

MIL-L-6363F  
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 SUPERSEDING  
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## MILITARY SPECIFICATION

### LAMPS, INCANDESCENT, AIRCRAFT SERVICE GENERAL SPECIFICATION FOR

This specification is approved for use by all Departments and Agencies of the Department of Defense.

#### 1. SCOPE

1.1 Scope. This specification provides the general requirements for incandescent lamps intended for use primarily in military aircraft applications.

1.2 Classification. Lamps covered by this specification will be of the following types, as specified on the applicable specification sheet or MS standard.

- Type I - General purpose lamps suitable for use in applications at ambient temperatures up to 74°C (165°F) (see 3.5.1).
- Type II - Special purpose lamps suitable for use in applications at ambient temperatures above 74°C (165°F) (see 3.5.2).

1.3 Part number. Lamp part numbers will be as specified in the applicable specification sheet or MS standard.

#### 2. APPLICABLE DOCUMENTS

##### 2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the following specifications and standards of the issue listed in the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation, form a part of this specification to the extent specified herein.

#### SPECIFICATIONS

##### Federal

A-A-883

Tape, Pressure Sensitive, Adhesive, Masking

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer, Naval Engineering Center, Systems Engineering and Standardization Department, Code 93, Lakehurst, NJ 08733-5100, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

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## Military

|             |  |
|-------------|--|
| MIL-E-17555 | Electronic and Electrical Equipment, Accessories, and Repair Parts, Packaging and Packing of |
| MIL-C-25050 | Color, Aeronautical Lights and Lighting Equipment, General Requirements for                  |
| MIL-P-116   | Preservation, Methods of   |

## STANDARDS

## Military

|             |   |
|-------------|---|
| MIL-STD-105 | Sampling Procedures and Tables for Inspection by Attributes           |
| MIL-STD-130 | Identification Marking of U.S. Military Property                      |
| MIL-STD-143 | Specification and Standards, Order of Precedence for the Selection of |
| MIL-STD-202 | Test Methods for Electronic and Electrical Component Parts            |
| MIL-STD-889 | Dissimilar Metals   |

(See Supplement 1 for list of applicable specification sheets and MS standards.)

(Copies of specifications, standards, and publications required by the manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, (except for associated detail specification, specification sheets, or MS standards) the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

## 3. REQUIREMENTS

3.1 Specification sheets. The individual lamp requirements shall be as specified herein and in accordance with the applicable specification sheet. The term "detail specification" shall be interpreted to include other specifications, specification sheets, and MS standards which provide detailed and specific requirements for a single lamp or group of similar lamps.

3.2 Qualification. Lamps furnished under this specification shall be products which are qualified for listing on the applicable Qualified Products List (QPL) at the time set for opening of bids (see 4.5 and 6.3).

3.3 Selection of specifications and standards. Selection of specifications and standards for materials, parts, and Government certification and approval of processes and equipment which are not specifically designated herein and which are necessary for the execution of this specification, shall be selected in accordance with MIL-STD-143.

3.4 Materials. The materials shall be as specified herein. However, when a definitive material is not specified, a material shall be used which will enable the lamps to meet the performance requirements of this specification and detail specification.

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3.4.1 Metals. Metals shall be corrosion resistant or treated to resist corrosion caused by fuels, salt spray, or atmospheric conditions as may be encountered in storage or normal aircraft service.

3.4.1.1 Dissimilar metals. Dissimilar metals as defined by MIL-STD-889, shall not be used in intimate contact with each other unless adequately protected against electrolytic corrosion.

3.4.1.2 Recycled and reclaimed material. Recycled or reclaimed material may be used provided all requirements of this specification are met and the material does not jeopardize the quality or life of the lamps.

3.5 Design and construction. Lamps shall be of the design, color, and physical dimensions shown on the applicable detail specification (see 3.1 and 6.2).

3.5.1 Type I lamps. When specified, Type I lamps shall be clear or colored incandescent lamps for use at ambient temperatures of up to 74°C (165°F).

3.5.2 Type II lamps. When specified, Type II lamps shall be clear or colored incandescent lamps for use at ambient temperatures above 74°C (165°F) or as specified in the applicable detail specification (see 6.2).

