U.S. Department
of Transportation

**Federal Aviation Administration**

# Advisory Circular

**Subject:** AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM

**Date:** Draft

**Initiated by:** AAS-100

**AC No:** 150/5345-53C

**Change:**

**1. PURPOSE.** This advisory circular (AC) describes the Airport Lighting Equipment Certification Program (ALECP). It provides information on how an organization can get Federal Aviation Administration (FAA) acceptance as a third party certification body (third party certifier) and how manufacturers may get equipment qualified under the program. It includes a list of the equipment that are certified under the program. This AC does not impose requirements or mandate participation in the ALECP by any party. This revision to the AC is intended to clarify the criteria that FAA will use to determine whether a certification body qualifies for participation and how equipment may be qualified.

**2. CANCELLATION.** AC 150/5345-53B*, Airport Lighting Equipment Certification Program*, dated October 23, 1998, is cancelled.

**3. BACKGROUND.** Until December 31, 1989, the FAA administered the Airport Lighting Approval Program under the Federal airport grant programs. Under this program the FAA inspected equipment to confirm that it met FAA standards and to ensure quality control. The program was discontinued as of December 31, 1989, as a result of declining FAA resources. The listing of equipment in AC 150/5345-1, *Approved Lighting Equipment*, was no longer maintained.

On January 1, 1990, a new program was established which named a commercial testing laboratory under the oversight of an Industry Technical Advisory Committee (ITAC), as the program certification body. On May 15, 1995, the FAA, realizing that there were additional commercial laboratories that may want to participate as certification bodies instituted and established the Airport Lighting Equipment Certification Program (ALECP). This program provided that any commercial laboratory meeting certain criteria may participate as a certification body and provided for FAA oversight and acceptance of certification bodies.

Under the ALECP, the FAA has established a list of accepted certification bodies. The certification bodies evaluate and certify airport lighting equipment and license suppliers to mark qualifying products. The FAA maintained a list of certified equipment as part of the AC Addendum. This list was provided to assist airport sponsors in discharging their duty to determine that equipment met the applicable FAA specifications, which is required for eligibility for funding under Federal grant assistance program for airports and to assist the general public in identifying equipment meeting FAA requirements specified in referenced Advisory Circulars

This AC, as a continuing refinement of the ALECP, institutes and establishes a recertification requirement for the equipment under ALECP (Appendix 2) and a list of the type of equipment with their applicable ACs that are under this program (Appendix 3). The FAA maintains on the Internet lists of currently certified equipment, of manufacturers' addresses, and of third party certifiers that can be used.

**INTERNET ACCESS**. This AC, the latest certified equipment list, the address list of certified airport lighting equipment manufacturers, and list of third party certifiers are available on the Internet at http://www.faa.gov/airports_airtraffic/airports/. From the Airports page, select "Advisory Circulars," and continue to "AC 150/5345-53C Addendum."

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Director of Airport Safety and Standards

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# AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM

**1. GENERAL.** The FAA has established the Airport Lighting Equipment Certification Program. Third party certification bodies found acceptable to the FAA implement this program. The program is primarily intended for equipment funded under the FAA airport grant program. The purpose of the program is to assist airport sponsors in discharging their duty to ensure that airport lighting equipment meets the applicable FAA standards for safety, performance, quality, and standardization.

**2. COSTS.** The program is funded entirely by fees paid by participating manufacturers. The fee schedule may be obtained from the third party certification body(s) listed in Appendix 1.

**3. PROCEDURES.** Manufacturers of lighting and visual aids equipment that desire to participate in the program may select any third party certification body from the list contained in Appendix 1, Third Party Certification Bodies. An exclusive licensing agreement, as outlined in Appendix 2, paragraph 4, detailing the relationship between the manufacturer and the third party certification body and their respective responsibilities is then developed. A procedural guide as outlined in Appendix 2, paragraph 5, supplements the license agreement and describes the operational aspects of the program. The third party certification body under the procedures contained in Appendix 2, Third Party Certification Program and Procedures evaluates equipment. The manufacturer is issued a Certificate of Conformance by the third party certifier for each type of equipment that meets the applicable FAA standards. A copy of each Certificate of Conformance shall be submitted to the FAA by the third party certification body. On a monthly basis, the certified equipment will be added to Appendix 3 in the Addendum of this Advisory Circular, under the Internet home page for FAA Airports. Copies of this file may be obtained from the FAA Airport Engineering Division or from FAA Regional Airports and District/Field Offices (http://www.faa.gov/airports_airtraffic/airports/regional_guidance).

**4. THIRD PARTY CERTIFICATION BODY.** In addition to administering the qualification program in accordance with this AC a third party certification body must assure that the manufacturer provides and maintains a quality control system in accordance with FAA-STD-013, *Quality Control Program Requirements*, or suitable alternative, such as the ISO 9000 family of standards or Department of Defense quality standards. It must also assure that testing laboratories that perform qualification testing conform to the requirements of the International Organization for Standardization/ International Electrotechnical Commission (ISO/IEC) Guide 17025, "General Requirements for the Competence of Testing and Testing Laboratories."

**5. ACCEPTANCE CRITERIA.** An independent testing laboratory may become an FAA accepted third party certification body if it demonstrates conformance with the American National Standards Institute (ANSI) Z34.1, Third Party Certification Programs, for Products, Processes, and Services, and:

**A.** complies to FAA sponsored audit under the requirements of this AC;

**B.** demonstrates the ability and competency to perform required testing in the areas of electrical, mechanical, environmental, and photometry;

**C.** has been in operation as a third party certification body for a minimum of 3 years;

**D.** has a permanent assigned staff, knowledgeable in photometrics, if required for the scope of services offered and other disciplines related to testing and quality control;

**E.** is under the supervision of a professional (Bachelor of Science Degree in related field; i.e., engineering, physics, physical science, etc.) with a minimum of 4 years experience in interpreting testing standards/specifications, test methods; and evaluating test reports and quality assurance programs.

