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MILITARY SPECIFICATION

LIGHT SYSTEMS, AIRCRAFT, ANTI-COLLISION, STROBE, 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 covers the general requirements for two types of anti-collision, aircraft lighting strobe systems. The lighting system shall be defined as the total number of lightheads and power supplies required to provide 360° protective lighting in the horizontal plane of the aircraft. Vertical protective lighting coverage provided by the lighting system is dependent on the system selected in accordance with the applicable specification sheet.

1.2 Classification. Strobe anti-collision, aircraft light systems shall be of the following types, as specified (see 6.2):

Type I - For use with 28 volt direct current (VDC) aircraft power source

Type II - For use with one phase of a three phase 115 volt alternating current (VAC) 400 hertz (Hz) aircraft power source

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. Unless otherwise specified, the following specifications, standards, and handbooks of the issue listed in that issue of 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.

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

MIL-L-85314A

SPECIFICATIONS

* <u>Military</u>	
MIL-W-5088	Wiring, Aerospace Vehicle
MIL-E-5400	Electronic Equipment, Aerospace, General Specification for
MIL-S-7742	Screw Threads, Standard, Optimum Selected Series, General Specification for
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-C-38999	Connector, Electrical, Circular, Miniature, High Density, Quick Disconnect, (Bayonet, Threaded and Breech Coupling), Environment Resistant, Removable Crimp and Hermetic Solder Contacts, General Specification for

STANDARDS

Federal

FED-STD-595 Colors

Military

DOD-STD-100	Engineering Drawing Practices
MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-130	Identification Marking of U.S. Military Property
MIL-STD-454	Standard General Requirements for Electronic Equipment
MIL-STD-461	Electromagnetic Emission and Susceptibility, Requirements for the Control of Electromagnetic Interference
MIL-STD-462	Electromagnetic Interference Characteristics, Measurement of

MIL-L-85314A

STANDARDS (Continued)

Military (Continued)

MIL-STD-704	Aircraft, Electric Power Characteristics
MIL-STD-781	Reliability Tests: Exponential Distribution
MIL-STD-794	Parts and Equipment, Procedures for Packaging and Packing of
MIL-STD-810	Environmental Test Methods
MIL-STD-831	Test Reports, Preparation of
MIL-STD-882	System Safety Program Requirements
MIL-STD-889	Dissimilar Metals
MIL-STD-1568	Materials and Processes for Corrosion Prevention and Control in Aerospace Weapons Systems

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

3. REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheet. In the event of any conflict between requirements of this specification and the specification sheet, the latter shall govern. (If a specific requirement specified herein is not required for an item, it shall be as indicated on the specification sheet (e.g., shock - N/A).)

3.2 First article. The strobe, anti-collision, aircraft light systems furnished under this specification shall be a product which has been inspected and passed the first article inspection specified herein (see 4.3).

* 3.3 Materials and components. Materials and components shall conform to applicable specifications and standards as specified herein and in the applicable specification sheet. Materials and components not specified herein or in the applicable specification sheet shall be selected in accordance with MIL-E-5400. Materials and components which are not covered by applicable specifications or standards or which are not specifically described herein or in the applicable specification sheet shall be of the best quality, of the lightest practicable weight and suitable for the purpose intended. Materials used shall be self-

MIL-L-85314A

extinguishing, shall not give off noxious gases in harmful quantities, shall not give off gases in quantities sufficient to cause explosion of sealed enclosures, and shall not cause contamination of the contacts or other parts of the system when subjected to any of the tests specified herein or environmental conditions encountered in service usage. The selection of materials shall be such as to provide a shelf life of at least 3 years without affecting the operation of the system. Maintenance action to reform electrolytic capacitors shall be permissible as specified in 3.12.

3.4 Corrosion prevention and control. The materials and processes considered in design, the corrosion protection during manufacturing operations, and protective treatment finishes shall be selected with the guidance of MIL-STD-1568.

3.4.1 Metal parts. All metal parts shall be of a corrosion resistant material or treated in a manner to render them adequately resistant to corrosion.

3.4.1.1 Dissimilar metals. Dissimilar metals as defined in MIL-STD-889 shall not be in direct contact with each other unless appropriately protected against electrolytic corrosion with protective coatings.