3.5.3 Reflector lamps. Reflector lamps shall be fabricated by applying an external reflective coating to a specially shaped globe, or by placing the filament between an internally coated reflector and a cover glass that is permanently sealed to the reflector. In the latter arrangement, the use of an internal lamp within the globe is at the manufacturer's option.

3.5.4 Coatings. The exterior coating on lamps (both reflective and colored) shall be such that it will withstand the rigors of normal handling, service use, and storage.

3.5.5 Colored lamps. The lamps shall be uniformly colored with no perforations or openings through which non-colored light can be emitted. All light emitted from colored lamps shall conform to MIL-C-25050 for the color specified.

3.5.6 Internal wiring. Provisions shall be made to prevent any type of electrical shorting inside the metal base of lamps so constructed.

3.5.7 Filament. The arrangement of the filament and filament support shall be equal to or better than the type designated by the detail specification.

3.5.8 Optional design. Design details not specified or specifically dimensioned are optional within the maximum design envelope specified for the applicable lamp configuration. Minor variations will be permitted provided the performance requirements are met and the lamp is totally interchangeable with lamps which use the identified design details. Any changes in design shall be approved by the contracting officer.

### 3.6 Performance.

3.6.1 Ratings. When operating at rated voltage, lamps shall conform to the current, power, and light output ratings specified on the applicable detail specification (see 4.6.3 and 6.5).

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3.6.2 Average rated life. The lamps shall operate satisfactorily for the average rated life shown on the detail specification for the specific lamp part number. The average life shall be based on the average life of groups of lamps operated at rated voltage under controlled laboratory conditions when tested as specified (see 4.6.4 and 4.6.4.1).

3.6.3 Light output. The light output for lamps shall not fall below 80 percent of the initial light output at 70 percent of rated operating life. The exterior coatings of lamps (if so furnished, both reflective and colored) shall not be damaged or discolored, crack, fade, blister, peel. The light output shall not noticeably deteriorate in any manner which will adversely affect the functional qualities when tested as specified (see 4.6.5 and 6.5).

3.6.4 Coating adhesion. When tested for adherence to the glass bulb the exterior coatings (both reflective and colored), shall be such that they will not be damaged or blister, crack, or peel from the globe when tested as specified (see 4.6.6 4.6.7 and 6.5).

3.6.5 Environmental. Lamps shall satisfactorily perform when subjected to the following environmental requirements for the specified times, temperatures, and environmental conditions, unless otherwise specified in the detail specification.

3.6.5.1 High temperature. When operating at rated voltage the lamps shall perform satisfactorily for a minimum of 70 percent of the rated operating life while exposed to the specified maximum temperature for the type lamp being tested or the established maximum operating temperature for the type lamp through use (see 4.6.7 and 6.5).

3.6.5.2 Thermal shock. When operating at rated voltage the lamps shall perform satisfactorily when subjected to severe changes in thermal conditions (see 4.6.8 and 6.5).

3.6.5.3 Random vibration. When operating at rated voltage the lamps shall perform satisfactorily when subjected to random vibrations in a frequency range from 10 to 2000 Hz (see 4.6.9 and 6.5).

3.6.5.4 Shock. When operating at rated voltage the lamps shall perform satisfactorily when subjected to a peak "g" load of 15g or as specified in the detail specification (see 4.6.10 and 6.5).

3.6.5.5 Humidity. After extended, non-operating exposure to a hot, humid atmosphere, the lamps shall be visually inspected for globe to base integrity. The lamps shall then be operated for a sufficient period of time to determine conformance to the specified ratings (see 4.6.11 and 6.5).

3.6.5.6 Salt spray. After extended, non-operating exposure to a hot, humid, salt atmosphere, the lamps shall be visually inspected for signs of corrosion. The lamps shall then be operated for a sufficient period of time to determine conformance to the specified ratings (see 4.6.12 and 6.5).

3.7 Identification of product. Unless otherwise specified on the detail specification, all lamps shall be marked for identification in accordance with MIL-STD-130. Markings shall be clear, legible, and durable (see 4.6.1).

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3.8 Workmanship. Each lamp, including all parts and accessories, shall be fabricated and finished, free of blemishes and defects which will adversely affect its life, form, fit, or function. Soldering, welding, brazing, cementing, and wiring shall be thorough and alignment of parts shall be accurate. Each lamp shall be thoroughly cleaned, with loose, spattered, or excess solder, metal chips, flux, and other foreign material removed. The globe and filament shall be vertically mounted in the base or as specified on the detail specification (see 4.6.1 and 6.5).