**6. APPLICATION.** In order to be listed as a third party certification body, the certification body must agree to undergo an assessment to determine if it qualifies. The FAA will provide application information upon request. Requests should be submitted to:

Federal Aviation Administration
Airport Engineering Division, AAS-100
800 Independence Ave., SW
Washington, DC 20591

The following information must be submitted with the application:

**A.** summary of background as a third party certification body;

**B.** documentation confirming the laboratory has competency in testing in related disciplines (ANSI report, etc..);

**C.** resumes of permanent staff members who will be assigned to the certification program;

**D.** draft copy of procedural guide and licensing agreement for the Airport Lighting Equipment Certification Program. A schedule of fees does not have to be included in the licensing agreement.

**7. INSPECTION OF FACILITIES.** Each participating third party certification body must agree to make facilities and program records available to ANSI for an initial compliance audit, and scheduled audits thereafter with reports including compliance with this AC to be provided to FAA. The FAA reserves the right to accompany ANSI during the visit to the third party certifier for review of its program. The FAA also reserves the right to accompany the third party certification body to a manufacturer's facility or testing laboratory to witness qualification tests, quality assurance audits, site production tests, or inspections.

**8. LETTER OF ACCEPTANCE.** If the FAA determines that the third party certification body conforms to all criteria, a letter of acceptance will be issued to that body and they will be listed as stated in Appendix 1. A letter of acceptance by the FAA is valid for a period of 2 years. A third party certification body that wishes to continue in the program shall reapply by resubmitting the information called for in paragraph 6 above, and demonstrate successful compliance of scheduled audit. However, should a third party certifier make any changes in their program prior to that time, the FAA is to be notified and changes approved before said changes are implemented. Any questions concerning this program or the operation of any of the accepted third party certification bodies should be sent to:

Federal Aviation Administration
Airport Engineering Division, AAS-100
800 Independence Ave., SW
Washington, DC 20591

**9. THIRD PARTY CERTIFICATION PROGRAM.** Manufacturers of airport lighting equipment may request to participate in a third party certification program, be licensed by the third party certifier, and use a Certificate of Conformance as evidence that the Qualifying Equipment has been evaluated, tested to and meets the provisions of Appendix 2 of FAA AC 150/5345-53 (current revision) "Third Party Certification Program and Procedures". Products certified in the Program are included in the list of FAA "Certified Airport Equipment" in Appendix 3 in the Addendum of AC 150/5345-53 published by the FAA. Manufacturers submitting products for qualification must have a representative in North America to provide aftermarket services to purchasers of the equipment.

Requirements of Appendix 2 "Third Party Certification Program and Procedures" include:

**A. PROCEDURAL GUIDE.** The Procedural Guide describes the operational aspects of the third party certification program, the relationship between third party certifier and manufacturer, and the equipment qualification procedures.

**B. LICENSE AGREEMENT.** The licensing agreement details the relationship between the manufacturer and the third party certifier, and their respective responsibilities in the program. A schedule of fees for participation in the program, including at a minimum the yearly Administrative Services fee and fees for quality control review and witnessing of tests will be part of the agreement.

**C. EQUIPMENT QUALIFICATION** Manufacturers' equipment qualification tests must be conducted in accordance with guidelines of Appendix 2, "Third Party Certification Program and Procedures."

**D. CERTIFICATE OF CONFORMANCE**. The third party certifier will issue a Certificate of Conformance to a licensed manufacturer upon successful equipment qualification. The Certificate of Conformance must be representative of the sample shown in Appendix 7.

**10. CHALLENGE PROCEDURE: INTER-PROGRAM MANUFACTURERS.** In the event the performance and/or design of a certified manufacturer's product is challenged by a manufacturer licensed by another third party certification body, the process below will be followed. The third party certifiers and FAA will maintain the confidentiality of each manufacturer. The costs associated with the challenge process are not the responsibility of the FAA, the challenger or the challenger's third party certifier.

**A.** The challenging manufacturer must submit to their third body certifier supporting documentation--outlining details of the challenge including applicable test data. The documentation must

specify the section(s) of the applicable specification being challenged.

**B.** The challenger's third party certifier will evaluate the documentation and applicable test data to determine if the documentation supports the challenge. If the third party certifier determines that the supporting documentation is not sufficient, that data supplied with support documentation requires retesting with a witness, or additional testing is required, the third party certifier will notify the challenger. Costs associated with further activities are the responsibility of the challenger.

**C.** The third party certifier must submit a documentation package to the FAA.

**D.** Within 10 business days of submission to the FAA, the FAA will notify the challenged manufacturer's third party certifier; and forward submitted documentation to the challenged manufacturer's third party certifier.

**E.** Within 60 business days of notice by the FAA, the challenged manufacturer's third party certifier must submit to the FAA verification that the challenged product has been determined to be in compliance with the requirements of the applicable Advisory Circular and any related provisions of this AC. Activities culminating in data associated with the challenge are coordinated between the challenged party and their third party certifier.

**F.** If the product is found to be non-compliant, notification to rescind the product certification and/or details of corrective action plan will be submitted by the challenged manufacturer's third party certifier to the FAA. The challenged manufacturer's third party certifier must contact the challenged manufacturer and direct appropriate changes be made to all applicable support documentation, advertising media and websites

**G.** The FAA will forward disposition documentation to the challenger's third party certifier.

**H.** The challenger's third party certifier will notify the challenger only of the completion of the challenge. Details of the challenge disposition may not be revealed to any party other than the third party certifiers and the FAA.

**11. CHALLENGE PROCEDURE: THIRD PARTY CERTIFICATION BODY.** If the FAA receives documentation from a third party certification body to support that another third party certification body is not performing in accordance with the minimum criteria of this AC, the FAA will notify the challenged party and investigate the charges. If the challenge is upheld, and the third party certifier is not performing in accordance with the criteria set forth in this Advisory Circular, at the end of 30 days, the FAA reserves the right to withdraw the letter of acceptance.

**12. REVISION OF SPECIFICATIONS.** The FAA may, at times, revise the specification for a particular equipment to reflect changing needs of aviation or of new technology. The process of specification revision is intended to allow for constructive interaction between the FAA and other affected parties.