3.4.2 Protective treatment. When materials are used in the construction of the strobe, anti-collision light systems that are subject to corrosion in salt air or other atmospheric conditions likely to occur during service usage, they shall be protected against such corrosion in a manner that shall in no way prevent compliance with the performance requirements of this and the applicable specification sheet. Protective coatings that shall chip or scale during normal service life or under extremes of atmospheric conditions, shall not be used. Protective treatment shall conform to requirement 15 of MIL-STD-454.

3.4.3 Fungus-proof materials. Materials which are nutrients for fungi shall not be used where it is practicable to avoid them. Where used and not hermetically sealed, they shall be treated with a fungicidal agent acceptable to the acquiring activity. Fungus-proof material shall conform to requirement 4 of MIL-STD-454.

3.4.4 Standard parts. MS and AN standard parts shall be used where they suit the purpose and shall be identified by their part number. In applications for which no suitable standard part is in effect on the date of invitation of bid, commercial parts may be used, provided they conform to the requirements of this and the applicable specification sheet.

3.4.5 Screw threads. Screw threads shall conform to MIL-S-7742.

3.5 Environmental conditions. Unless otherwise specified in the applicable specification sheet, the light systems shall function as designed when exposed to any likely combination of the following environmental conditions:

MIL-L-85314A

- a. Temperature from -54 to +71°C.
- b. Humidity as encountered in all-weather operation.
- c. Salt spray as encountered in salt water operations.
- d. Sand and dust as encountered in desert operations.
- e. Vibration shock within the limits of tests, as described in 4.6.7.
- f. From sea level to 50,000 feet altitude.
- g. In any attitude of the aircraft.

* 3.6 Design. The strobe, anti-collision, aircraft lighting systems shall provide the anti-collision lighting as specified in the applicable specification sheet. The design shall incorporate a modular concept where subassemblies of the major assemblies are easily replaceable as a complete module. In the construction of the light systems, full advantage of the design for minimum size and weight, long life, maximum reliability, maintainability and minimum electromagnetic interference (EMI) per the applicable category shall be employed. The light emitted by each system or systems shall provide coverage above and below the horizontal plane of the aircraft as defined by the applicable specification sheet. The horizontal field of coverage shall be 360 degrees. The horizontal plane of the aircraft is defined by the longitudinal and lateral axes of the aircraft.

* 3.6.1 System. The systems consist of transparent covers, light assemblies and power supplies. The control circuitry necessary to operate the system on the aircraft shall not be furnished as components of this system. Each system shall be capable of operation in accordance with the requirements specified herein and the applicable specification sheet. The light source(s) shall be single mode (single intensity level) or dual mode (low and high intensity levels) specified herein and the applicable specification sheet. Each mode shall be selectable utilizing a remotely located cockpit mounted switch.

* 3.6.1.1 Mode selection. The system shall be compatible with cockpit mounted switches used to provide control signals for operation of the system. Control signals may include "ON" - "OFF", "RED" - "WHITE", "UPPER" - "LOWER", as applicable and any other control signals deemed necessary for operation of the system. Main aircraft power shall not be used in conjunction with any cockpit mounted control switches. A low power control circuit shall be provided for control of the strobe system. The system shall provide for a rapid connect/disconnect capability between the switch interconnecting wiring and each type power supply assembly. The switches and their interconnecting wiring with mating connectors shall not be furnished as components of the system.

MIL-I-85314A

3.6.1.2 Interface design. The design of the systems shall include the interface and installation data required to mate the specific system with the aircraft. However, the interconnecting wiring and electrical connector mating halves for the aircraft shall not be furnished as components of the system. All wiring shall meet the applicable requirements of MIL-W-5088. Each type system shall operate in accordance with the requirements specified herein and the applicable specification sheet utilizing the applicable aircraft power containing the characteristics defined in MIL-STD-704. Performance requirements of this and the applicable specification sheet shall conform with interconnecting wiring from the power supply(s) to the light sources not exceeding 0.188 OHMS resistance for each mode.

3.6.1.3 Thermal design. The systems shall be designed to incorporate within each assembly any thermal devices necessary to comply with the environmental requirements of this and the applicable specification sheet. Such thermal devices shall be automatically activated and deactivated. The design of each type system shall not require any externally supplied heating or cooling devices such as fans, blowers, ducts, etc.

