INCH-POUND

MIL-DTL-6363H
30 September 1997
SUPERSEDING
MIL-L-6363G
25 September 1992

DETAIL 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 and environmental performance 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 in the applicable specification sheet.

Type I - General purpose lamps for use in applications at ambient temperatures from -55°C (-67°F) to 85°C (185°F).

Type II - Special purpose lamps for use in applications at ambient temperatures from -55°C (-67°F) and above 85°C (185°F).

1.3 Part identifying numbers. Lamp part identifying numbers will be as specified in the applicable specification sheet (see 6.6).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Air Warfare Center Aircraft Division, Code 414100B120-3, Highway 547, Lakehurst, NJ 08733-5100, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 6240

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications. standards. and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

A-A-883	-	Tape, Pressure Sensitive, Adhesive, Masking

DEPARTMENT OF DEFENSE

MIL-C-25050	-	Color, Aeronautical Lights and Lighting Equipment, General Requirements for

STANDARDS

DEPARTMENT OF DEFENSE

MIL-STD-202	-	Test Methods for Electronic and Electrical Component Parts
MIL-STD-889	-	Dissimilar Metals

(See supplement 1 for list of associated specifications).

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI-C81.61 - Lamp, Electrical Bases

(Application for copies should be addressed to the American National Standards Institute, 11 West 42nd Street, New York, NY 10036.)

SOCIETY OF AUTOMOTIVE ENGINEERS

SAE-AS4156 - Lamps, Color-Coded Incandescent Flange Base T1 and T1-3/4 for Voltage Identification

(Application for copies should be addressed to SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated specification or specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes 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 "specification sheet" shall be interpreted to include other specifications, specification sheets, and MS specification sheets which provide specific requirements for a single lamp or group of similar lamps. In the event of any conflict between the requirements of this specification and the specification sheets, the latter shall govern.

3.2 Qualification. Lamps furnished under this specification shall be products that are authorized by the qualifying activity for listing on the applicable qualified products list (QPL) before contract award (see 4.4 and 6.3).

3.3 Selection of parts. materials. and finishes. Selection of parts, materials, and finishes which are not specifically designated herein or in the applicable specification sheet shall be at the

manufacturers option. Parts, materials, and finishes selected shall meet or exceed the requirements of this specification. Acceptance or approval of any constituent part, material or finish shall not be construed as a guarantee of the acceptance of the finished product.

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 applicable specification sheets.

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. Lamp base and contact materials shall be resistant to electrolytic corrosion when installed in metal sockets and holders.

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 protected against electrolytic corrosion.

3.4.2 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.

3.4.3 Solder. The solder type selected shall be at the manufacturer's option to meet the intended use of the lamp or its application, and temperature rating as defined by the applicable specification sheet.

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

3.5.1 Type I lamps. Type I lamps shall be clear, colored, or reflective coated incandescent lamps for use at ambient temperatures up to 85°C (185°F).

3.5.2 Type II lamps. Type II lamps shall be clear, colored, or reflective coated incandescent lamps for use at ambient temperatures above 85°C (185°F), or as otherwise specified in the applicable specification sheet.

3.5.3 Reflector lamps. Reflector lamps may 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. Color may be obtained by the use of either colored glass or a coating on the glass.

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

3.5.7 Filament. The structure and processing of the filament material shall be of a quality to meet the specification performance and environmental requirements. The arrangement of the filament and filament support shall be as designated by the applicable specification sheet. When not specified by the specification sheet, the filament arrangement and support shall be at the manufacturer's option, to meet the performance and environmental requirements specified herein and in the applicable specification sheet.

3.5.8 Lamp bases. Where applicable, lamp base configuration and dimensions shall conform to the base type designation of ANSI-C81.61 as specified in the specification sheet. Where a lamp base is required that is not covered by ANSI-C81.61, the configuration and dimensions shall conform to those specified in the specification sheet.

3.5.9 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 which affect form, fit or function of the lamp shall be approved by the qualifying activity, as part of the qualification procedure.

3.6 Performance. The applicable performance requirements are defined by the applicable specification sheet if not defined herein.

3.6.1 Ratings. When operating at rated voltage, lamps shall conform to the current, power, and light output ratings specified in the applicable specification sheet (see 4.6.4 and 6.5).

3.6.1.1 Light output.

3.6.1.1.1 Initial candlepower. Lamps furnished under this specification shall have an initial candlepower output within the range specified in the applicable specification sheet when tested as specified (see 4.6.4).