## 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspections set forth in this section shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. Qualification inspection (see 4.4).
- b. Quality conformance inspection (see 4.5).

4.3 Inspection conditions. Unless otherwise specified (see 6.2), all inspections shall be performed in accordance with the test conditions specified in Section 2, MIL-STD-202.

4.3.1 Light output criteria. Unless otherwise specified (see 6.2), light output criteria will be as specified on detail specification. The test procedure for determining the change in light output before and after burning shall be the same for any one type lamp.

4.3.3 Lamp operation. Lamps shall be operated at the rated voltage specified in the applicable detail specification. Voltage tolerance shall be within  $\pm 0.5$  percent of the rated voltage (unless otherwise specified on the detail specification), when measured with an instrument calibrated to 10mv resolution.

4.3.4 Lamp mounting. Unless otherwise specified (see 6.2), lamps shall be tested in a lampholder or fixture suitable for the lamp under test. The lampholder shall be rigidly mounted with no special provisions for absorbing or isolating the effects of shock, vibration, or temperature. When testing directional beam lamps which re-

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quire light distribution measurements to be made relative to a specified reflector or flight axis, provision shall be made in the test fixture for rotation of the mounted lamps to provide the required measurement axis. Care shall be taken to ensure that the light output measurements for each directional beam lamp is made on the same mechanical angle each time so that changes in the beam axis can be detected.

4.3.4 Precautions. The following precautions shall be observed when performing the high temperature tests:

a. The test chamber shall be capable of maintaining the specified temperature  $\pm 5^{\circ}\text{C}$  ( $\pm 10^{\circ}\text{F}$ ). The test chamber shall be operated for 1 hour prior to installation of lamps to insure that the temperature has stabilized.

b. Temperature measurements shall be made with thermocouples having leads at least 20 inches long within the oven. This will minimize the conduction of heat away from the junction.

c. Baffles shall be placed within the oven so as to shield the lamps and thermocouple junctions from direct radiation from the heating elements and surfaces of the oven.

d. The lamps shall be mounted so that there is a clear space between the lamps equal to at least the width of one lamp. The lamps shall be mounted so that the flux (radiant energy) from any lamp does not directly strike any other lamp.

4.4 Qualification inspection. Qualification inspection shall be performed at a laboratory acceptable to the Government qualifying activity (see 6.3), on sample lamps produced with equipment and procedures normally used in production.

4.4.1 Sample. The qualification test sample shall consist of twenty-five (25) lamps of the specific part number for which qualification is desired. The sample lamps shall be divided into six (6) sample groups; one sample group of ten (10) lamps (Sample Group 1), and five (5) sample groups of three (3) lamps (Sample Groups 2 through 6) Sample Groups 1 through 5 shall be subjected to and pass the test series in table I for the group number indicated. The sixth group of samples shall be used for spares to replace unrelated failures.

4.4.2 Failures.

4.4.2.1 Test sample failures. Failure of any lamp in the test sample to conform to the requirements specified herein shall be cause for not granting qualification approval. The qualifying activity shall be notified when an unrelated failure occurs and reserve lamps are used, prior to the continuance of testing.

4.4.2.2 Latent failures. Lamps which can be identified to a specific manufacturer and through field service usage fail significantly premature to normal ratings and requirements, and that can have a ratings and requirements baseline established that indicates the lamps do not meet the established normal ratings and requirements may, at the discretion of the qualifying activity, be required to be re-tested and re-qualified as meeting all of the requirements, or be removed from the QPL.

