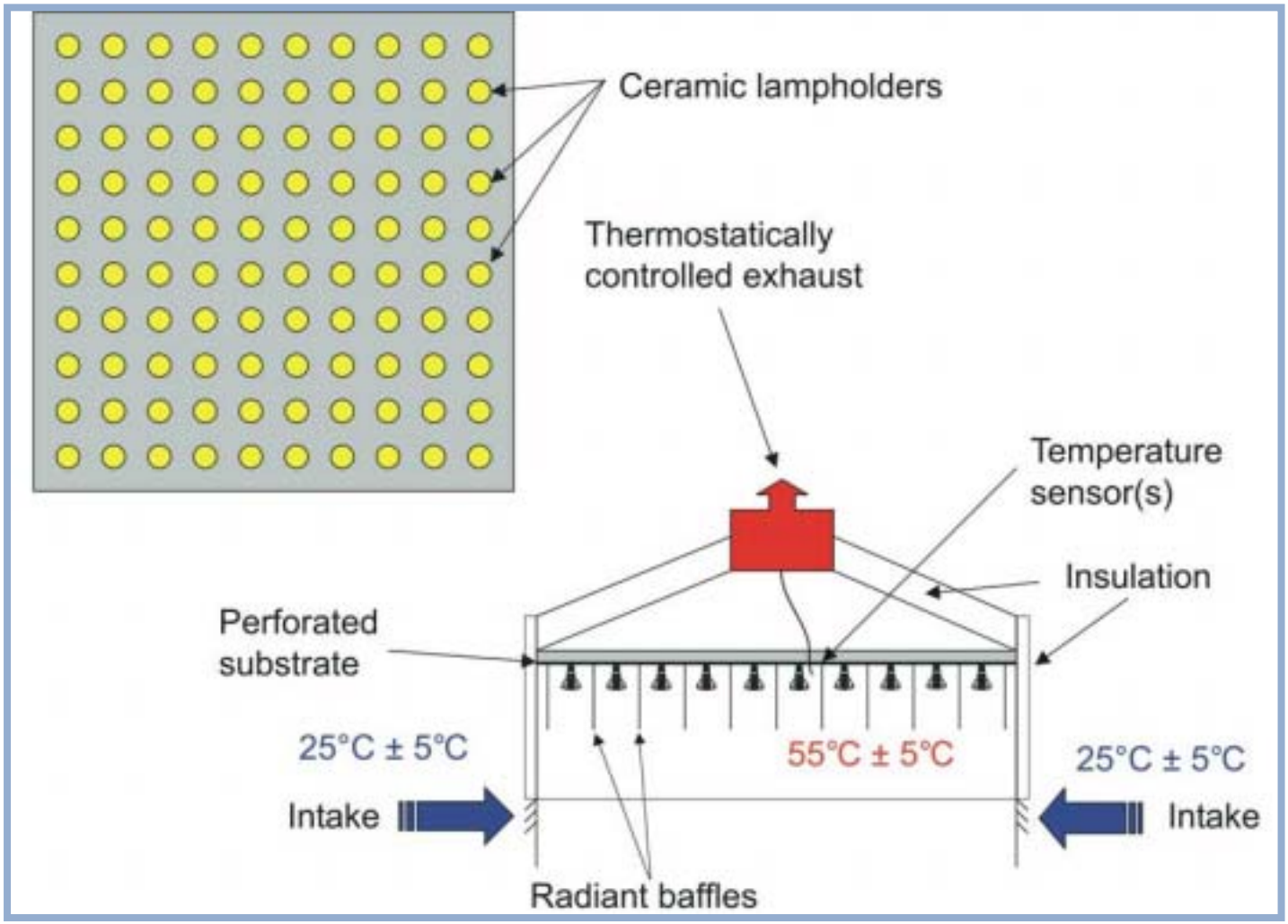
Sample Test Report



Elevated Temperature Testing

- Testing conducted at 55°± 5°C
- Standard test cycle 3 hrs. ON/20 min. OFF
- Uses a “relative” approach, i.e. a point illuminance