3.6.1.1.2 Candlepower maintenance. Unless otherwise specified in the specification sheet, the average candlepower output of sample group lamps shall not fall below 80 percent of the initial candlepower output at 70 percent of average rated life. The exterior coating of lamps (if so furnished, both reflective and colored) shall not be damaged or discolor, crack, fade, blister or peel (see 4.6.6 and 6.5).

3.6.2 Life. Life requirements for lamps furnished under this specification shall be average rated laboratory life, as specified in the specification sheet. The sample group lamps shall operate for the average rated life shown in the specification sheet for the specific lamp part number. The average rated 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 4.6.5, 4.6.5.1 and 6.4).

3.6.3 Coating adhesion. When tested for adherence to the glass bulb, the exterior coatings (both reflective and colored), shall be such that they shall not be damaged or blister, crack, or peel from the globe when tested as specified (see 4.6.7, 4.6.9 and 6.5).

3.6.4 Solderabilitv. Unbased lamps having tinned lead terminals shall have the leads tested for solderability. The solder dipped surface of the terminal shall be at least 95 percent covered with a new, smooth solder coating. The remaining 5 percent of the terminal surface may contain small pinholes, voids or rough spots not concentrated in any one area. Bare base metal and areas where the new solder dip failed to cover the original coating are indications of poor solderability. The solderabiltiy test shall be performed as specified (see 4.6.15).

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

3.6.5.1 High temperature. When operating at rate voltage, the lamps shall perform to a minimum of 70 percent of the average rated life specified in the applicable specification sheet (up to 1000 hours maximum test time) while exposed to the specified maximum temperature for the type lamp being tested. Lamps shall show no evidence of burn-out or damage to any lamp component as a result of exposure to temperature extremes. Exterior coated lamps (both reflective and colored) shall show no evidence of damage, discoloration, cracking, fading, blistering or peeling of the coating (see 4.6.9 and 6.5).

3.6.5.2 Thermal shock. When operating at rated voltage, the lamps shall perform when subjected to severe changes in thermal conditions. Lamps shall show no evidence of burn-out or damage to any lamp component as a result of exposure to temperature extremes. Exterior coated lamps (both reflective and colored) shall show no evidence of damage, discoloration, cracking, fading, blistering or peeling of the coating (see 4.6.10 and 6.5).

3.6.5.3 Random vibration. When operating at rated voltage, the lamps shall perform when subjected to random vibrations in a frequency range from 5 to 2000 Hz. Lamps shall show no evidence of damage to any lamp component, or loose parts (see 4.6.11 and 6.5).

3.6.5.4 Shock. When operating at rated voltage, the lamps shall perform when subjected to a shock test using peak "g" load values as specified in the applicable specification sheet. If no "g" load value is specified, the shock test shall be performed using a minimum of 30 "g's" peak load. Lamps shall show no evidence of burn-out, damage to any lamp component, or loose parts (see 4.6.12 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 and any evidence of atmospheric leakage into the lamp. The lamps shall then be operated at rated voltage to determine conformance to the ratings (current, power and light output) specified in the applicable specification sheet (see 4.6.13 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 at rated voltage to determine conformance to the ratings (current, power and light output) specified in the applicable specification sheet (see 4.6.14 and 6.5).

3.7 Identification of product. Unless otherwise specified, all lamps shall be marked for identification in accordance with the marking specified in the specification sheet. Markings shall be clear, legible and durable (see 4.6.1).

3.7.1 Color coding for voltage identification. When specified in the specification sheet, lamp base insulators shall be color coded in accordance with SAE-AS4156 in order to identify voltage ratings of subminiature lamps.

3.8 Examination of product. Lamps shall be dimensionally inspected for conformance to the applicable specification sheet and visually examined for conformance to workmanship and identification of product (see 4.6.1).

3.9 Packaging inspection. Inspection of packaging for shipment of lamps shall be accomplished as required (see 4.6.2 and 6.2).

3.10 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. Loose, spattered, or excess solder, metal chips, flux, and other foreign material shall be removed (see 4.6.1 and 6.5).

4. VERIFICATION

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

a. Qualification inspection (4.4)

b. Conformance inspection (4.5)

4.2 Inspections and tests. The inspections and tests specified herein are intended to verify that the items produced meet or exceed the performance requirements specified.

4.3 Inspection conditions. Unless otherwise specified, 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, light output criteria shall be as specified in the applicable specification sheet. The test procedure for determining the change in light output before and after burning shall be the same for any one type lamp.