4.4.3 Retention of qualification. To retain qualification, the manufacturer shall forward a report at twelve (12) month intervals to the qualifying activity

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(see 6.3). The qualifying activity shall establish the initial reporting date. The report shall consist of:

a. A summary of the results of the tests performed for examination of product and packaging for delivery (Groups A and B), indicating as a minimum the number of lots that have passed, the number that have failed, and the group which failed. The results of the tests of all reworked lots shall be identified and accounted for.

b. A summary of the results of tests performed for periodic inspection (Group C), including the number and mode of failures. The summary shall include results of all periodic inspection tests performed and completed during the twelve (12) month period. If the summary of the test results indicates non-conformance with specification requirements, and corrective action acceptable to the qualifying activity has not been taken, action may be taken to remove the failing product from the QPL.

c. Failure to report within 30 days after the end of each twelve (12) month period may result in the loss of qualification for the product. In addition to the periodic submission of inspection data, the contractor shall immediately notify the qualifying activity at any time during the twelve (12) month period that the inspection data indicates failure of the qualified product to meet the requirements of this specification.

d. In the event that no production occurred during the reporting period, a report shall be submitted certifying that the company still has the capabilities and facilities necessary to produce the item. If during two consecutive reporting periods there has been no production, the manufacturer may be required, at the discretion of the qualifying activity, to submit his qualified products for testing in accordance with the qualification inspection requirements, and the reason for no production during that time.

#### 4.5 Quality conformance inspection.

4.5.1 In-process inspection. The manufacturer shall have an in-process quality conformance inspection and test procedure acceptable to the Government. Inspections shall be performed throughout the manufacturing process to assure that lamps produced will be capable of meeting the requirements of this specification and associated detail specifications. Examination of product ratings, and operating life testing shall be a normal requirement of the manufacturer's in-process quality conformance procedures.

4.5.2 Inspection lot. An inspection lot shall consist of all lamps of one designation and size, from an identifiable period, from one manufacturer and from one plant location, submitted for acceptance and delivery under contract or purchase order.

#### 4.5.3 Inspection of product for delivery.

4.5.3.1 Inspection lot in-process screening. Each inspection lot shall be screened for random vibration in accordance with MIL-STD-105, level II, Acceptance Quality Level (AQL) 1.0. A failure of six (6) lamps during this inspection is cause for rejection of the entire lot. The balance of the rejected lot shall be 100% percent screened for random vibration before being submitted for acceptance by the Government. Those lamps which fail during the screening test shall not be submitted for delivery under the contract or purchase order.

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TABLE I. Qualification inspection.

| Inspection                                  | Number of Sample Units | Requirement Paragraph | Test Method Paragraph |
|---|------------------------|-----------------------|-----------------------|
| All sample groups<br>Examination of product | all                    | 3.8                   | 4.6.1                 |
| Sample Group 1                              |                        |                       |                       |
| Ratings                                     | 10                     | 3.6.1                 | 4.6.3                 |
| Life 1/                                     |                        | 3.6.2                 | 4.6.4                 |
| Light output maintenance                    |                        | 3.6.3                 | 4.6.5                 |
| Coating                                     |                        | 3.6.4                 | 4.6.6                 |
| Sample Group 2                              |                        |                       |                       |
| High temperature                            | 3                      | 3.6.5.1               | 4.6.7                 |
| Sample Group 3                              |                        |                       |                       |
| Thermal shock                               | 3                      | 3.6.5.2               | 4.6.8                 |
| Sample Group 4                              |                        |                       |                       |
| Random vibration                            | 3                      | 3.6.5.3               | 4.6.9                 |
| Sample Group 5                              |                        |                       |                       |
| Shock                                       | 3                      | 3.6.5.4               | 4.6.10                |
| Humidity                                    |                        | 3.6.5.5               | 4.6.11                |
| Salt spray                                  |                        | 3.6.5.6               | 4.6.12                |

1/ Life requirement may be satisfied by Government verification and acceptance of manufacturer's data from in-process quality conformance (see 3.6.2, 4.6.4, and 6.4).

4.5.3.1.1 Random vibration screening. The lamps shall be subjected to random vibration for ten (10) minutes; five (5) minutes non-operating immediately followed by five (5) minutes operating at normal rated voltage with filament (unless otherwise specified) in the vertical axis. The vibration spectrum shall be between 10 and 2000 Hz per figure 1. The spectral density value shall be within +40% and -30% (+/-1.5dB). The overall RMS value shall be 6g RMS.

4.5.3.2 Group A and B inspection. Inspection of product for delivery under contract or purchase order shall consist of Group A and B inspections (see table II). Sample lamps shall be selected from each inspection lot in accordance with and no less than inspection level S-3, MIL-STD-105 for the examinations and tests specified in table II. The AQL shall be 1.0.

