

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460



OFFICE OF AIR AND RADIATION

July 1, 2003

Dear ENERGY STAR® Residential Lighting Fixture Partner:

On behalf of the U.S. Environmental Protection Agency (EPA), I would first like to thank you for your involvement and continued support of ENERGY STAR. By manufacturing ENERGY STAR qualified products, your company is showing its commitment to protecting the environment and manufacturing high quality products that meet strict energy and safety requirements and consumer expectations. The purpose of this letter is to inform you about a process EPA is initiating to ensure compliance with the ENERGY STAR Residential Light Fixtures (RLF) specification.

Recently, EPA has been made aware of some concerns regarding the quality and reliability of ENERGY STAR qualified residential light fixtures. Anecdotal reports of premature failures from industry, retailers, and consumers, along with EPA's interest in protecting the integrity of the ENERGY STAR label, has led us to the Lighting Research Center (LRC) and their research of durability issues. Over the last year EPA has participated in discussions with LRC and industry members regarding the development of a durability testing method for use in the ENERGY STAR RLF Eligibility Criteria. As a result of these discussions, and LRC's preliminary research, EPA has determined that closer scrutiny of the Maximum Ballast Operating Case Temperature for Optimal Performance requirement is warranted. As a reminder, the ENERGY STAR specification requirement for maximum ballast operating case temperature is either $\leq 90^{\circ}\text{C}$ or a temperature not to exceed ballast manufacturer requirements, whichever is lower.

It is becoming increasingly clear that heat is a likely cause of premature failure in fluorescent fixtures, especially in recessed and ceiling flush mount applications. Compact fluorescent, electronic ballasts are particularly susceptible to failure due to elevated temperatures. When placed inside recessed and ceiling flush mount fixtures the ballast case can reach very high temperatures, which reduces the load life of the capacitor; thus compromising ballast performance and causing premature failure. In EPA's opinion, it is in the best interest of any manufacturer to test the temperatures within their products, since this will identify overheating conditions that will undermine product durability and long-term performance and affect long term consumer acceptance of fluorescent technologies.

For the above stated reasons and to maintain the integrity of the ENERGY STAR label, **EPA announces its intent to request manufacturers of recessed and ceiling flush mounted indoor fixtures to submit a laboratory test report that shows compliance with the Maximum Ballast Operating Case Temperature for Optimal Performance requirement.** Manufacturers contacted by EPA will be given 60 days to submit the required test report from the date the written request is made. **Failure to comply with these requirements or failure of products to meet with the durability requirements could result in de-listing of these products from the ENERGY STAR Web site.**

In an effort to focus on high-risk fixtures, EPA has determined that initially only some subset of electronically ballasted, compact fluorescent recessed and ceiling flush mount fixtures will require laboratory test reports. A letter will be sent to individual manufacturers in early July with a request for manufacturer laboratory test reports for specific ENERGY STAR models. EPA developed a Standard Operating Procedure (SOP), attached, that describes exactly what is expected of both manufactures and EPA during this process.

Existing laboratory test reports demonstrating that the ballast operating case temperature meets the ENERGY STAR specification will be accepted. If no existing test report is available, then the manufacturer should use LRC's "Proposed Durability Testing Method: Temperature" as guidance to ensure that the laboratory test reports you supply meet the requirement of the ENERGY STAR specification. LRC's durability testing method for temperature utilizes UL testing apparatus to measure the ballast case operating temperature. It is important to note, however, that the location of the thermal probes and the maximum allowable ballast operating case temperatures required for the heat test are different than those required in the UL safety testing. The temperature of the ballast case should be taken at the "hot-spot" locations for performance as indicated by the ballast manufacturer. If the maximum ballast operating case temperature and hot-spot locations cannot be obtained from the ballast manufacturer, measurements should be completed in accordance with the LRC's "Proposed Durability Testing Method: Temperature". The LRC testing method for temperature can be accessed at: www.lrc.rpi.edu/programs/lightingTransformation/pdf/durabilityTestingFinalReport.pdf.

While EPA is requesting testing documentation at this time only for high risk fixtures for heat build-up, it is important to note that **all qualified indoor fixtures are expected to meet the Maximum Ballast Operating Case Temperature for Optimal Performance requirement**. This includes all single ended fluorescent light fixtures including those that may be exempt from UL1598.

If you have any questions about the submission of this durability data, please contact me at 202-564-6246 or Shiller.david@epa.gov.

Thank you in advance for your cooperation and, as always, for your support of ENERGY STAR.

Sincerely,



David Shiller, Product Manager
ENERGY STAR for Residential Light Fixtures

ENERGY STAR® Standard Operating Procedure: Submission of Maximum Ballast Operating Case Temperature for Optimal Performance Laboratory Test Report(s)

Purpose: To ensure the quality of ENERGY STAR qualified residential lighting fixtures as it relates to durability.

I. Data Request and Response:

1. EPA will determine which fixture type(s) it wishes to collect performance data on and send those ENERGY STAR Residential Light Fixture (RLF) partners a letter requesting manufacturer laboratory test reports that show compliance with the ENERGY STAR specification requirement for Maximum Ballast Operating Case Temperature for Optimal Performance. This letter will list the specific high risk (in terms of heat build-up) fixture models for which manufacturer laboratory test reports will need to be supplied.
2. Each RLF partner must submit a manufacturers laboratory test report within 60 days of receipt of the letter.