4.3.2 Lamp operation. Unless otherwise specified, lamps shall be operated at the rated voltage specified in the applicable specification sheet. Voltage tolerance shall be within ±0.5 percent of the rated voltage (unless otherwise specified in the specification sheet).

4.3.3 Lamp mounting. Unless otherwise specified, lamps shall be tested in a lampholder or fixture for the lamp under test. The lampholder or fixture 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 require light distribution measurements to be made relative to a specified reflector for 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 within ±5°C (±l0°F). The test chamber shall be operated for one hour prior to installation of lamps to ensure 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 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. The samples may be selected at random from recent production or fabricated, if lamps of recent production are not available. Qualification inspection shall be classified as follows:

a. Full qualification - Lamp samples shall be subjected to and pass all inspections and tests specified in table I.

b. Qualification by similarity - Lamp samples shall be subjected to and pass all inspections and tests specified in table II.

4.4.1 Extension of qualification by similarity. Unless otherwise specified, qualification of similar lamps from the same or different specification sheets may be extended from a previous fully qualified lamp, provided the following conditions are met and the required data and samples are supplied to the qualifying activity.

4.4.1.1 Conditions for qualification by similarity. Primary lamp(s) for full qualification, as designated by the applicable specification sheet, must pass full qualification for additional lamps of similar structure to be considered for qualification by similarity. Performance of the primary lamp(s) to the operating characteristics and environmental tests specified herein will qualify the basic generic design, construction, manufacturing process and quality controls for the family style. Additional lamps submitted for qualification by similarity must be products manufactured at the same manufacturing plant location, under the same manufacturing processes and quality controls as the fully qualified primary lamp(s). Unless otherwise specified, additional lamps must be of the same generic design and construction as the qualified primary lamp(s).

TABLE I. Qualification inspection.

Inspection/Test	Number of Sample Units	Requirement Paragraph	Test Method
All sample groups			
Examination of product	All	3.8	4.6.1
Burn-in/seasoning		---	4.6.3
Sample Group 1			
Ratings (current, power, initial light output)	10	3.6.1	4.6.4
Life 1/		3.6.2	4.6.5
Light output maintenance 2/		3.6.1.1.2	4.6.6
Coating adhesion*		3.6.2	4.6.7
Solderabi1iy*		3.6.4	4.6.15
* Where applicable			
Sample Group 2			
High temperature	3	3.6.5.1	4.6.9
Sample Group 3			
Therma1 shock	3	3.6.5.2	4.6.10
Sample Group 4			
Random vibration	3	3.6.5.3	4.6.11
Sample Group 5			
Shock	3	3.6.5.4	4.6.12
Humidity		3.6.5.5	4.6.13
Salt spray		3.6.5.6	4.5.14
Sample Group 6			
Spares only to replace unrelated failures (see 6.5)	3	---	---

1/ For average rated life specified in the applicable specification sheet up to 1000 hours maximum. For longer life lamps, the qualifying activity reserves the right to satisfy the life requirement by Government verification and acceptance of manufacturer's data from in-process conformance tests.

2/ Unless otherwise specified, for 70 percent of average rated 1ife specified in the applicable specification sheet up to 1000 hours maximum life.

TABLE II. Qualification inspection by similarity.

Inspection/Test	Number of Sample Units	Requirement Paragraph	Test Method
Burn-in/seasoning		---	4.6.3
Ratings (current, power, initial candlepower)	3	3.6.1	4.6.4
Random Vibration		3.6.5.3	4.6.11
Colored lamps (color, high temp, coating adhesion)		3.5.5	4.6.8
		3.6.5.1	4.6.9
		3.6.3	4.6.7
Solderability (where applicable)	3 (spares only)	3.6.4	4.6.15

4.4.2 Data and test samples to be submitted to the qualifying activity.

4.4.2.1 Data. See 6.3.1 for submission requirements.

4.4.2.2 Test samples. At the time of the application for qualification, test samples shall also be submitted to the qualifying activity as follows:

a. Sample for full qualification. Unless otherwise specified, the test sample shall consist of 25 lamps of each specified part number for which full qualification is desired. For purposes of qualification testing, the qualifying activity will divide the 25 lamps into six sample groups: one sample group of 10 lamps (Sample Group 1), and 5 sample groups of 3 lamps each (sample groups 2 through 6). Sample groups 1 through 5 shall be subjected to and must 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 (see 6.5).

b. Samples for qualification by similarity. Unless otherwise specified, the test sample shall consist of 10 lamps of each specific part number for which qualification by similarity is desired. For purposes of qualification testing, 3 lamps of each part number shall be subjected to and must pass the test specified in table II. Three lamps of each part number will be used as spares to replace unrelated failures (see 6.5).