3.6.2 Safety. The intent of MIL-STD-882 shall be met in that all hazards associated with the system shall be identified and eliminated or controlled. In addition, the system shall be designed to insure that a system failure shall be limited to the system and shall not affect the safety of the aircraft in which it is installed or other interfacing systems. The system shall be designed to provide for maximum personnel safety as specified herein and the applicable specification sheet and in accordance with MIL-STD-454, requirement number 1. When power shall be removed from the system by any means, the system shall be rendered "electrically safe" to maintenance personnel who handle system components, assemblies and subassemblies. Electrically safe shall be defined as the removal of all electrical shock hazard to the maintenance technician. Provisions for the system squat switch shall be as specified in 3.6.1.

3.6.2.1 Grounding. Grounding of the systems shall comply with MIL-STD-454, requirement number 1.

3.6.2.2 Electrical connectors. The electrical connectors used in conjunction with systems wiring shall be as specified in MIL-C-38999, Series 3 or 4. When not specified, they shall be military qualified connectors utilizing screw threads or bayonet coupling for their mating. Electrical connectors shall be selected and installed so that contacts on the "live" or "hot" side of the connector are socket type rather than pin type. Electrical connectors used for power, control and light source circuits shall be dissimilar to the extent that electrical connections cannot be made which would electrically damage any portion of the equipment.

* 3.6.2.3 Circuit overload/electrical damage protection. The design of the systems shall be such that in case of either an open or short circuit of any light source, high or low mode, each remaining light source shall continue to operate. The power supply shall not

MIL-L-85314A

suffer any damage due an external open or shorted condition on the input, output, or control wiring. System will return to normal operation upon removal of a shorted or open condition.

3.6.2.4 Shielding. The lights shall be capable of being shielded to prevent light beams from being directly or indirectly projected into the cockpit or other areas that would interfere with operating personnel.

3.6.3 Modules. The light source assembly shall be designed to provide a light source module(s) incorporating dual/single modes and a base module for aircraft interfacing. The light source module and the base module shall be independently replaceable as separate modules requiring no more than 15 minutes of effort to remove and replace without requiring any special tools.

3.6.4 Mounting. The power supply assembly design shall incorporate the necessary mounting provisions required to comply with the mounting requirements specified for any mounting attitude, including interior and exterior, to the airframe. Each light source shall be designed to incorporate any necessary mounting provisions required to comply with the requirements specified herein and the applicable specification sheet. The mounting flange shall not be furnished as a component of the system. The lights shall be mounted as specified in the applicable specification sheet.

3.6.5 Transparent covers. The transparent covers of the light source shall be glass which shall not craze, crack, discolor or dimensionally distort as a result of operational environmental temperatures or other conditions. In addition, the transparent cover assemblies shall not deteriorate from ultra-violet radiation or aircraft fluids. The transparent covers shall not in any manner degrade color emission requirements as specified herein or in the applicable specification sheet. Plastic materials shall not be used in any of the optical portions of the systems.

* 3.6.6 Power consumption. Each type system shall comply with input power requirements defined as average electrical power from an aircraft source per the applicable specification sheet.

3.7 Performance characteristics. The light systems (lamps and power supplies) shall meet all the performance requirements of this and the applicable specification sheet when tested as specified in Section 4 of this specification.

* 3.7.1 Electrical power. Type I and Type II lighting systems shall be compatible with the aircraft electric power characteristics as defined by MIL-STD-704.

Type I - DC power characteristics for 28 VDC
Type II - AC power characteristics for 115 VAC

MIL-L-85314A

Lighting systems shall not suffer damage or degradation when subjected to emergency or abnormal voltage conditions as defined in MIL-STD-704 for AC and DC power sources. In addition, the system shall not be damaged when subjected to the over/under voltage/frequency or voltage and frequency transients as specified in MIL-STD-704. Normal operation is not required during over/under and transient conditions, however, the system must meet all performance specifications upon return of normal operating electrical power.

3.7.2 Flash rate. The flash rate of each light assembly shall conform to the applicable specification sheet when tested as specified in 4.6.3. When any light source is deactivated, each remaining source, when applicable, shall continue to flash at the rate specified.

3.7.3 Light intensity. The light intensity of each light assembly, when tested as specified in 4.6.4, shall comply with the requirements of the applicable specification sheet.