**A.** The process of specification revision is generally as follows:

**i.** The FAA distributes a draft revised Advisory Circular to allow for comment from third party certifiers, certified manufacturers and selected users of the equipment.

**ii.** Once the FAA has received comments, either a meeting of affected parties is scheduled for discussion of comments or resolution will be by direct communication based on the changes requested.

**iii.** The FAA distributes a second draft to all parties and posts it on the Internet for general comment from the public. Certified manufacturers in the program are advised of the posting.

**iv.** Once the FAA has considered all comments, FAA releases the new revised equipment specification as a new revised Advisory Circular.

**v.** The Advisory Circular will contain an effective date, normally 6 months from date of issue, at which time the prior equipment certification automatically expires unless the manufacturer has been requalified to the revised specification. Manufacturers will be informed by the FAA by letter and supplied a copy of the revised specification.

**B.** If a manufacturer has a form of new airport lighting technology to be considered for inclusion in a particular Advisory Circular, the following process is to be followed:

**i.** The manufacturer must coordinate with a third party certification body to determine the

level of compliance with the existing Advisory Circular.

**ii.** The manufacturer/third party certifier must submit to the FAA the proposal for inclusion of the new technology into the Advisory Circular, including a detailed explanation of proposed changes.

**iii.** If the FAA determines that a revision to the Advisory Circular is required, the process listed in paragraph 12A above will be followed.

**13. WITHDRAWAL OF LETTER OF ACCEPTANCE.** In the event the third party certification body does not meet the criteria of this Advisory Circular, the FAA reserves the right to withdraw the letter of acceptance. A third party certifier may reapply for reinstatement after 3 months.

**14. LISTING OF CERTIFIED AIRPORT LIGHTING EQUIPMENT.** A listing of equipment that has been certified by third party certification bodies will be published on a monthly basis by the FAA under the Internet home page for Airports as an Addendum file to this Advisory Circular. FAA will update Appendix 3 of the Addendum only upon notification from the third party certifier.

This AC, the latest certified equipment list, the address list of certified airport lighting equipment manufacturers, and the list of third party certifiers are available at http://www.faa.gov/airports_airtraffic/airports/. From the Airports page, select "Advisory Circulars" and continue to "AC 150/5345-53C Addendum."

# APPENDIX 1. THIRD PARTY CERTIFICATION BODIES.

The Third Party Certification Bodies (Third Party Certifiers) meeting the requirements contained in this Advisory Circular and accepted are listed in Appendix 1in the Addendum to the AC on the Internet (see prior paragraph 14).

# APPENDIX 2. THIRD PARTY CERTIFICATION PROGRAM AND PROCEDURES.

**1. BASIS OF QUALIFICATION PROGRAM.** The purpose of the qualification program is to provide airport operators with a list of equipment that meets the required standards for safety, performance, quality, and standardization. Manufacturers of lighting and visual aids equipment that desire to participate in the program may select any third party certification body from the list contained in Appendix 1 in the Addendum Third Party Certification Bodies. Manufacturers of airport lighting equipment may request to be approved by a third party certifier and use a Certificate of Conformance as evidence that the Qualifying Equipment has been tested to and meets the requirements of this Appendix, "Third Party Certification Program and Procedures". Products certified in the Program are included in the list of FAA "Certified Airport Equipment" in Appendix 3 in the Addendum of this AC.

**2. THIRD PARTY CERTIFIER'S ROLE.** A testing laboratory accepted by the Federal Aviation Administration (FAA) as a third party certification body as defined in this Advisory Circular evaluates and certifies airport lighting equipment for manufacturers. The third party certification body, under the procedures contained in the Procedural Guide, evaluates equipment. The manufacturer is issued a Certificate of Conformance by the third party certifier for each type of equipment that meets the applicable FAA standards. A copy of each Certificate of Conformance must be submitted to the FAA by the third party certification body. FAA accepts this Program, and products qualified under this Program will be subsequently listed as certified equipment in Appendix 3 in the Addendum of this AC. The third party certification body may also serve the function of a testing laboratory when necessary or when requested by the manufacturer.

**3. PARTICIPANT'S ROLE.** The manufacturer must certify to the third party certifier by notarized affidavit that the equipment initially and continuously meets all provisions of the applicable FAA Advisory Circular. Any manufacturer of airport lighting equipment may participate by satisfying all program requirements and signing an exclusive license agreement with a third party certifier and paying the appropriate schedule of fees. The program is funded entirely out of fees paid by the manufacturers. A principal feature of the program is that it is accepted by the Federal Aviation Administration as a means of meeting equipment certification requirements. Manufacturers are subject to a quality audit and twice yearly quality assurance inspections by the third party certifier. Manufacturers submitting products for qualification must have a representative in North America to provide aftermarket services to purchasers of the equipment.

**4. LICENSE AGREEMENT.** An exclusive licensing agreement details the relationship between the manufacturer and the third party certification body and their respective roles. It is the responsibility of each manufacturer/participant to conduct its business related to a certified product in a manner which is consistent with the pertinent FAA Advisory Circular and the provisions of the Procedural Guide and License Agreement for this certification program. The Procedural Guide supplements the License Agreement.

Prior to entering into a License Agreement with an equipment manufacturer and issuance of the Certificate of Conformance, an initial quality audit in accordance with FAA-STD-013, "Quality Control Program Requirements," or suitable alternative, of the manufacturer and all manufacturing facilities must be performed by the third party certifier.

**A.** Any manufacturer of airport lighting equipment within the scope of the FAA Advisory Circular 150/5345 series may participate by satisfying all program requirements, including demonstrating that equipment produced is eligible for qualification. Upon entering the program, an initial facility audit will be scheduled. The facility audit must include a review of the manufacturer's Quality Control Program.

**B.** Each manufacturing facility of the Licensee must be licensed individually (except for multiple operations under the same control located in the same city or within 30 miles of each other), and equipment therefrom tested, inspected and certified separately and apart from equipment manufactured in other facilities or branches of any Licensee.

**5. PROCEDURAL GUIDE.** The Procedural Guide supplements the License Agreement, describes the operational aspects of the third party certification program, and details the manufacturer requirements and equipment qualification process.

