Cancelled 150/5345-48

AC NO: 150/5345-9C

DATE: 12/23/69

ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

SUBJECT: SPECIFICATION FOR L-819 FIXED FOCUS BIDIRECTIONAL HIGH INTENSITY RUNWAY LIGHT

1. PURPOSE. This circular describes the subject specification requirements and is published by the Federal Aviation Administration for the guidance of the public.

2. CANCELLATIONS. AC 150/5345-9B, Specification for L-819 Fixed Focus Bidirectional High Intensity Runway Light, is cancelled.

3. APPLICABLE SPECIFICATIONS. The following specifications and standard, as referred to hereinafter, of the issues in effect on date of application for qualification (Paragraph 9) are applicable to this specification. In case of conflict between this specification and the applicable specification, this specification shall govern.

   a. Copies of the following Federal specifications and standard may be obtained from the appropriate Regional General Services Administration Office:

      (1) QQ-A-591 - Aluminum Alloy Die Castings.

      (2) QQ-A-601 - Aluminum-Alloy Sand Castings.

      (3) Federal Standard No. 595 - Colors.

   b. Copies of the following Military specifications may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120, Attention: Code CDS.

      (1) MIL-C-7989-Covers, Light-Transmitting, for Aeronautical Lights, General Specification for.

      (2) MIL-C-25050-Colors, Aeronautical Lights and Lighting Equipment, General Requirements for.

Initiated by: AS-580

c. A 120-61T - Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Uses. Copies of this ASTM specification may be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

d. Copies of the following circulars and additional copies of this circular may be obtained from the Department of Transportation, Distribution Unit, TAD-484.3, Washington, D.C. 20590.

(1) AC 150/5345-6, Specification for L-809 Airport Light Base and Transformer Housing.

(2) AC 150/5345-22, Specification for L-834 Individual Lamp Series-to-Series Type Insulating Transformer for 5000 Volt Series Circuit.

(3) AC 150/5345-26, Specification for L-823 Plug and Receptacle, Cable Connectors.

(4) AC 150/5345-32, Specification for L-837 Large-Size Light Base and Transformer Housing.

(5) AC 150/5345-34, Specification for L-839 Individual Lamp Series-to-Series Type Insulating Transformer for 5000 Volt Series Circuit 6.6/20 Amperes 300 Watt.

4. EXPLANATION OF REVISIONS. In addition to editorial changes, the requirement for wind speed was raised from 200 to 350 miles per hour, due to greater jet blast of the larger jets; and, the photometrics were changed to agree with the military photometric requirements for the same equipment.

5. SCOPE OF PUBLICATION. The specification requirements are for a fixed focus bidirectional high intensity runway light. This runway light consists essentially of an optical system, a lamp, a lamp holder mounted in a suitable housing, and a mounting assembly. The runway light shall be furnished complete and ready for installation on a base mounting.

6. PERFORMANCE REQUIREMENTS.

a. Design the runway light to have the light distribution described below when tested with a clear lens and a 210-watt, 6.6-ampere lamp operated at, or corrected to, 4500 lumens.

(1) The light distribution shall be asymmetrical with front and rear beams having an elevation of 4.5° and a toe-in of 3.5°. (The corresponding longitudinal angles are 86.5° and 273.5°.) The 90° to 270° horizontal line is parallel to the runway centerline and the 0° horizontal direction is toward and perpendicular to the runway centerline.

(2) The minimum light intensity in the beam shall be 20,000 candela in the rectangular beam of 5° horizontal and 4° vertical, with rounded corners of 2° radii at 20,000 candela and 5,000 candela in 10° horizontal and 9° vertical, with rounded corners of 4° radii.

(3) The beam axis shall be within 1-1/2° of the 4.5° elevation and the 3.5° toe-in angles when the light has been properly levelled and correctly aimed.

(4) The light shall have a minimum of 400 candela from 92° to 268° horizontal at elevations of 4.5° to 12.5° vertical for circling guidance.

(5) The maximum for a runway light shall be 100 candela from 320° to 40° horizontal at elevations of 0° to 15° vertical. It shall have a maximum of 50,000 candela in the main beam.

(6) In all areas not otherwise specified, the minimum shall be 20 candela in all directions above the horizontal.

b. When color is specified, the candela values shall not be less than those obtained by multiplying the candela values shown above by the following:

(1) Yellow - .400

(2) Green - .150

c. All current carrying parts of the unit shall be suitable for the service intended.

d. The unit shall be designed and constructed for continuous service under the following operating conditions:

(1) Temperature. Any ambient temperature from a minimum of -45° Centigrade to a maximum of 50° Centigrade at sea level.