* 3.7.4 Electromagnetic Interference (EMI). The light system shall meet the requirements of Parts 1 and 2 of MIL-STD-461 for Class Alb equipment as specified and/or modified below:

TEST METHODS

CE01	(1)	RE02	(5), (7)
CE03	(2), (3), (4)	RS02	(6)
CS01		RS03	(8)
CS02	(8)		
CS06	(6)		

The numbers in parentheses above refer to the notes below:

NOTES: (The notes take precedent over MIL-STD-461)

- (1) CE01 is applicable only for narrowband emissions between 30 Hz and 15 KHz on alternating current (AC) or direct current (DC) leads which obtain power from other sources or provide power to equipment or subsystems. This requirement is not applicable for interconnecting leads.
- (2) The CE03 requirement is applicable for AC and DC leads which obtain power from other sources or provide power to other equipment or subsystems. This requirement is not applicable to interconnecting leads.
- (3) CE03 Limits: Electromagnetic emissions shall not appear on AC and DC leads in excess of the values shown on figures 2-2 and 2-3 of MIL-STD-461 for narrowband and broadband emissions, respectively. Conducted switching transient emissions including ON/OFF switching shall meet the limits of CE07.

MIL-L-85314A

- (4) CE03 limits in figure 2-3 of MIL-STD-461 should be redrawn such that the end points of the line segments are 140 dBuA/MHz at 0.015 MHz and 50 dBuA/MHz at 2 MHz and 5 MHz.
- (5) Radiated transients resulting at the instant of operation of a manual switch shall not exceed the applicable limit curve on figure 2-10 of MIL-STD-461 by more than 20 dB.
- (6) The procedure and limits of Methods RS02 and CS06 shall apply except that both of the following spikes will be used and the values of $E(\)$ and $t(\)$ shall be:
 - a. Spike #1 $E_1 = 200$ volts; $t_1 = 10$ microseconds $\pm 20\%$.
 - b. Spike #2 $E_2 = 200$ volts; $t_2 = 0.15$ microseconds $\pm 20\%$.
- (7) RE02 limits in figure 2-10 should be redrawn such that the end points of the line segments are 130 dBuV/m/MHz at 0.015 MHz and 65 dBuV/m/MHz at 200 MHz for broadband emissions; 65 dBuV/m/MHz at 0.015 MHz and 40 dBuV/m/MHz at 25 MHz for narrowband emissions; limits defined beyond the frequencies noted remain the same.
- (8) Susceptibility signals. Susceptibility signals (CS02 and RS03) shall be modulated as follows:
 - a. Below 400 MHz - 1000 Hz, 80% AM or 1000 Hz square wave.
 - b. Above 400 MHz - pulse modulation at 1000 Hz pulse repetition rate and 10 microsecond pulse width.
- (9) Measurement receiver bandwidth selection. Only one bandwidth shall be used in any particular frequency band of the measurement receiver. The use of different bandwidths within frequency band to measure broadband and narrowband emissions independently is not permitted. Measurement receiver bandwidths shall be determined for each method according to the following technique:
 - a. At the end points of each frequency band use the following equation to calculate the impulse bandwidths at which the measurement receiver outputs for the broadband and narrowband limits are identical:

$$\text{Bandwidth (MHz)} = \text{Antilog}_{10} [(\text{NB limit} - \text{BB Limit})/20]$$
 - b. From available receiver bandwidths select the bandwidth which is closest to the calculated bandwidths. This bandwidth shall be used over the entire band.

MIL-L-85314A

* 3.7.4.1 Susceptibility criteria. As a minimum, the light assembly shall be considered susceptible if when tested in accordance with the susceptibility tests specified in paragraph 4.6.5, the light system either fails to flash properly or flashes spontaneously without having been properly triggered.

3.7.5 Chromaticity. The chromaticity of the light emitted by each light assembly, when tested as specified in 4.6.6, shall be aviation white light or aviation red, as applicable, conforming to MIL-C-25050 except that the "X" chromaticity coordinate for the aviation white light shall be not less than 0.285 and the "Z" chromaticity for the aviation red light shall be not greater than 0.02. For Air Force use only the "X" chromaticity coordinate for the aviation white light shall be not less than 0.300, the "Z" chromaticity for the aviation red light shall be not greater than 0.002, and the yellow boundary of aviation red shall be 0.335.

3.7.6 Environmental tests. After being subjected to the environmental tests specified in 4.6.7, each light system shall conform to the requirements of 3.7.2 (flash rate) and 3.7.3 (light intensity).