The qualifying activity reserves the right to perform any test or inspections on the untested lamp sample deemed necessary to verify qualification of additional lamps for extended qualification. The requirements for latent failures (see 4.4.3.2) and retention of qualification (see 4.4.4) apply to additional lamps qualified by similarity and limited testing.

c. All test samples submitted for qualification shall be identified as to the applicant and the applicable specification sheet and part identification number.

4.4.3 Failure.

4.4.3.1 Test sampling failures. Failure on 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 (see 6.5) occurs and reserve lamps are used, prior to the continuance of testing.

4.4.3.2 Latent failures. Lamps which can be identified to a specified manufacturer, and through field service usage fail significantly premature to an established baseline of normal ratings and requirements, may at the discretion of the qualifying activity, be required to be retested and requalified as meeting all of the requirements, or to be removed from the QPL.

4.4.4 Retention of qualification. To retain qualification, the manufacturer shall complete and forward a certification of qualified products (DD Form 1718) at 24 month intervals to the qualifying activity (see 6.3). Failure to complete and return this form is cause for removal of product(s) from QPL-6363. The qualifying activity shall establish the initial reporting date.

4.5 Conformance inspection.

4.5.1 Quality control and production. The manufacturer shall have a documented quality control system approved by the Government. Complete and accurate records of the inspections and tests performed under this system shall be maintained. 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 specification sheets. Examination of product, ratings, and operating life testing shall be normal requirements 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 production period, from one manufacturer and one plant location, submitted for acceptance and delivery under contract or purchase order. When production lots are fractionalized for acceptance and partial delivery under contract or purchase order, each partial quantity shall be considered a separate inspection lot.

4.5.3 Inspection of product for delivery.

4.5.3.1 Group A and B inspection. Inspection of product for delivery under contract or purchase order shall include Group A and B inspections (see table III). Random sampling for Groups A and B inspections shall be accomplished throughout the complete production lot manufacturing process in accordance with the sampling plan and acceptance level specified in the contract or purchase order (see 6.2).

TABLE III. Conformance inspection.

Inspection	Requirement Paragraph	Inspection Paragraph
Group A		
Examination of product	3.8	4.6.1
Packaging	3.9	4.6.2
Group B		
Ratings (current, power, initial light output)	3.6.1	4.6.4
Solderability (where applicable)	3.6.4	4.6.15
Colored lamps	3.5.5	4.6.8
Group C		
Life	3.6.2	4.6.5
Light output maintenance	3.6.1.1	4.6.6
Coating adhesion (where applicable)	3.6.3	4.6.7

4.5.3.1.1 Noncompliance. In the event of failure of sample lamps to pass the Group A and B inspections, the inspection 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.

4.5.4 Periodic in-process inspection. Periodic in-process inspection shall consist of Group C inspection. Except where the results of these inspections show non-compliance with the applicable requirements (see 4.5.4.1.1), delivery of products which have passed the Group A and B inspections shall not be delayed pending the results of these periodic inspections.

4.5.4.1 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 III. The manufacturer's normal sampling, based upon production quantity or time periods, shall be used, and samples shall have passed the applicable Group A and B inspections. Group C inspection samples shall be representative of production.

4.5.4.1.1 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 or products 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 or cognizant inspection activity 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 representative or the cognizant inspection activity. Groups A and B inspections may be re-instituted; 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 reinspection, information concerning the failure shall be furnished to the qualifying activity and the cognizant inspection activity.

4.5.4.1.2 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 visually and dimensionally examined for conformance to this specification and the applicable specification sheet.

4.6.2 Packaging inspection. The sampling and inspection of packaging shall be as specified in the contract or purchase order (see 6.2).

4.6.3 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 percent of the rated life specified in the applicable specification sheet or a maximum of 10 hours.

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

4.6.4.1 Photometric tests. Photometric tests shall be performed using standard lamps traceable to National Institute of Standards and Technology (NIST). Lamp standards shall be calibrated on a yearly basis minimum.

4.6.4.2 Initial ratings. After burn-in/seasoning, the sample group lamps shall be energized at rated voltage, and the current, power and initial light output shall be measured, recorded, and compared to ratings specified in the applicable specification sheet.