**A. EQUIPMENT QUALIFICATION REQUEST.** Only complete systems of airport lighting equipment conforming to all the requirements of the applicable Advisory Circular(s) may be certified. No individual components of

these systems may be considered for certification. Request for equipment qualification shall be submitted in writing to a third party certifier listed in Appendix 1 of this Advisory Circular. At a minimum, this request must include the following:

**i.** A list of the types, classes, styles, and sizes of equipment, along with the manufacturer's catalog number(s) for which qualification certification is requested. Manufacturer's catalog numbers must be representative of specific equipment certified and not a series of equipment. A list of equipment options should also be included when so specified in individual equipment specifications.

**ii.** Engineering assembly and schematic drawings of the equipment to permit determination of adherence to specification design requirements.

**iii.** A copy of the proposed test procedures and test data sheets, and a statement as to whether the manufacturer proposes to conduct the tests at its own facility, or the name and location of a third party testing laboratory where the tests are to be conducted. Third party certifier may provide testing services for the manufacturer. Since the third party certifier reserves the right to witness any or all tests, the manufacturer should not commence the tests without authorization from the third party certification body. The third party certifier may conduct initial inspections and audits of any laboratories used for testing. The third party certifier may elect to witness or waive the option to witness the tests. In any instance, the third party certifier must verify that laboratories conducting testing conform to the requirements of International Organization for Standardization /International Electrotechnical Commission (ISO/IEC) Guide 17025 for applicable testing. The manufacturer must give the third party certifier at least 2 weeks notice prior to starting tests.

**iv.** A statement that the manufacturer agrees to provide the following minimum warrantee for the equipment:

"That the equipment has been manufactured and will perform in accordance with applicable specifications and that any defect in design, materials, (excluding lamps), or workmanship which may occur during proper and normal use during a period of 1 year from date of installation or a maximum of 2 years from date of shipment will be corrected by repair or replacement by the manufacturers f.o.b. factory."

**v.** A statement that the manufacturer agrees to provide and maintain a quality control program in accordance with FAA-STD-013 or suitable alternative such as ISO 9000 family of standards or Department of Defense quality standards. The manufacturer should provide a copy of the proposed quality control program.

**vi.** A copy of the proposed instruction manual for the equipment and a copy of each product listed Product Description Sheet (i.e. marketing material).

**vii.** Lamp life test procedure, if applicable, in accordance with Appendix 5.

**B. REVIEW PROCEDURE FOR QUALIFICATION TESTING REQUEST.** After receipt by the third party certifier of the request for equipment qualification documentation, the manufacturer will be notified as to whether the proposed test procedures, test data sheets, and other documentation are acceptable. Notification of acceptance, or of changes required for acceptance, will be made to the manufacturer.

**C. TESTS.** All equipment and each configuration of equipment (for example: size, type, class, style, wattage, color) offered for certification to the program will be subject to the required qualification tests of each applicable Advisory Circular before it can be certified.

i. **Qualification Tests.** The tests may be conducted at the third party certifier laboratory, or witnessed by the third party certifier at the manufacturer's laboratory or at a third party laboratory. All testing laboratories utilized must conform to the requirements of the ISO/IEC Guide 17025, "General Requirements for the Competence of Testing and Testing Laboratories." Where the third party certifier waives the option to witness tests, the manufacturer must submit a certified copy of all test reports. Only test data collected after contact with the third party certifier may be utilized toward certification of equipment. The manufacturer must bear all associated costs.

ii. **Recertification.** Each piece of equipment must be requalified to the applicable Advisory Circular in its entirety every 8 years, or as specified in the applicable AC. Interim limited

testing associated with product modification or Advisory Circular revisions is not applicable toward recertification.

iii. **Equipment Requirements.** The equipment must meet all of the design requirements described in the applicable Advisory Circular. The third party certifier may require additional testing of equipment and/or system components to demonstrate compliance to design requirements in areas where qualification testing does not address a specific requirement.

iv. **Modification To Equipment.** Once an equipment type has been certified, the manufacturer may not make any changes in the equipment without submission of the changes to and recertification by the third party certification body. Requests for design or component changes must be submitted in writing to the third party certification body and must be accompanied by supporting documentation plus (if applicable) copies of the revised instruction manual pages, which reflect the proposed change. The third party certifier will review the modification. If acceptable and required, it will issue a revised Certificate of Conformance. Substitution of stock electrical items such as resistors, capacitors, which are identical in form, fit, and function and which are equal or better in quality and rating is permissible. Although such substitution does not necessarily require recertification, the manufacturer must supply the third party certifier a list of the substituted items for filing with the inspection records. This exception does not apply to light sources.

v. **Substitution of Lamp/Light Sources**. Once an equipment type has been certified only the lamp or light sources (for example: a light emitting diode (LED) array) subjected to all applicable specifications per the applicable Advisory Circular, and as referenced in conjunction with equipment listed in AC150/5345-53 Appendix 3 in the Addendum as currently published by the FAA, Lamp Descriptions, may be utilized. When a manufacturer chooses to utilize an alternative lamp or light source (i.e. different OEM, wattage, voltage amperage, type) in any fixture, complete photometry and chromaticity testing and any other testing related to light source/lamp operation must be conducted successfully

vi. **Production Tests.** In addition to qualification tests and equipment requirements, each equipment specification requires some tests to be conducted on production units. An acceptable testing laboratory, as verified by the third party certifier, must conduct production testing. Records of production test results must be traceable to equipment serial numbers/production lots when not serialized and retained for a minimum period of 3 years.

vii. **Lamp Life Tests.** Within 6 months of certification, lamp life tests, if applicable, shall be conducted in accordance with the procedures contained in Appendix 5, Lamp Life Test Procedure.

**D. REQUIREMENTS FOR CERTIFICATION.** The manufacturer must be a licensee to have its equipment certified in the program. The equipment must successfully pass all qualification tests described in the applicable Advisory Circular. If a manufacturer has no product certified for a period of 180 days, or does not produce any certified product for a period of 180 days, that manufacturer may not be a licensee.