II. Data Requirements and Requested Format:

For products submitted under the Version 3.1 RLF specification, EPA will accept existing laboratory test results in accordance with UL 1598. For those products that do not have existing testing documentation, manufacturers will be required to submit a test report to EPA according to the following requirements:

1. At least one test must be completed for each fixture model listed in the letter.
2. The laboratory test report may come from one of the following: 1) "In-house" fixture manufacturer laboratory; 2) lamp or ballast manufacturer laboratory; 3) third party independent laboratory.
3. Provide the ballast manufacturer's data that describes the maximum allowable case temperature for performance and the "hot-spot location". **Note:** This data must be supplied from the ballast manufacturer; partner can attach this information to the manufacturer laboratory test report.
4. The following data must be supplied in the manufacturer laboratory test report:
 - a. Description of the testing method (reference applicable standards).
 - b. Description of the equipment used (reference applicable standards).
 - c. Maximum ballast operating case temperature for performance when tested inside the fixture. Indicate thermocouple locations. **Note:** The temperature of the ballast case should be taken at the "hot-spot" locations for performance as indicated by the ballast manufacturer. If the maximum ballast operating case temperature and hot-spot locations cannot be obtained from the ballast manufacturer, measurements should be completed in accordance with LRC's "Proposed Durability Testing Method: Temperature".
 - d. Name of organization and engineer, along with signature, that conducted the test.

5. If available, include photograph(s) of fixture(s) mounted on the testing apparatus.
6. Fixture manufacturers should follow LRC's "Proposed Durability Testing Method: Temperature" in all cases. This is attached for reference.

III. EPA Data Review:

1. Upon receipt, EPA will review data and notify partners of next steps within 14 days. The review cycle will not begin until all necessary documentation has been provided by the RLF partner.

IV. Procedure for Products That Meet Maximum Ballast Operating Case Temperature for Performance Requirements:

1. If test report proves acceptable, EPA will notify the partner in writing. No further action will be required.

V. Procedure for Products that Exceed Maximum Ballast Operating Case Temperature for Performance Requirements:

1. EPA will contact the partner in writing to obtain clarification on the test results and identify discrepancies. At this time, EPA will also request a corrective action plan and any additional supporting documentation or data, all of which must be submitted by the RLF partner within 30 days of receiving the EPA letter of notification.
2. EPA will review the corrective action plan and any additional information submitted by the partner within 7 days of receipt of all requested documentation. If the product continues to be non-compliant, it will be **de-listed for up to six months so the partner can make necessary improvements**. The partner will be notified of this de-listing via written notification.
3. Anytime within this six-month period, a partner may resubmit products for ENERGY STAR re-qualification.
4. If the partner fails to submit or follow the corrective action plan as agreed within this six-month period, the product(s) will be removed from the ENERGY STAR Web site, indefinitely. (see Section VI, below)
5. Partners whose products are repeatedly found to be in violation of the specification will be terminated from the ENERGY STAR program.

VI. Procedure for Manufacturers That Fail to Provide Maximum Ballast Operating Case Temperature for Performance Test Report:

1. If, after 60 days the partner has not yet provided EPA with the requested information, a second letter will be sent notifying the partner that the product(s) will be de-listed unless the laboratory test report is submitted within 21 days.
2. If EPA receives no response by the end of the 21-day deadline, all products in question will be de-listed from the ENERGY STAR Web site.

LRC's Proposed Durability Testing Method: Temperature¹

Testing location

Testing shall be conducted in a room with ambient temperature of 25°C ±5°C.

Apparatus

Underwriters Laboratory (UL) has established a thermal testing procedure and apparatus for safe operation of electric fixtures. The apparatus construction techniques for ENERGY STAR durability testing should follow those described in UL 1598 for normal temperature testing, but thermocouple locations will be different than the ones required by UL.

Procedure

- a. Fixtures shall be connected to the apparatus in the manner described in UL 1598.
- b. Thermocouples will be placed on the ballast in the locations indicated by ballast manufacturer. This information should be listed in the NEMA/ALA matrix, and/or clearly marked on the ballast, and/or clearly stated in the ballast manufacturer's literature (printed or website). If more than one location is indicated, temperature measurements are to be made in every location.
- c. Maximum allowable temperature (for ballast performance) at the location indicated by the ballast manufacturer shall be indicated by the ballast manufacturer. This information shall be listed in the NEMA/ALA matrix, and/or clearly marked on the ballast, and/or clearly stated in the ballast manufacturer's literature (print or website). If none of the sources cite this information, the manufacturer should assume that the maximum allowable temperature at the indicated location on the ballast is 65°C.
- d. Stabilization time shall be a minimum of 7.5 hours. Fixtures must be turned on inside the testing box for a minimum of 7.5 hours before any measurements are taken.

¹ Note: The "Proposed Durability Testing Method: Temperature" is a modified version of LRC's proposed testing method. Steps 1, 2, and 6 were removed because the information is redundant to what is included in the Standard Operating Procedure (SOP). A full version of the testing method can be found in Appendix I of the LRC Durability Testing report that can be accessed at:
<http://www.lrc.rpi.edu/programs/lightingTransformation/pdf/durabilityTestingFinalReport.pdf>