4.5.3.2.1 Noncompliance. In the event of failure of sample lamps to pass the Group A and B inspections, the lot shall be rejected and the manufacturer shall suspend offering lamps of the same designation until corrective action, as warranted, has been taken and another inspection lot of lamps has been inspected and passed the Group A and B inspections.

4.5.3.3 Group C inspection. Sample lamps selected from the manufacturer's normal in-process inspection procedure shall be subjected to the Group C inspections specified in table II. The manufacturer's normal sampling shall be used, and samples



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shall have passed the applicable Group A and B inspections. Group C inspection samples shall be representative of production. Non-coated lamps shall not be subjected to the coating adhesion inspection.

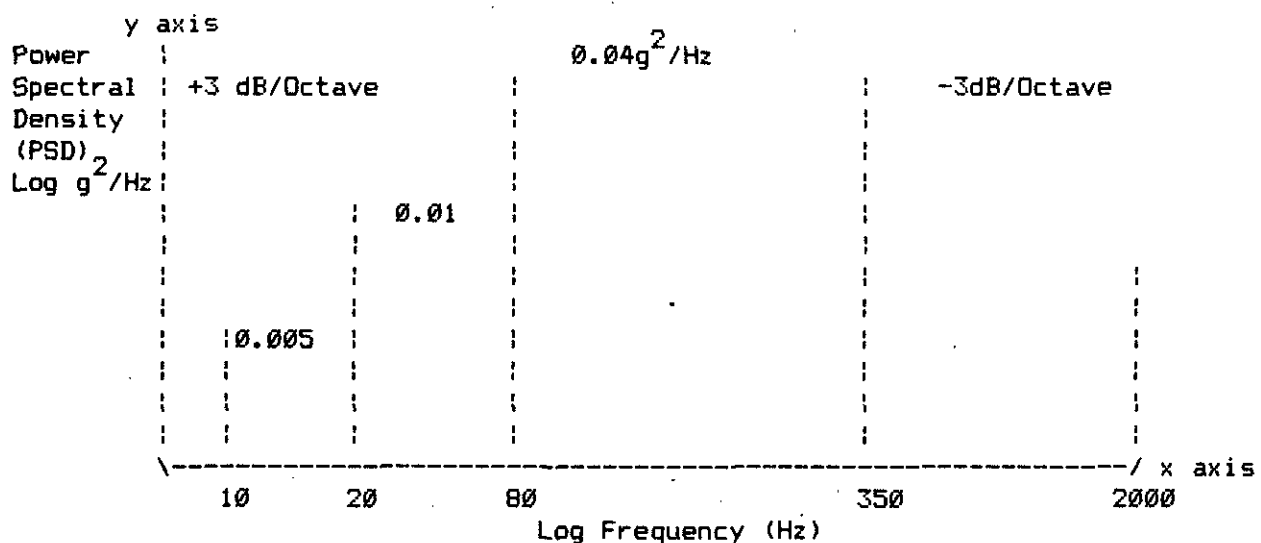


FIGURE 1. Random vibration screening spectrum.

**4.5.3.3.1 Noncompliance.** If a lamp sample fails to pass Group C inspection, the manufacturer shall notify the qualifying activity representative and the cognizant inspection activity of such failure and take corrective action on the materials and processes, or both, as warranted, and on all lamps of product which can be corrected and which are manufactured under essentially the same materials and processes, and which are considered subject to the same failure. Acceptance and shipment of lamps shall be discontinued until corrective action, acceptable to the qualifying activity representative has been taken. After the corrective action has been taken, Group C inspection shall be repeated on additional sample lamps (all tests and examinations, or the test which the original sample lamp failed, at the option of the qualifying activity). Groups A and B inspections may be reinstated; however, final acceptance and shipment shall be withheld until Group C inspection has shown that the corrective action was successful. In the event of failure after re-inspection, information concerning the failure shall be furnished to the qualifying activity and the cognizant inspection activity.

**4.5.3.3.2 Disposition of samples.** Sample lamps which have been subjected to Group C inspection shall not be delivered to the Government on contract or purchase order.

#### 4.6 Test methods and examinations.

**4.6.1 Examination of product.** The sample group lamps shall be examined for conformance to this specification and the applicable detail specification.

**4.6.2 Packaging inspection.** The sampling and inspection of the packaging, packing, container and container marking shall be in accordance with level III, MIL-P-116 or as specified in the contract or purchase order.