**E. PRODUCT ACCEPTANCE.** Prior to issuance of the Certificate of Conformance, the following documentation is required for review:

**i.** The written test report(s) covering all required testing and design verification.

**ii.** Within 6 months of certification, lamp life test procedure, if applicable, in accordance with Appendix 5.

**iii.** Required documentation as listed in section 5.A of Appendix 2.

**iv.** Each certified product's Listed Products Description Sheet (marketing material). Reference to "FAA" approval or certification is unacceptable. Reference to non-certified product characteristics or components must be denoted clearly as such.

After the last submittal of the required documentation, if acceptable, the manufacturer will be notified that the equipment is certifiable. The Certificate of Conformance is then issued. A complete file, containing all supporting documentation, must be maintained by the third party certifier for every certified product.

**F. QUALITY CONTROL.** After the manufacturer has entered the Program, inspections and audits will be conducted on a semi-annual basis at each manufacturing facility.

**i. Quality Assurance Audit**. Prior to licensing, and once annually thereafter, the manufacturing facility will be subjected to an in-depth Quality Audit. At a minimum, the audit must evaluate the following:

- Management Commitment Organization Documentation of the quality System
- Control of Procured Material
- Manufacturing Quality Controls
- Final Inspection and Testing
- Equipment Calibration and Maintenance
- Control of Non-conforming Material
- Corrective Action Program
- Handling, Packaging and Storage
- Product Identification
- Periodic Product Qualification
- Collection and Analysis of Field Performance Data

**ii. Inspections.** Production of certified equipment is audited annually to verify that the product is the same as the sample subjected to the qualification tests. It is intended that samples of all certified equipment produced in a given year be inspected.

**a)** The inspections may be scheduled or unannounced, at the option of the third party certifier.

**b)** Production test records must be made available for review for compliance to applicable FAA Advisory Circulars, and production testing may be witnessed by the third party certifier.

**c)** If equipment is not being produced during the inspection, production test records and test data will be reviewed.

**d)** After verbal review of findings with a designated representative of the manufacturer, a formal report documenting the inspection will be made by the third party certifier to the manufacturer detailing the status of certification and identifying any actions that are required to correct any deficiencies.

**e)** Nonconformance to specifications found during these inspections will result in suspension of the model, as certified, unless corrections are made. Additional inspections or testing may be necessary to resolve any suspension or withdrawal of certification.

**G. REVISION OF SPECIFICATIONS.** The FAA may, at times, revise the specification for a particular equipment to reflect changing needs of aviation or of new technology. The procedure for requalification of currently qualified equipment is the same as for the original qualification as discussed in Appendix 2, paragraph 5 with the following exceptions:

**i.** The manufacturer does not have to resubmit the quality control plan unless changed.

**ii.** Depending on the nature of an Advisory Circular revision, it may not be necessary to perform all qualification tests. The manufacturer must submit an action plan to the third part certifier, which will in turn complete an engineering review to determine the extent of testing required complying with the revised Advisory Circular.

**H. CERTIFICATE OF CONFORMANCE.** The manufacturer must have a Certificate of Conformance (see Appendix 7) issued by the third party certifier verifying the acceptance of the equipment by the program. Optional labeling and/or other markings may be utilized, but is not recognized as proof of certification. The certification will be subject to the condition that it may be rescinded if:

**i.** The manufacturer fails to provide the required documentation.

**ii.** The manufacturer fails to honor the warrantee or does not maintain quality control in accordance with the approved plan.

**iii.** The equipment has an unsatisfactory failure rate. Since reliable equipment is of prime importance to safety of airport operations, equipment that proves unreliable in use (as determined by the FAA) may be removed from the certified listing. The determination of unreliability will be based on judgment and experience with equipment of a like nature. Where any such equipment is deemed to have an unsatisfactory failure rate or is deficient in workmanship or materials, the FAA will notify the manufacturer in writing. The manufacturer must then notify the FAA in writing within 15 working days as to its plan of action for correcting the problem. If the manufacturer does not resolve the problem within a reasonable time (the time frame will, of

necessity, be based on safety considerations and/or the nature of the problem), the manufacturer and third party certifier will be notified and the equipment will be removed from the certified listing. The FAA reserves the right to require the equipment to be subjected to any or all qualification tests when the equipment has been deemed unreliable.

**iv.** The manufacturer fails to perform the required production tests.

**v.** Changes are made in the equipment without approval from the third party certifier.

**vi.** The equipment specification is canceled or is revised and the manufacturer fails to requalify.

**vii.** The manufacturer is found not in conformance with the quality control requirements of paragraph 5F or other program and licensing requirements.

**viii.** The equipment does not comply with the requirements for recertification (Appendix 2, paragraph 5 C ii).

**ix.** The equipment is determined to be non-compliant as a result of a manufacturer challenge.

The third party certifier must notify the manufacturer and the FAA within 24 hours of any suspension or withdrawal of equipment. Non conformance to FAA specifications found during inspection visits may result in suspension of the equipment model as certified unless corrections are made to the satisfaction of the third party certifier. Corrective action must be taken by the manufacturer. Manufacturers are given 15 working days to advise the third party certifier of corrective action to be taken, including a schedule for any necessary retesting and/or inspections. Corrective action schedules may not be longer than 30 days.

**I. INFRACTIONS**. It is the responsibility of each manufacturer to conduct its business related to the program in a manner which is consistent with the pertinent FAA Advisory Circular(s) and the provisions of the Program Procedural Guide and License Agreement.

Appropriate sanctions may be imposed by the third party certifier if it is determined that a manufacturer within their program is manufacturing/marketing a product in a manner inconsistent with the program requirements. Penalties will be proportional to the offense or infraction.

**J. CHALLENGE PROCEDURE - INTRA-PROGRAM MANUFACTURER**. In the event the performance and/or design of a certified manufacturer's product is challenged by a maufacturer licensed by the same third party certifier, the process below must be followed. The confidentiality of each manufacturer must be maintained by the third party certifier at all times. The challenged manufacturer's equipment will remain on the Certified Airport Lighting Equipment list while the challenge is underway.