4.6.4.3 Post test ratings. When required by the specified test procedure, the sample group lamps shall be energized at rated voltage, and the current, power and light output shall be measured, recorded and compared to ratings specified in the applicable specification sheet.

4.6.5 Life. 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, The lamps shall be operated at rated voltage to determine that average lamp life conforms to that specified in the applicable specification sheet. For qualification purposes, life test shall be performed up to 1000 hours maximum.

4.6.5.1 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 50 percent of the test samples to fail. Lamps are considered as having failed when they burn out or light output decreases by more than 20 percent of initial reading. For qualification purposes, when test samples are exceeding the specification requirement prior to the point of failure of 50 percent of the sample lamps, the life test may be terminated prior to 50 percent sample failure.

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

4.6.7 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 or a longer piece of pressure sensitive adhesive tape, 0.75 inches in width, conforming to Commercial Item Description A-A-883, Type I, shall be pressed firmly onto a flat or cylindrical coated surface of the sample lamp or as specified in the applicable specification sheet, rubbing out all air bubbles under the tape. Ten 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 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 group lamps are operated for 10 percent of the rated life. After testing, the sample group lamps shall be checked for conformance to 3.6.3. Any sample lamp indicating failure shall be cause for rejection of the sample group. When performed as part of the Group C tests, failure of the sample group to meet the coating adhesion requirements shall be cause for acceptance and shipment of lamps to be discontinued until the requirements of 4.5.4.1.1 have been satisfied.

4.6.8 Colored lamps. Colored lamps shall be operated at rated voltage and the light emitted shall be measured for conformance to MIL-C-25050 for the specified color.

4.6.9 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 or as specified in the applicable specification sheet up to a maximum of 1000 hours for qualification testing. Lamps designated as Type I shall be operated at 85°C (185°F) and lamps designated as Type II shall be operated at the maximum temperature specified in the applicable specification sheet. The time of any individual sample lamp failure and reason for failure shall be reported. After test, lamps shall be checked for conformance to 3.6.5.1.

4.6.10 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 indicted in table IV. This test shall be performed with the lamps operating at rated voltage. Table IV below shall be substituted for table 107-1, Test Method 107, MIL-STD-202. Continue steps 1 through 4 of table IV for 25 cycles. The time of any individual sample lamp failure and reason for failure shall be reported. After test, lamps shall be checked for conformance to 3.6.5.2.

TABLE IV. Thermal shock test conditions.

Step	Type I Lamps			Type II Lamps		
	Temperature		Time per cycle	Temperature		Time per cycle
	°C	°F		°C	°F	
1	-55 +1	-67 +2	Table 107-2	-55 +1	-67 +2	Table 107-2
2	+25 +2	+77 +5	5 min max	+25 +2	+77 +5	5 min max
3	+85 +2	185 +5	Table 107-2	See 1/	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 in the applicable specification sheet.

4.6.11 Random vibration. The sample group lamps shall be subjected to a random vibration spectrum between 5 and 2000 Hz with power spectral densities as specified in the applicable specification sheet for each lamp type.

4.6.11.1 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 as specified in the applicable specification sheet. The vibration apparatus control and analysis of vibration shall be in accordance with Test Method 214, MIL-STD-202.

4.6.11.2 Test setup applicable to all lamps. The sample group lamps shall be vibrated for a total of 30 minutes; 7.5 minutes with the lamps nonoperating and 22.5 minutes with the lamps operating at rated voltage. Nonoperating vibration shall be in "Z" axis as indicated in the

applicable specification sheet. During the operating mode, the lamps shall be vibrated for 7.5 minutes in each of 3 mutually perpendicular axes as defined in the applicable specification sheet.

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 axes. The time to failure of any individual sample lamp and the observed reason for failure shall be reported. After this test, the sample group lamps shall be inspected for conformance to 3.6.5.3.

4.6.12 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 "g" load value as specified in the applicable specification sheet shall be substituted for that specified in Test Condition J, Table 213 - 1. If no "g" load value is specified in the specification sheet the shock test shall be conducted using a 30 g's peak load. The time of failure of any individual sample lamp and reason for failure shall be reported. After this test, the sample group lamps shall be inspected for conformance to 3.6.5.4.

4.6.13 Humidity. The sample group lamps, nonoperating, shall be subjected to a humidity test using Test Method 103, Test Condition A (240 hours), MIL-STD-202. After this test, the sample group lamps shall be operated to determine conformance to 3.6.5.5.