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TABLE II. Quality conformance inspection.

| Inspection               | Requirement Paragraph | Inspection Paragraph |
|--------------------------|-----------------------|----------------------|
| Group A                  |                       |                      |
| Examination of product   | 3.8                   | 4.6.1                |
| Packaging                | Section 5             | 4.6.2                |
| Group B                  |                       |                      |
| Ratings                  | 3.6.1                 | 4.6.3                |
| Group C                  |                       |                      |
| Life                     | 3.6.2                 | 4.6.4                |
| Light output maintenance | 3.6.3                 | 4.6.5                |
| Coating adhesion         | 3.6.4                 | 4.6.6                |

4.6.3 Ratings. The sample group lamps shall be mounted on an open rack, locked in a vibration free position and connected to a suitable power source and required instrumentation.

4.6.3.1 Burn-in/seasoning. Prior to the start of testing, the sample group lamps shall be seasoned by being operated at the rated voltage for a period of time equal to one (1) percent of the rated life specified on the applicable detail specification or a maximum of ten (10) hours.

4.6.3.2 Initial tests. After burn-in/seasoning, the sample group lamps shall be energized and the voltage, current, power, and initial light output shall be measured and recorded.

4.6.4 Average rated life. The sample group lamps shall be mounted on an open rack locked in a vibration free position. The lamps shall be operated at rated voltage to determine that average lamp life conforms to that specified in the applicable detail specification.

4.6.4.1 Life test average determination. The average laboratory lamp life is determined by operation of the lamps at rated voltage. The average represents the number of hours that it would take for fifty (50) percent of the test samples to fail. Lamps are considered as having failed when they burn out.

4.6.5 Light output maintenance. The sample group lamps shall be tested to determine that at 70 percent of the specified rated life, the light output does not fall below 80 percent of the minimum initial output specified in the applicable detail specification. For colored lamps, all light emitted shall conform to MIL-C-25050 for the color specified.

4.6.6 Coating adhesion. The sample group lamps shall be tested to determine the coating adhesion by tape stripping using the following procedure. A minimum of 2 inches of a longer piece of pressure sensitive adhesive tape, 0.750 inches in width, conforming to Commercial Item Description, Type I, A-A-883 shall be pressed firmly onto a flat or cylindrical coated surface of the sample lamp or as specified on the applicable detail specification, rubbing out all air bubbles under the tape. Ten (10) seconds shall be allowed for the test area to return to room temperature. Then grasping a free end of the tape and in a rapid motion the tape shall be pulled back

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upon itself at 180 degrees (in such a manner that the tape is folded back to back during the procedure). This test shall be performed both before and after the sample lamps are operated for 10 percent of the rated life. After testing, the sample lamps shall be checked for conformance to 3.6.4. Any sample lamp indicating failure shall be cause for rejection of all lamps processed since the last acceptance to be rejected. The manufacturer shall determine the cause of rejection and solution. The rejected lamps shall be reprocessed and retested prior to resubmission for acceptance by the Government.

4.6.7 High temperature. The sample group lamps shall be mounted on an open rack locked in a vibration-free position and operated at rated voltage for a minimum of 70 percent of average rated life. Lamps designated as Type I shall be operated at 74°C (165°F) and lamps designated as Type II shall be operated at the maximum temperature specified on the applicable detail specification. The time of individual sample lamp failure and reason for failure shall be reported. After test lamps shall be checked for conformance to 3.6.4.

4.6.8 Thermal shock. The sample group lamps shall be subjected to a thermal shock test using the procedure of Test Method 107, MIL-STD-202, with the exceptions indicated in table III. This test shall be performed with the lamps operating at rated voltage. Table III below shall be substituted for Table 107-1, Test Method 107, MIL-STD-202. Continue steps 1 through 4 of Table III for 25 cycles. The time of the individual sample lamp failure and reason for failure shall be reported.

4.6.9 Random vibration. The lamps shall be subjected to a random vibration spectrum between 10 and 2000Hz with power spectral densities as specified on the detail specification for each lamp type.