**i.** The challenger must submit in writing by certified mail to the third party certifier supporting documentation outlining the detail of the challenge and applicable test data. The documentation must specify the section(s) of the particular specification being challenged.

**ii.** The third party certifier will estimate the full cost of testing and or audits that will be required to verify the challenge, and invoice the challenger for that amount.

**iii.** The challenger must then agree to accept the challenge costs or discontinue the challenge.

**iv.** Within 30 days of the challenger's acceptance of costs, the third party certifier will obtain a sample of the challenged product. The third party certifier will then perform testing and/or audits within 15 days of procurement as necessary to confirm or deny the challenge.

**v.** An initial determination will be made by the third party certifier whether each challenged characteristic is controlled in manufacturing solely by the design of the product or by control of variation in the maufacturing process. Testing or auditing will be performed only on the challenged characteristics of the challenged model. Non-conformance found by test or audit will constitute challenge confirmation. If the challenge is confirmed, then the challenge applies to all other models from the manufacturer sharing the same design characteristics.

**vi.** If the characteristic is controlled solely by design, testing of a randomly acquired unit should be sufficient to confirm or deny the challenge.

**vii.** If the characteristic is also controlled by process (i.e., by adjustments, set up, technique, methods) an audit at the maufacturer's facility will be performed.

**viii.** After a challenge confirmation (test or audit failure), the third party certifier must notify the challenged party and the challenger within 24 hours. No challenged product may not be shipped until corrective action and/or a retest is completed.

**ix.** Upon failure of tests, the challenged party is given 15 days working days to correct the discrepancy and submit the product for retest. The third party certifier will use the means necessary (for example: testing, and auditing) to assure that the subsequent modifications by the manufacturerer to meet FAA specification did not adversely affect any other performance characteristics, and that tests, inspections, and/or procedures are in practice at the challenged manufacturer's facility to assure 100% product conformance to specifications.

**x.** Upon failure of an audit, the challenged party, within the same 15 day period, must submit a detailed auditable test/inspection plan to control the characteristics. The third party certifier will increase the frequency of facility visits to assure conformance to approved plan.

**xi.** If no redesigned product is submitted within the 15 day period, or the resubmitted product fails any test, or no acceptable test/inspeciton plan (if required) is submitted within the 15 day period, then the product will be removed from the Certified Equipment List until full qualification tests are performed on the resubmitted product. The FAA, challenger, and challenged manufacturer must be notified by the third party certifier.

**xii.** Equipment utilized in the challenge becomes the property of the third party certifier and will be destroyed 90 days after completion of the challenge process. Why?

**xiii.** The full costs of the challenge procedure must be paid by the challenger or the challenged manufacturer. If the challenge is found to have basis, the challenged party pays all costs plus any costs for requalification testing and/or follow up facility audits. If the challenge is without basis, the challenger pays all costs associated with the challenge.

**K. APPEALS PROCEDURE.** A manufacturer who is affected by an adverse determination by their third party certifier with respect to its certified equipment or its participation in the program may appeal the determination to the third party certification body per the guidelines detailed in the third party certifier's procedural guide.

**L. FORMS.** The use and function of forms to be used in administering the program shall be addressed in the third party certifier's procedural guide. The Certificate of Conformance must follow the sample shown in Appendix 7.

# APPENDIX 3. CERTIFIED AIRPORT LIGHTING EQUIPMENT.

## NOTICE TO USERS

This appendix provides a list of the current equipment under the certification program. The specification for each type of equipment listed below in this document is contained in the AC given. The equipment specification defines the type, class, and style classifications used in the listing. Not all combinations of type, class, and style are permissible. The equipment specification should be consulted for approved equipment configurations.

An addendum to this appendix listing all current certified equipment with the manufacturer is updated monthly. It is available on the Internet at http://www.faa.gov/airports_airtraffic/airports/ under "Advisory Circulars" in the file titled "150/5345-53 Addendum". This addendum can also be obtained from the Office of Airport Safety and Standards, Attention: AAS-100, Federal Aviation administration, 800 Independence Ave., SW, Washington, DC 20591, or from FAA Regional Airports and District/Field Offices (http://www.faa.gov/airports_airtraffic/airports/regional_guidance).

Users should consult equipment manufacturers' catalogs or literature for complete ordering. For each fixture listed in the addendum, the number in parentheses () after the manufacturer's catalog number indicates the specific lamp type used in testing the equipment. A description of each lamp used is provided in the addendum.

For latest approved equipment specification go to the Internet address list above for AC's.