4.6.14 Salt spray. The sample group lamps nonoperating, shall be subjected to a salt spray test using Test Method 101, Test Condition B (48 hours), MIL-STD-202. After this test, the sample group lamps shall be operated to determine conformance to 3.6.5.6.

4.6.15 Solderabilitv. Sample group unbased lamps having wire lead terminations shall be tested in accordance with Method 208, MIL-STD-202, and evaluated for solderability of wire leads as specified in 3.6.4.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Lamps acquired 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 instruments and panel illumination, control and signal indicators, anti-collision lights, wing position lights, taxiing and landing lights.

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of the specification, the applicable specification sheet and applicable QPL.

b. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2).

c. Part identifying number of lamp required (see applicable specification sheet).

d. Color of lamp required, if not otherwise specified in the specification sheet (see 6.6).

e. Sampling plans and acceptance levels for Group A and Group B inspections (see 4.5.3.1).

f. Sampling and inspection requirements for packaging (see 4.6.2 and 5).

g. Packaging requirements (see 5).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, 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 Federal 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. Application for qualification should be in accordance with publication SD-6, Provisions Governing Qualification. The qualifying activity responsible for the Qualified Products List id the Commander, Naval Air Warfare Center Aircraft Division, Code 4141B120-3, Highway 547, Lakehurst, NJ 08733-5100. Information pertaining to qualification of products may be obtained from that activity.

6.3.1 Data. Application for qualification should be by letter addressed to the Commander, Naval Air Warfare Center Aircraft Division, Code 4142B120-3, Highway 547, Lakehurst, NJ 08733-5100. The application shall provide the following data:

a. Identification of all lamps being submitted for both full qualification and qualification by similarity (specification sheet number and part identification numbers).

b. Actual manufacturer's name and plant location, including complete address.

c. Applicant's brand designation for the lamp(s). Where applicable, certification from the actual manufacturer to rebrand and distribute the lamp(s) under a distributor's own brand and designation.

d. Test reports and data from manufacturer indicating conformance to the applicable specification.

e. Technical literature illustrative of the scope of the manufacturing facilities.

f. Certification that the manufacturer has a documented quality control program in effect.

6.4 Rated life. The specified average rated life (see 3.6.2) is based upon operating the lamps at the specified design voltage. Where performance of life testing at rated voltage is considered to be impractical, the use of accelerated life testing based on the 12^{th} power rule is permissible.

$$L_A = L_R(V_R/V_O)^{12}$$

Where L_A = Accelerated life
L_R = Rated life at design voltage
V_R = Rated voltage
V_O = Operating voltage

Upon application to, and approval of the acquiring activity, the manufacturer may provide test results from their in-process quality conformance testing to substantiate the life requirements.

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

Blemish - A visual nonfunctional 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.

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

Light center for C-2 shaped filaments - Light center is a point lying in a plane through the axis of the filament coils midway between the "top" and "bottom" of the lighted filament and midway between the outer edges of the filament coils at the horizontal level of the light center.

NOTE: Filament top is the upper extremity of the highest lighted turn (away from base) in either coil segment. Filament bottom is the underside of the lowest lighted turn (toward base) in either coil segment. The lowest lighted turn is considered for this purpose as being the first turn above the first inside angle between turns of the projected filament image.

Light center for C-6 shaped filaments - Light center is a point lying in the axis of the filament coil midway between the end turns of the lighted filament.

Light center length (LCL) - Light center length is the distance from light center to the specified reference point on the lamp.

Reference points on the lamp base for light center length measurement.

Bayonet base - Top of base pins.
Single contact miniature flanged - Top of bosses in the flange.
Single contact index - Top of base pin nearer bottom contact.
SC midget flange - Top of flange.
Submidget flange - Top of flange.

Peel - Defined as any one of the following conditions for:

a. Colored lamps:

1. No more than one area having a coating void not to exceed 0.0625 inch average diameter.

2. No more than two areas having coating voids not to exceed 0.0312 inch average diameter or combined total of 0.0625 inch diameter.

3. No more than five areas having coating voids of less than 0.0312 inch average diameter or a combined total of 0.0625 inch diameter.

b. Reflector lamps:

With the lamp operating at rated voltage no more than four non-adjacent voids should be visible when the lamp is checked from a distance no closer than 18 inches. Void diameter should not exceed 0.050 inch. These requirements do not apply within 0.050 inch of the glass to base junction and the coating to glass junction.