4.6.9.1 Vibration system control and analysis. The output of the vibration machine shall be presented graphically as power-spectral density ( $G^2/Hz$ ) versus frequency. The spectral density values shall be within +40 and -30% (+/-1.5dB) of the specified values for each lamp. The vibration apparatus, control and analysis of vibration shall be in accordance with MIL-STD-202.

4.6.9.2 Test setup applicable to all lamps. The lamps shall be vibrated for a total of 30 minutes; 7.5 minutes with the lamps non-operating and 22.5 minutes with the lamps operating at rated voltage. During non-operating vibration, the filament shall be perpendicular to, and the filament supports shall be parallel to the vibration axis. During the operating mode the lamps shall be vibrated for 7.5 minutes in each of the three (3) axis as follows:

- a. 1st axis; filament perpendicular to vibration direction and filament supports parallel to vibration direction (same as for non-operating vibration).
- b. 2nd axis; filament and filament supports perpendicular to direction of vibration.
- c. 3rd axis; filament and filament supports parallel to the direction of vibration.

The vibration with lamps operating shall start immediately after lamps are lit without any additional burn-in. Either the fixture or the lamps may be rotated to achieve the positioning of lamps in each of the axis. Lamps may be turned off during axis rotation for a maximum of five (5) minutes.

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TABLE III. Thermal shock test conditions.

| Step | Type I Lamps       |                    |                | Type II Lamps      |                    |                |
|------|--------------------|--------------------|----------------|--------------------|--------------------|----------------|
|      | Temperature        |                    | Time per cycle | Temperature        |                    | Time per cycle |
|      | $^{\circ}\text{C}$ | $^{\circ}\text{F}$ |                | $^{\circ}\text{C}$ | $^{\circ}\text{F}$ |                |
| 1    | -55 +1             | -67 +2             | Table 107-2    | -55 +5             | -67 +2             | Table 107-2    |
| 2    | +25 +2             | +77 +5             | 5 min max      | +25 +2             | +77 +5             | 5 min max      |
| 3    | +74 +2             | +165 +5            | Table 107-2    | See 1/             |                    | Table 107-2    |
| 4    | +25 +2             | +77 +5             | 5 min max      | +25 +2             | +77 +5             | 5 min max      |

1/ High temperature as specified on the applicable detail specification.

4.6.10 Shock. The sample group lamps shall be subjected to a shock test using Test Method 213, Test Condition J, MIL-STD-202 with the exceptions indicated herein. This test shall be performed with the lamps operating at the rated voltage. A peak "15g" load value or as specified on the applicable detail specification, shall be substituted for that specified in Test Condition J, Table 213-1. The time of individual sample lamp life to failure and reason for failure shall be recorded. After this test, the sample group lamps shall be inspected for conformance to 3.6.5.4.

4.6.11 Humidity. The sample group lamps, non-operating, shall be subjected to a humidity test using Test Method 103, Test Condition A, MIL-STD-202. After this test, the sample group lamps shall be operated to determine conformance to 3.6.5.5.

4.6.12 Salt spray. The sample group lamps, non-operating, shall be subjected to a salt spray test using Test Method 101, Test Condition B, MIL-STD-202. After this test, the sample group lamps shall be operated to determine conformance to 3.6.5.6.

## 5. PACKAGING

5.1 Packaging. Lamps shall be packaged in accordance method III, MIL-E-17555, as specified in 6.2.e. Lamps shall not be packaged with any type of volatile corrosion inhibitors.

5.2 Packing. Lamps shall be packed in accordance with MIL-E-17555 or as specified in 6.2.e.

### 5.3 Marking.

5.3.1 Standard marking. In addition to any special marking required herein, containers shall be marked in accordance with MIL-STD-129.

5.3.2 Special marking. In addition to the marking requirements of 5.3.1 and regardless of the level or type of packaging specified, all unit, supplementary, intermediate, and exterior containers shall also be marked with the specification part number and true manufacturer's code (CAGE).

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## 6. NOTES

6.1 Intended use. Lamps procured to this specification are intended for use primarily in military aircraft lighting applications where equipment and aircraft must operate under severe performance, storage, and environmental conditions. Typical lamp usages include applications in instrument and panel illumination, control and signal indicators, anti-collision lights, wing position lights, taxiing and landing lights, and ground taxi and runway lighting.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number and date of this specification.
- b. Part number of lamp required (see detail specification sheet).
- c. Color of lamp required (if not otherwise specified on the detail specification).
- d. Levels of packaging and packing (see 5.1).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time set for opening of bids, qualified for inclusion in Qualified Products List (QPL-6363) whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. The activity responsible for the Qualified Products List is the Naval Air Engineering Center (SESD), Code 53, Lakehurst, NJ 08733-5100, and information pertaining to qualification of products may be obtained from that activity.