Elevated Temperature Test Apparatus



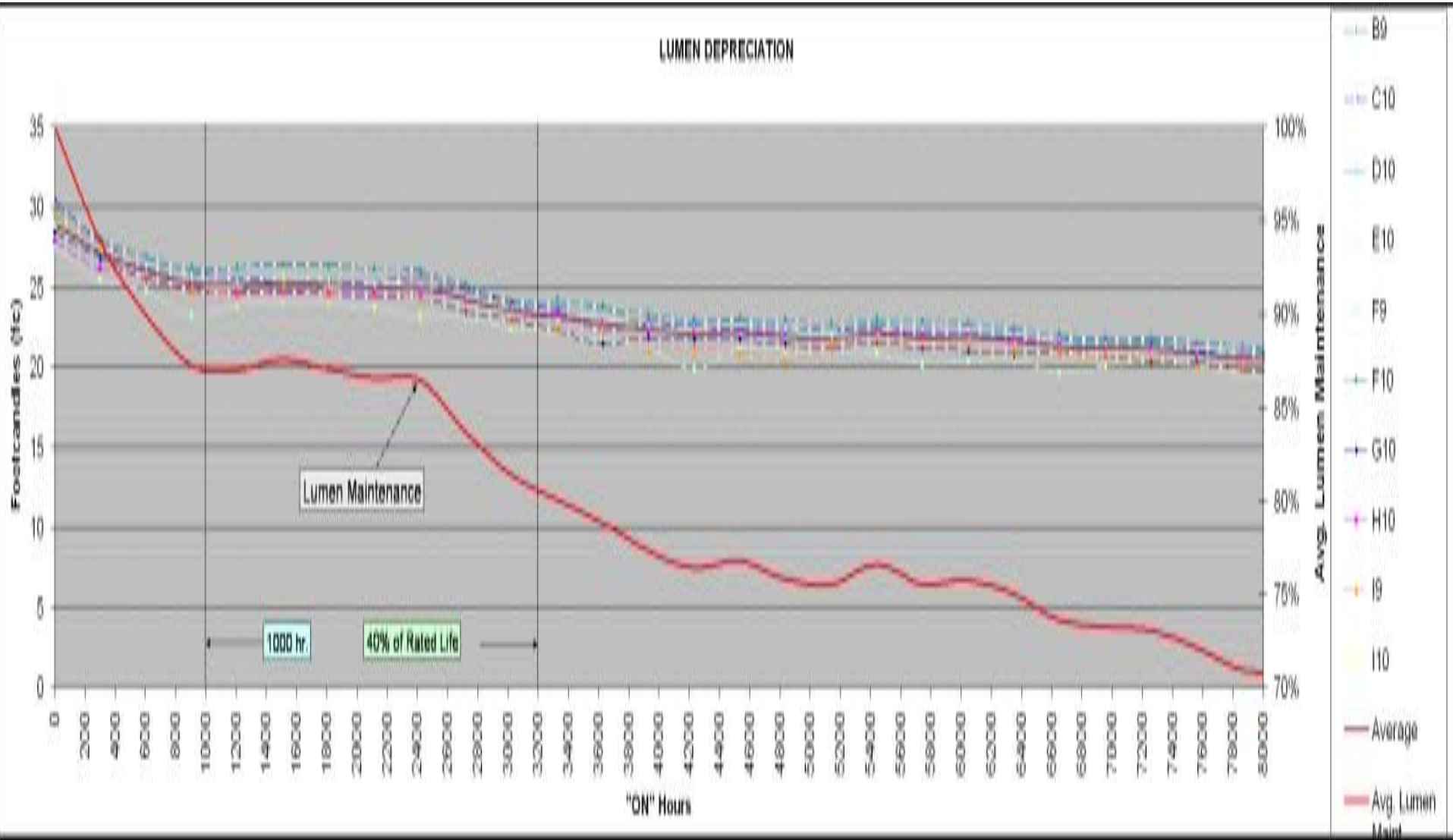
Elevated Temperature Test Apparatus

Elevated Temperature Test Apparatus

Elevated Temperature Test Procedure

1. Season ten (10) lamps
   - Internal 100 hrs.
   - External (79 hrs. external/21 hrs. internal)
2. At the 100-hour point, record the photometric measurement for each lamp. Establishes baseline illuminance.
3. Initiate 3 hours ON/20 minutes OFF cycle
4. At the 1000-hour point, record the photometric measurement for each lamp
5. At 40% of the lamps' rated life, record the photometric measurement for each lamp
6. Continue to monitor the lamps until rated life is achieved (the point of failure for 6 lamps)

Sample Test Report



Contact Information

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Questions?