**L-801 Beacons, Medium Intensity (AC 150/5345-12)**

**L-802 Beacons, High Intensity (AC 150/5345-12)**

**L-804 Light, Holding Position Edge (AC 150/5345-46)**

**L-806 Wind Cones, Frangible (AC 150/5345-27)**

**L-807 Wind Cones, Rigid (AC 150/5345-27)**

**L-810 Lights, Obstruction (AC 150/5345-43)**

**L-821 Panel, Airport Lighting Control (AC 150/5345-3)**

**L-823 Connectors, Cable (AC 150/5345-26)**

**L-824 Underground Electrical Cable for Airport Lighting Circuits (AC 150/5345-7)**

**L-827 Monitors, Regulator (AC 150/5345-10)**

**L-828 Regulators, Constant Current (AC 150/5345-10)**

**L-829 Regulators, Monitored Constant Current (AC 150/5345-10)**

**L-830 Isolation Transformers, 60Hz (AC 150/5345-47)**

**L-831 Isolation Transformers, 50Hz (AC 150/5345-47)**

**L-841 Cabinet, Auxiliary Relay (AC 150/5345-13)**

**L-847 Switch, Circuit Selector (AC 150/5345-5)**

**L-849 Lights, Runway End Identification (AC 150/5345-51)**

**L-850 Lights, Runway, Inpavement (AC 150/5345-46)**

**L-852 Lights, Taxiway, Inpavement (AC 150/5345-46)**

**L-853 Markers, Retroreflective (AC 150/5345-39)**

**L-854 Radio Controls (AC 150/5345-49)**

**L-856 Lights, Obstruction, High Intensity, White, 40 FPM (AC 150/5345-43)**

**L-857 Lights, Obstruction, High Intensity, White, 60 FPM (AC 150/5345-43)**

**L-858 Signs, Runway and Taxiway (AC 150/5345-44)**

**L-859 Lights, Flashing, Omnidirectional (AC 150/5345-51)**

**L-860 Lights, Runway Edge, Low Intensity (AC 150/5345-46)**

**L-861 Lights, Runway & Taxiway Edge, Medium Intensity (AC 150/5345-46)**

**L-862 Lights, Runway Edge, High Intensity (AC 150/5345-46)**

**L-863 Lights, Portable Runway (AC 150/5345-50)**

**L-864 Lights, Obstruction, Red, 20-40 FPM (AC 150/5345-43)**

**L-865 Lights, Obstruction, Medium Intensity, White, 40 FPM (AC 150/5345-43)**

**L-866 Lights, Obstruction, Medium Intensity, White, 60 FPM (AC 150/5345-43)**

**L-867 Light Base, Non-Load Bearing (AC 150/5345-42)**

**L-868 Light Base, Load Bearing (AC 150/5345-42)**

**L-880 Precision Approach Path Indicator (AC 150-5345-28)**

**L-881 Abbreviated Precision Approach Path Indicator (AC 150/5345-28)**

**L-882 Generic Visual Approach Descent Indicator (AC 150/5345-52)**

**L-883 Generic Visual Approach Descent Indicator (AC 150/5345-52)**

**Light Structure, Lightweight (AC 150/5345-45)**

**L-884 Power and Control Unit for Land and Hold Short Lighting Systems (AC 150/5345-54)**

**L-885 Lights, Obstruction (AC 150/5345-43)**

**L-890 Airport Lighting Control and Monitoring Systems (AC 150/5345-56)**

# APPENDIX 4. ADDRESS LIST OF CERTIFIED AIRPORT LIGHTING EQUIPMENT MANUFACTURERS.

An addendum to this appendix, listing all current certified equipment manufacturer's addresses, is updated monthly. The addendum is available on the Internet at http://www.faa.gov/airports_airtraffic/airports/ under "Advisory Circulars" in the file titled "150/5345-53B Addendum". The addendum can also be obtained from the Office of Airport Safety and Standards, Attention: AAS-100, Federal Aviation administration, 800 Independence Ave., SW, Washington, DC 20591, or from FAA Regional Airports and District/Field Offices (http://www.faa.gov/airports_airtraffic/airports/regional_guidance).

# APPENDIX 5. LAMP LIFE TEST PROCEDURE.

1. **PURPOSE.** This appendix specifies a test method for establishing lamp life for airport lighting fixtures. This procedure shall be accomplished on each new fixture, design or on any design change which will affect lamp life.

**2. SCOPE.** This procedure shall be performed on all lamps having a specified lamp useful life of 8,750 hours or less.

**3. DEFINITIONS.** The following terms are defined for the purpose of this procedure:

**a. RATED LAMP LIFE.** The mean life of the lamp while installed and operated in a lighting fixture as established by test and calculation described in this procedure.

**b. LAMP USEFUL LIFE.** The portion of the lamp operating characteristic where the photometric output of the lamp operating in the fixture is within specification requirements.

**c. LAMP OPERATING TIME.** The time that electrical service to the lighting system is on and contacts to lamp circuits are closed.

**d. ACCELERATED TESTING.** The testing technique used to compress the time to operate a lamp to end of useful life while under test. A correlation between performance of the lamp under normal operating conditions and the conditions for accelerated testing must be established. Note: Accelerated testing cannot be performed on tungsten halogen lamps***, or any other current controlled lamp***.

**4. CONDITIONAL CERTIFICATION OF EQUIPMENT.** Equipment submitted for qualification testing prior to completion of lamp life tests may be given a conditional certification if the following conditions have been met:

**a.** The lighting fixture manufacturer has submitted its written procedure for conducting the lamp life tests in accordance with paragraph 5 below.

**b.** A schedule for conducting the tests has been established.

**c.** The procedure has been reviewed and approved by a third party certification body.

If a conditional certification has been given for a piece of equipment and it subsequently does not pass the lamp life tests, the certification will be rescinded.

**5. TEST SPECIFICATION.** The test procedure is divided into two parts: normal and accelerated testing. Although normal testing is preferred, accelerated testing is acceptable under special circumstances. When accelerated testing is performed, the test shall be backed up with a normal test as soon as practical. Accelerated test reports shall include a schedule indicating when normal testing will be completed. Normal testing may be waived by the third party certifier if a correlation, verified by test, exists.

The lighting fixture manufacturer shall use the most conservative lamp designer's life rating, derated by 15 percent, in determining lamp life. No credit shall be given for any techniques or devices used to extend lamp life. Lamp life shall be quoted as "Lamp life estimated" during this period.

**a. Normal Testing.**

**(1)** The test shall consist of a minimum of 10 randomly selected lamps installed in the fixture for which life data is being established. If additional lamps are to be tested, the tests shall be performed in multiples of 10 lamps.

**(2)** Lamps shall be installed in the fixture and tested in the configuration which simulates the actual "as installed" condition of the light system (e.g., in-pavement lights should be tested with the lamp fixture installed on the smallest base can which in turn is buried in a non-heat absorbing medium, such as sand).

**(3)** Where lighting system power conditioning equipment is located remote from lamp units in the field, cabling between lamp and system components shall be shortest allowed by design.

**(4)** A light system shall be operated at highest lamp manufacturer rated voltage or current using approved regulators or a current supply having one percent regulation. The duty cycle shall consist of 20 hours lamp operating time and 4 hours deenergized. A voltage controlled system shall be operated from a supply having three percent regulation.

**(5)** Testing shall continue until 90 percent of all lamps have reached the end of useful life.

**(6)** Tests shall be performed in a controlled environment at an ambient temperature between 60 and 80 degrees Fahrenheit.

**(7)** Electrical service voltage and current; lamp voltage and current; and for discharge type lights, pulse train wave shape and frequency shall be randomly recorded using calibrated instruments during the test period to verify that control circuits are functioning and that input energy is maintained within tolerance. As a minimum, these parameters shall be checked twice a week.