(2) Weather. Continuous outdoor operation under all normal weather conditions, including wind velocities up to 350 miles per hour.

7. DETAIL REQUIREMENTS.

a. Optical System. The optical system shall consist of a glass lens assembly, or combination of lenses, and may include reflectors and shields. This assembly must be easily removed and replaced, and must retain its correct alignment on replacing. Glass lenses shall be fabricated from heat-resistant glass conforming to Military Specification MIL-C-7989, Class B. Colored lenses or colored screens used shall conform to the requirements of Military Specification MIL-C-25050, Type I. Reflectors, if used, shall be aluminum with a specular finish similar and equal to "Alzak."

b. Socket. The socket shall be the medium prefocus base type and shall be mounted rigidly in the metal fitting. The socket shall have a rating suitable for the service intended.

c. Lamp. The lamp used shall be a 210-watt, 6.6-ampere, T-14 bulb, medium prefocus base, C-13 filament, 2-3/16-inch light center length, 4,500 lumens, with rated life of 300 hours.

d. Housing.

(1) All metal parts of the housing shall be fabricated from nonferrous metal or from ferrous metal suitably protected against corrosion. Copper bearing hardware in contact with aluminum shall be cadmium, nickel, or zinc-plated. Aluminum castings shall conform to Federal Specification QQ-A-601, Alloy 43 or 214, and aluminum die castings shall conform to Federal Specification QQ-A-591, Alloy 13, A13, or 360. Housing shall be of sufficient strength to cause the frangible coupling to break before the housing. A means for drainage shall be provided in the bottom of the housing to drain condensation and water. The joints between metal and glass shall be sealed by watertight and heat resistant gaskets, which will withstand 90° Centigrade temperature without damage, or by a sealing compound where joints are not to be disturbed for relamping.

(2) A continuous metal band of nonbrittle corrosion resistant material fitted with a trunk latch, or an acceptable equal, to assure a positive holding lens assembly shall be provided. The unit shall be designed to require no special tools for relamping or for cleaning the lenses. The housing shall be provided with a means for readily leveling the fixture and orienting the light beams, when mounted on the breakable coupling, and a means for determining when a level condition has been achieved. The housing shall support the lens and lamp so that they are tilted 4° downward toward the runway side after the assembly has been leveled.

(3) The housing shall have the manufacturer's name and catalog number stamped or cast on the housing to assume ready identification.

e. Orientation. The outside of the housing shall be marked to indicate correct orientation with respect to the runway centerline. Where the lens and/or reflector assembly is removable for relamping, it shall be keyed for correct orientation. A sighting device shall be included on each unit to check alignment of the optical system with respect to adjacent units when installed in place.

f. Leads. A connecting lead assembly shall be supplied to connect to the receptacle on the secondary lead of the insulating transformer. The lead shall consist of an appropriate length of two-conductor, or two single conductors, 300-volt minimum, No. 16 AWG stranded wire conforming to the provisions of the Underwriters' Laboratories, Incorporated requirements for Type SJ or SJO cord. This lead shall terminate in a plug conforming to Figure 1a of Advisory Circular 150/5345-26. A cable clamp or similar device shall be provided in the fitting or housing to prevent strain at the socket terminals.

g. Mounting Assembly. The mounting assembly shall consist of a breakable coupling, base plate, and pipe column if required. The overall height of the unit, mounted in place, shall not exceed 14 inches above ground level. All parts of the mounting assembly shall be made of nonferrous metal or of ferrous metal suitably protected against corrosion. Aluminum sand castings shall conform to Federal Specification QQ-A-601, Alloy 43 or 214; and aluminum die castings shall conform to Federal Specification QQ-A-591, Alloy 13, A13, or 360.

(1) The breakable coupling shall have a 2-inch tapered male thread for mounting on the base plate. This thread shall conform to the requirements of ASTM Specification A 120-61T. The coupling shall have a "shearing groove" produced by scoring, molding, etc. It shall withstand a static load of 300 pounds applied perpendicularly to the axis of the coupling at a point 12 inches from the shearing groove and shall break cleanly at the groove when a static load of 500 pounds is applied at the same position. In addition, deflection at a point 12 inches from the shearing groove shall not be more than 1/2-inch when a static load of 300 pounds is applied as described above. The breakable coupling shall have a hexagonal section between the thread and the shearing groove to facilitate removal of a broken coupling. The breakable coupling shall also be provided with one or more drainage holes near the shearing groove.

(2) The metal base cover plate shall be cast or fabricated to fit a base conforming to AC 150/5345-6 or to AC 150/5345-32, whichever is specified.