Unrelated failure - A lamp failure, malfunction, or breakage, occurring during testing, which is not attributable to the effect of the test procedure. Examples:

Lamp inadvertently damaged or broken during handling or fixturing.

Malfunction of test equipment causing lamp under test to fail or malfunction.

6.6 Part or identifying number (PIN). The part or identifying number (PIN) consists of the letter "M", the basic number of the applicable specification sheet (not including the revision letter) and an assigned dash number. When required for colored lamps, an additional upper case suffix letter indicating the lamp color will be used. When required for aged and selected tolerance on MSCD, an additional suffix "AS_" indicating the aged and selected tolerance will be used.

Example of part identifying number: M6363/X-lRAS15

MIL Designation	Specification Sheet Number	Dash Number	Suffix Letter for Color	Suffix for Aged & Selected
M	6363/X	-1	R	AS15

Suffix letter codes for colored lamps:

Suffix Letter	Color
R	Red
G	Green
B	Blue
Y	Yellow
W	White

6.7 Appendix cross-reference. The appendix which follows is a cross-reference listing of MIL-DTL-6363 specification sheet part numbers to similar Industry/ANSI lamp part numbers. This cross-reference is for convenience only and is not intended for use as an interchangeability list to substitute commercial lamp numbers for MIL-DTL-6363 part numbers.

6.8 Subject term (keyword) listing.

Aircraft lamps
Aircraft lighting
Bulbs
Illumination
Lighting
Lights

6.9 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

APPENDIX A

CROSS-REFERENCE LIST

A.1 SCOPE

A.1.1 Scope. This appendix is not a mandatory part of the specification. This appendix provides guidance information only and is not intended to be used for purposes of interchangeability.

A.1.2 Purpose This appendix provides a listing of part identifying numbers indicated on MIL-DTL-6363 detail specification sheets cross-referenced to Industry/ANSI lamp numbers for similar lamps. This cross-reference listing i5 intended for reference use only and is not to be used for interchangeability with commercial or other military designated lamps due to unique aircraft applications and qualification requirements of MIL-DTL-6363 and its associated detail specification sheets.

A.2 APPLICABLE DOCUMENTS

(This section is not applicable to this appendix.)

A.3 CR0SS-REFERENCE LISTING

A.3.1 This listing will be revised when additional part numbers are added to the MIL-DTL-6363 specification sheets listed, or when new MIL-DTL-6363 specification sheets are drafted or issued.

MIL-DTL-6363 Specification Sheet and Part No.	Similar Industry/ANSI Lamp No.	NSN
MIL-DTL-6363/1 - SC Bayonet Candelabra Base, Reflective Coated		
M6363/1-1	7079	6240-01-262-0145
M6363/1-2	617	6240-01-262-0146
M6363/1-3	1687	6240-01-262-5786
MIL-DTL-6363/2 - SC Bayonet Candelabra Base, Reflective Coated		
M6363/2-1	600	6240-01-262-0147
M6363/2-2	7512	6240-01-262-0148

APPENDIX A

MIL-DTL-6363 Specification Sheet and Part No.	Similar Industry/ANSI Lamp No.	NSN
MIL-DTL-6363/3 - SC Bayonet Candelabra Base, Reflective Coated		
M6363/3-1	4174	6240-01-262-5787
M6363/3-2	1163	6240-01-262-0149
MIL-DTL-6363/4 - T-3/4 Submin Unbased Wire Lead Terminals Integral Lighting		
M6363/4-1 AS15	6803AS15	
M6363/4-2 AS15	6833AS15	
M6363/4-3 AS15	7153AS15	
M6363/4-4 AS15	6153AS15	
MIL-DTL-6363/5 - T-1 Submin Unbased Wire Lead Terminals Integral Lighting		
M6363/5-1 AS15	680AS15	
M6363/5-2 ASl5	683AS15	
M6363/5-2R	683Red	
M6363/5-3 AS15	715AS15	
M6363/5-4 AS15	6150AS15	
M6363/5-5 AS15	6802AS15	
M6363/5-6 AS15	6832AS15	
M6363/5-7 AS15	7132AS15	
M6363/5-8 AS15	7152AS15	
M6363/5-8R	7152Red	
M6363/5-9 AS15	6152AS15	
M6363/5-10	7009	