* 3.7.7 Reliability. When tested as specified in 4.6.8, each type system shall have a minimum acceptable mean time between failure (MTBF) of 1000 hours, a specified MTBF of 2000 hours, with decision risks of 10 percent and a discrimination ratio of 2/1. Failure of the system is deemed to have occurred if a system fails to conform to this and the systems applicable specification.

3.7.7.1 Optical failure of the high mode. During the first 2000 hours of operation, a failure of the high mode will be deemed to have occurred when the light intensity falls below 85 percent of the minimum value specified in the applicable specification sheet.

3.7.7.2 Optical failure of the low mode. During the first 2000 hours of operation, a failure of the low mode will be deemed to have occurred when the light intensity is outside the values specified in the applicable specification sheet.

3.7.7.3 Optical failure high/low (day/night) mode computational data base (applicable to dual mode systems). For system reliability computation, a 70 percent high mode and 30 percent low mode duty cycle shall be assumed.

3.8 Weight. The weight of the systems shall be as specified in the applicable specification sheet when determined as specified in 4.6.9.

3.9 Modes. The light modes shall be as specified in the applicable specification sheet.

3.10 Finish. The color of the finish of the power supply assembly shall approximately match lusterless black color number 37038 of FED-STD-595.

MIL-L-85314A

3.11 Interchangeability. The light source assemblies shall be designed to allow full interchangeability of like function modules between light sources in any aircraft position. All parts having the same military part number shall be directly and completely interchangeable with each other with respect to installation and performance. Changes in manufacturer's part numbers shall be governed by the drawing practices requirements of DOD-STD-100.

3.12 Shelf life. Each system shall be capable of operating as specified after a maximum storage time of three years. Maintenance action to re-form electrolytic capacitors shall be permissible.

* 3.13 Maintenance. Each type assembly shall provide for ease of system maintenance as specified herein and in the applicable specification sheet. Removal/installation of major assemblies or modules shall not require any subsequent adjustments. There shall be no capability of field adjustments of the system to maintain compliance with the performance parameters of this and the applicable specification sheet.

* 3.14 Markings. All markings shall conform to MIL-STD-130. The assemblies shall contain the following markings:

3.14.1 Identification. Equipment, assemblies and parts shall be marked for identification.

* 3.14.2 Electrical connectors. Marking adjacent to electrical connectors shall identify the connected circuit to preclude improper connections.

* 3.14.3 Input power. Input power to each individual power supply shall be either Type I or II and shall be identified.

* 3.15 Workmanship. Each component of the system shall be constructed and finished to produce an item free from any defect which shall affect proper functioning in service. Particular attention shall be given to neatness and thoroughness of soldering, wiring, marking of parts and assemblies, finish, alignment of parts, tightness of screw assemblies and freedom of parts from any burr or sharp edge. As a minimum, workmanship shall be in accordance with MIL-STD-454, requirement 9.

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 the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

MIL-L-85314A

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

- a. First article inspection (see 4.3).
- b. Quality conformance inspection (see 4.4).

4.3 First article inspection. First article inspection of the light systems shall consist of examinations and tests for all of the requirements of this and the applicable specification sheet. First article inspection report format shall be in accordance with MIL-STD-831.

4.3.1 First article inspection samples. First article inspection samples shall be as specified by the acquiring activity and in accordance with 6.4.

4.4 Quality conformance inspection. The sampling and inspection levels shall conform to MIL-STD-105. Quality conformance inspection shall consist of the examinations and tests specified in Table I. Quality conformance inspection report format shall be in accordance with MIL-STD-831.

4.4.1 Sampling.

4.4.1.1 Inspection lot.

* 4.4.1.1.1 Assemblies. An inspection lot size shall be expressed in units on one assembly of one type, complete with all the accessories, made essentially under the same conditions and from the same materials and components. The sample unit shall be one assembly of one type, complete with all the accessories.

* 4.4.1.1.2 Packaging. An inspection lot size shall be expressed in units of one fully prepared shipping container, containing assemblies of one type, complete with all the accessories, fully prepared for delivery from essentially the same materials and components. The sample unit shall be one shipping container, containing assemblies of one type, complete with all the accessories, fully prepared for delivery with the exception that it need not be sealed.