6.4 Rated life. The specified average rated life (see 3.6.2) is based upon operating the lamp at the specified design voltage. Upon application to and approval of the procuring activity, the manufacturer may provide test results from his in-process quality conformance testing to substantiate the average life requirements.

6.5 Definitions. For purposes of defining various types of defects or terminology which is referred to in this specification, the following definitions apply:

- |         |   |   |
|---------|---|---|
| Blemish | - | A visual non-functional imperfection of the symmetry of the lamp globe or base.   |
| Blister | - | A visible separation of a coating from the glass bulb which forms an upraised, unbroken bubble.                                 |
| Crack   | - | A narrow lengthwise opening, split, or fissure produced by a partial separation of the coating from the bulb surface.           |
| Damage  | - | Any lamp component defect which prohibits the lamp from conforming to its basic functional and light distribution requirements. |

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- Defect - A fault in workmanship or manufacture which affects the proper functioning of the item.
- Discolor - A distinct change in hue of color or coating which adversely affects the lamp's functional color or reflective qualities and reduces its illumination characteristics to an out of specification condition.
- Fade - A loss of brightness or vividness of color such as to adversely affect the lamp's functional color or reflective qualities and reduces its illumination characteristics to an out of specification condition.
- Filament - C = single helical coil  
CC = coiled coil or double helical coil  
F = flat coil  
S = straight uncoiled wire
- Peel - Defined as any one (1) of the following conditions for:

## a. Colored Lamps:

- (1) No more than one (1) area having a coating void not to exceed .0625 average diameter.
- (2) No more than two (2) areas having coating voids not to exceed .0312 inch average diameter or combined total of .0625 inch diameter.
- (3) No more than five (5) areas having coating voids of less than .0312 in average diameter or a combined total of .0625 inch diameter.

## b. Reflector lamps:

With the lamp operating at rated voltage no more than 4 non-adjacent voids shall be visible when the lamp is checked from a distance no closer than 18 inches. Void diameter shall not exceed .050. These requirements do not apply within .050 of the glass to base junction and the coating to glass junction.

6.6 Subject terms (key word) listing.

Lamps  
Incandescent lamps  
Bulbs  
Aircraft lamps  
Aircraft lighting  
Illumination

6.7 Changes from previous issue. Asterisks or vertical lines are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

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Custodians:

Army - AV  
Navy - AS  
Air Force - 99

Review activities:

DLA - GS  
Air Force - 82, 11  
Navy - SH

Preparing activity:  
Navy - AS

(Proj 6240-0368)

**STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL***(See Instructions - Reverse Side)*

|  |  |
|--|--|
| 1. DOCUMENT NUMBER<br>MIL-L-6363F  | 2. DOCUMENT TITLE<br>Lamps, Incandescent, Aircraft Service   |
| 3a. NAME OF SUBMITTING ORGANIZATION  | 4. TYPE OF ORGANIZATION <i>(Mark one)</i><br><input type="checkbox"/> VENDOR<br><input type="checkbox"/> USER<br><input type="checkbox"/> MANUFACTURER<br><input type="checkbox"/> OTHER <i>(Specify):</i> _____ |
| b. ADDRESS <i>(Street, City, State, ZIP Code)</i>  |  |
| 5. PROBLEM AREAS<br>a. Paragraph Number and Wording:<br><br><br><br><br><br><br><br><br><br><br>b. Recommended Wording:<br><br><br><br><br><br><br><br><br><br><br>c. Reason/Rationale for Recommendation: |  |
| 6. REMARKS   |  |
| 7a. NAME OF SUBMITTER <i>(Last, First, MI)</i> - Optional  | b. WORK TELEPHONE NUMBER <i>(Include Area Code)</i> - Optional   |
| c. MAILING ADDRESS <i>(Street, City, State, ZIP Code)</i> - Optional   | 8. DATE OF SUBMISSION <i>(YYMMDD)</i>  |