APPENDIX A

MIL-DTL-6363 Specification Sheet and Part No.	Similar Industry/ANSI Lamp No.	NSN
MIL-DTL-6363/6 - T-l Submidget		
Flanged Base		
M6363/6-1	682	
M6363/6-1 AS15	682AS15	
M6363/6-2	685	
M6363/6-2 AS15	685AS15	
M6363/6-3	6180	
M6363/6-3 AS15	6180AS15	
M6363/6-4	718	
M6363/6-4 AS15	718AS15	
M6363/6-5	6839	
M6363/6-5 AS15	6839ASI5	
MIL-DTL-6363/7 - T-1 1/4 Submin		
Knurled Screw Base		
M6363/7-1	323	
M6363/7-1R	323Red	
M6363/7-2	8639	
M6363/7-3	8623	
M6363/7-3R	8623Red	
MIL-DTL-6363/8 - T-1 3/4 SC		
Midget Flanged Base		
M6363/8-1	3150	
M6363/8-lASl5	3150AS15	
M6363/8-2	328	
M6363/8-2 AS10	328AS10	
M6363/8-2B	328Blue/White	
M6363/8-2R	328 Red	
M6363/8-3	381	
M6363/8-3AS15	381AS15	
M6363/8-4	8918	
M6363/8-4 AS15	8918AS15	

Continued

APPENDIX A

MIL-DTL-6363 Specification Sheet and Part No.	Similar Industry/ANSI Lamp No.	NSN
M6363/8-5	327	
M6363/8-5AS15	327AS15	
M6363/8-5R	327Red	
M6363/8-6 ASI5	385AS15	
M6363/8-7	387	
M6363/8-7 ASI5	387AS15	
M6363/8-7R	387Red	
MIL-DTL-6363/9 - T-3 l/4 SC Mln Bayonet Base		
M6363/9-1	316	
M6363/9-lR	316Red	
M6363/9-2	313	
M6363/9-2R	313Red	
M6363/9-3	1819	
M6363/9-3R	1819Red	
M6363/9-4	1829	
MIL-DTL-6363/10 - G-5 SC Bayonet Candelabra Base		
M6363/10-l	301	
MIL-DTL-6363/11 - G-6 SC Bayonet Candelabra Base		
M6363/11-1	89	
M6363/11-2	303	
MIL-DTL-6363/12 - S-8 SC Bayonet Candelabra Base		
M6363/12-1	1680	
M6363/12-2	1683	
M6363/12-3	1141	
M6363/12-4	307	

Continued

APPENDIX A

MIL-DTL-6363 Specification Sheet and Part No.	Similar Industry/ANSI Lamp No.	NSN
M6363/12-4R	307Red	
M6363/12-4SB	307Refl Coated	
M6363/12-5	315	
M6363/12-6	305	
M6363/12-7	1691	
M6363/12-8	2222	
M6363/12-9	2223	
MIL-DTL-6363/13 - S-11 SC		
Bayonet Candelabra Base		
M6363/13-1	311	
M6363/13-1R	311Red	
M6363/13-2	3011	
MIL-DTL-6363/14 - T-4-1/2		
SC Min Bayonet Base		
M6363/14-1X	1495X	

CONCLUDING MATERIAL

Custodians:
Army - AV
Navy - AS
Air Forte - 99

Preparing activity:
Navy - AS

(Project 6240-1441)

Review activities:
Navy - SH
Air Force - 11, 82
DLA - GS

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.

2. The submitter of this form must complete blocks 4, 5, 6, and 7.

3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	**1. DOCUMENT NUMBER** MIL-DTL-6363H	**2. DOCUMENT DATE (YYMMDD)** 970930

3. DOCUMENT TITLE LAMPS INCANDESCENT, AIRCRAFT SERVICE, GENERAL SPECIFICATION FOR

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME *(Last, First, Middle Initial)*	b. ORGANIZATION	
c. ADDRESS *(Include Zip Code)*	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON *(if applicable)*	**7. DATE SUBMITTED** (YYMMDD)

8. PREPARING ACTIVITY

a. NAME NAVAL AIR WAREFARE CTR, AIRCRAFT DIV	b. TELEPHONE *Include Area Code)* (1) Commercial (732)323-7488 (2) AUTOVON 624-7488
c. ADDRESS *(Include Zip Code)* CODE 414100B120-3 HIGHWAY 547 LAKEHURST, NJ 08733-5100	**IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:** DEFENSE QUALITY AND STANDARDIZATION OFFICE 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22401-3466 Telephone (703) 756-2340 AUTOVON 289-2340