(3) The plate shall be designed to receive the threaded end of the breakable coupling specified above. Means shall be provided for attaching the disconnecting receptacle per Figure 1c of AC 150/5345-26 to the bottom surface of the base plate to obtain a watertight seal.(A weephole may be used to provide drainage from the space around the disconnecting receptacle to below the watertight seal, if required.) This connector is specified under an AC 150/5345-22 and AC 150/5345-34 transformer and is not a part of this specification. The base plate shall be designed so that when assembled to the breakable coupling, the shearing groove on the coupling shall be not more than 3-1/2 inches above the top of the base flange.

(4) A heat resistant rubber gasket for the base flange shall be supplied to obtain a watertight seal with the base cover plate. This gasket shall have a minimum thickness of 1/8-inch and shall fit the bolt hole circle of the base flange shown in Figure 1 of AC 150/5345-6 or Figure 1 of AC 150/5345-32, whichever is specified.

h. Base. The base to be used with this unit shall conform to AC 150/5345-6 or AC 150/5345-32, whichever is specified. The base is not a part of this specification.

i. Insulating Transformer. The insulating transformer to be used with this unit shall conform to either AC 150/5345-22 or AC 150/5345-34. The transformer is not a part of this specification.

j. Painting. Paint for the finish coat shall be of a high quality enamel type suitable for the drying process used. The color shall conform to Federal Standard No. 595, Colors, Table X, Aviation Yellow No. 13538. Paint for the prime coat shall be suitable for the metal treatment involved. The parts of the unit to be painted and the number of coats to be applied to the surfaces of each part are as follows:

(1) Base Plate, Exterior Surface. One prime and one finish coat.

(2) Central Column and Breakable Coupling, Exterior Surface. One prime and one finish coat.

(3) Housing, Exterior Surface. One prime and one finish coat.

k. Parts List and Installation Instructions. A complete parts list and installation instructions shall be furnished with each installation. Sufficient drawings or illustrations shall be provided to indicate clearly the method of installation.

8. TESTING.

a. Qualification Testing.

(1) Each light fixture shall be subjected to the tests described below and to the applicable detail requirements under Paragraph 7.

(a) The optical performance of the unit shall be determined by photometric tests which show compliance with light distribution requirements of Paragraph 6a of this specification. The lamp used for this test shall be of the type specified under Paragraph 7c.

(b) The manufacturer shall provide certification from the lens manufacturer that the lens assembly meets the transmissivity, color, and wear requirements of referenced specifications under Paragraph 7a.

(c) The manufacturer shall furnish certified test reports showing that the breakable coupling meets the static load requirements of Paragraph 7g(1). All tests of the breakable coupling shall be performed with the couplings screwed tightly in place in a base plate and with the base plate securely bolted to a firm and rigid foundation. For these tests, there shall be inserted in the breakable coupling a 16-inch length of round aluminum rod, suitably turned down at one end to fit tightly in the breakable coupling. Do not apply the load faster than 50 pounds per minute, and continue to apply load until the coupling breaks. It is required to test and break five couplings and use the average results obtained in determining the static load tests. The average breaking strength shall not exceed 500 pounds. A description of the test methods, together with test results, shall accompany the request for approval.

(2) Additional inspections and tests will be made as deemed necessary by the Federal Aviation Administration, Airports Service, Washington, D.C. 20590, to determine compliance with this specification.

9. QUALIFICATION. Any material submitted for approval shall be sent to the Federal Aviation Administration, Airports Service, Washington, D.C. 20590.

a. The manufacturer shall furnish a sample fixture to an independent testing laboratory to be tested as described herein to obtain certification regarding the ability to manufacture lighting fixtures meeting the requirements of this specification. The independent testing laboratory shall be acceptable to the Federal Aviation Administration, Airports Service, Washington, D.C. 20590. The manufacturer shall furnish two copies of the testing laboratory's reports for review and approval consideration. Upon approval of the test reports which show satisfactory certification of compliance, the Airports Service will list the name of the qualified manufacturer and a description of their fixture in Advisory Circular 150/5345-1B, Approved Airport Lighting Equipment. The cost of testing shall be borne by the manufacturer offering the material for qualification. A preproduction model shall be furnished for physical inspection and approval.

b. Parts list and installation instructions shall be submitted for review and approval.

c. A certificate of compliance from the lens manufacturer that the lenses conform to the detail requirements specified in Paragraph 7 shall be submitted for review and approval.

d. At any time after approval has been granted under the above conditions, a certified copy of factory test reports on the latest production run of any one of the fixtures produced under this specification shall be made available by the manufacturer upon request.

Chester G. Bowers
Director, Airports Service