**(8)** A daily log shall be maintained at the test site. The log shall record lamp condition (e.g., whether the photometric output of the lamp exceeds minimum specification requirements), date, time, comments, and person performing the check.

**(9)** The pulse train wave shapes shall be monitored regularly during the duty cycle for discharge type lamps. Out-of-tolerance condition shall be logged. As a minimum, the following shall be monitored for out of tolerance conditions:

**(a)** Pulse train wave shape.

**(b)** Pulse train frequency.

**(c)** Voltage or current to lamp circuits.

**b. Accelerated Testing.**

**(1)** Accelerated testing shall be conducted in acordance with the applicable IES guideline on voltage controlled lamps only. Accelerated testing may be performed when normal testing is estimated to exceed 180 calendar days or to provide a basis for estimating lamp life on short notice, such as when evaluating new designs. Under no circumstances should accelerated testing reduce the normal test time by more than 1/3 of the normal test time based on lamp manufacturer life estimates. All accelerated tests shall be followed by normal testing in accordance with paragraph 5a to establish a correlation between accelerated and normal test rated lamp life test results.

**(2)** Accelerated tests shall follow the procedure described in paragraph 5a with the exception that the appropriate parameters are increased so that the estimated test time is reduced as specified above.

**(3)** In addition to the documentation requirements defined below, the testing authority should provide the rationale for selecting the parameters for the accelerated tests. Lamp vendor data shall form the basis for the rationale.

**6. ANALYSIS OF DATA.**

**a.** Form a list of the 90 percent of the lamps which have reached the end of lamp useful life. The list should include lamp number and lamp operating time as calculated below. This information should be arranged in ascending order of lamp operating time.

**b.** Lamp operating time is calculated by multiplying the number of full days that the lamp was operating by 20 (hours).

**c.** Delete the lamps with the 10 percent lowest lamp operating times from the calculations below.

**d.** Calculate the mean and standard deviation for the 80 percent of the lamps remaining on the list.

**e.** If the standard deviation is greater than 50 percent of the mean, delete the lamps with the 10 percent highest and 10 percent lowest lamp operating times from the table. Recalculate the mean and standard deviation for the remaining 60 percent of the lamps on the list.

**f.** Lamp life is the mean calculated above, rounded to the nearest 50 hours.

**7. DOCUMENTATION.** A test report documenting the test results and containing a copy of' the calculations shall be prepared. As a minimum, the report shall include the information listed below.

**a.** A drawing or sketch of the test setup indicating installation of the test fixture(s), instrumentation, and a block diagram indicating all electrical interconnections. This drawing shall be of sufficient detail so that an independent laboratory may perform the test and replicate the test results.

**b.** A calculation sheet indicating number of days each lamp operated, lamp operating hours, and data used in calculating the mean and standard deviation.

**c.** Copy of all wave shapes recorded in paragraph 5.a.(9) with calibration markings.

**d.** A description of all malfunctions which occurred during the test period including type of malfunction, date of occurrence, corrective action taken, and quality assurance concurrence on resolution.

**e.** A summary of the pulse train out-of-tolerance conditions shall be included. The summary shall list specific type of out-of-tolerance condition, number of times occurred, and frequency of occurrence.

# APPENDIX 6. PROCEDURAL GUIDE OUTLINE.

**1. SCOPE.**

**a.** Basis of Program
**b.** Certifier's Role
**c.** Manufacturer's Role
**d.** FAA Role

**2. LICENSE AGREEMENTS.**

**a.** License Agreement
**b.** Fee schedule
**c.** Certification Affidavit

**3. EQUIPMENT QUALIFICATION PROCEDURES.**

Use procedures in Appendix 2 as a guide.

**4. SEMIANNUAL INSPECTIONS.**

**a.** Timing of Inspections
**b.** Production Records
**c.** Inspection Review Report
**d.** Corrective Action
**e.** FAA Notification

**5. QUALITY CONTROL.**

**a.** Quality Assurance
**b.** Quality Assurance Audit
**c.** Inspections

**6. PRODUCTION TESTING.**

**7. CHALLENGE PROCEDURE.**

**a.** Written Challenge
**b.** Documentation
**c.** Costs
**d.** Sample Product
**e.** Testing
**f.** Corrective Action
**g.** Payment

**8. APPEALS PROCEDURE.**

**9. USE AND FUNCTION OF FORMS.**

**10. FORMS**

# APPENDIX 7. SAMPLE CERTIFICATION.

PROGRAM ADMINISTRATOR
_____

(Name and address of Third party certifier)

_____
_____
_____

REVISION DATE:_____
(This is date of revised certificate if issued)

ORIGINAL ISSUE DATE: _____
(This date is the date certificate is issued)

Recertification DUE Date:_____
(Eight years from earliest test report data referenced below –2(A), or as specified in AC)

**AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM**

**CERTIFICATION OF CONFORMANCE**

Name and Address of Manufacturer
_____
_____
_____

The product described below is hereby approved for listing in the next issue of the Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5345-53, Appendix 3 Addendum Airport Lighting Equipment Certification Program. The approval is based on successful completion of tests in accordance with the specifications listed in and the requirements for approval described in the AC 150/5345-xx and the reporting to the Program Administrator the results of such tests, accompanied by related documents by (third party certifier) recognized testing laboratory. The certification is not valid for product modified with non-OEM replacement parts or non-production components.

_____

L-type – EQUIPMENT NAME
(AC 150/5345-xx)

Mfgr's. (column heading/data as detailed per L-type AC in AC 150/5345-53 and Appendix 3 listing in the Addendum)

List lamp used in () after part number. If not listed, indicate lamp designation (number, watts,description designation, volts, amps, as appropriate) and manufacturer

1. This equipment requires continuing validation in accordance with the requirements of AC 150/5345-53.

2. Product tested and report issued by:
   (A) Report No.:_____(all applicable test reports issued)_____
   (B) Date of Report:___(issue date of report each listed in 2A)_____

APPROVED FOR CERTIFICATION:

BY: Certifier's Signature_____

Certifier's Typed Name_____

DATE: Date Signed_____