* 4.4.1.2 Sampling for tests and examinations of the light assemblies. The sample size, acceptance criteria, tests and examinations required for the assemblies shall be as specified in Table I.

4.5 Test conditions.

4.5.1 Standard ambient conditions. Unless otherwise specified herein, all examinations shall be conducted under the following standard conditions per MIL-STD-810:

MIL-L-85314A

<u>PARAMETER</u>	<u>CONDITION</u>
Temperature	$23^{\circ} \pm 10^{\circ}\text{C}$ ($73^{\circ} \pm 18^{\circ}\text{F}$)
Relative humidity	50 percent \pm 30 percent
Atmospheric pressure	725 $\begin{smallmatrix} +50\text{mm} \\ -75\text{mm} \end{smallmatrix}$ Hg ($28.5 \begin{smallmatrix} +2.0 \\ -3.0 \end{smallmatrix}$ in Hg)
Input power:	
Type I	28 Volts DC \pm 1 percent
Type II	115 Volts AC \pm 1 percent
	400 Hz \pm 1 percent

4.6 Inspection methods.4.6.1 Visual examination.

* 4.6.1.1 Assemblies. Every assembly shall be examined visually and dimensionally checked to determine conformance to all the requirements of this specification and the applicable specification sheet. Table II shall be used to classify the defects found.

* 4.6.1.2 Packaging. Each of the fully prepared shipping containers, containing assemblies, selected as a sample unit from the lot, shall be examined to determine that the packaging, packing and marking conform to this specification. Table III shall be used to classify the defects found.

4.6.2 Electrical power tests. The light system shall be tested for conformance to the requirements of 3.6.6 and 3.7.1 as follows:

4.6.2.1 Power consumption test. The power consumed by the system shall be measured when operated at the standard conditions of 4.5.1. The power consumed shall not exceed that specified in 3.6.6.

4.6.2.2 Voltage and frequency variation test. The input voltage and frequency shall be varied over the range as specified in 3.7. The flash rate and light intensity shall be measured in accordance with 4.6.3 and 4.6.4 at the high and low voltage/frequency values and shall conform to 3.7.2 and 3.7.3.

4.6.2.3 Over and under voltage/frequency tests. The over and under voltage/frequency given by MIL-STD-704 shall be applied to the system during operation. After application of the over/under condition the system shall be operated at the standard test conditions of 4.5.1 and shall meet all performance requirements. The system shall not show any evidence of damage.

* 4.6.2.4 Voltage and frequency transient test. Voltage and frequency transients as given by MIL-STD-704 shall be applied to a system during operation. After application of a transient, the system shall be operated at the standard test conditions of paragraph 4.5.1 and shall meet all performance requirements of this and applicable specifications.

MIL-L-85314A

4.6.3 Flash rate. The flash rate shall be uniform as specified in the applicable specification sheet and shall be observed over a five minute interval.

4.6.4 Light intensity. The minimum luminous intensity emitted by each light system shall be as specified in the applicable specification sheet. The minimum luminous intensity shall be measured with the appropriate lens in place and described in terms of effective intensity. The effective intensity shall be met at each of the power inputs specified in 3.7.3. The following Blondel-Rey equation relationship shall apply:

$$I_E = \frac{1}{0.2 + (T_2 - T_1)} \int_{T_1}^{T_2} I(t) dt$$

Where: I_E = Effective intensity in candelas and is the maximum value of the right-hand side of the equation. $I(t)$ equals the instantaneous intensity as a function of time. $T_2 - T_1$ equals the flash time interval in seconds.

Note: The maximum value of I_E is obtained when T_2 and T_1 are so chosen that the effective intensity is equal to the instantaneous intensity at T_2 and T_1 .

* 4.6.5 Electromagnetic interference (EMI) tests. The light assembly shall conform to the requirements of paragraph 3.7.4 when tested in accordance with MIL-STD-462 as modified by the applicable specification sheet.

* 4.6.6 Chromaticity. The chromaticity of the light emitted by each light system shall be determined in accordance with MIL-C-25050 and the requirements of 3.7.5.

* 4.6.7 Environmental tests. The environmental tests shall be conducted with each assembly of each system in their normal operating configuration. The recording of the "pretest performance record and post test data" of MIL-STD-810 is applicable for all the environmental test, except that it is not required for the temperature-altitude, explosive atmosphere and vibration tests. Upon completion of the environmental test, each exposed assembly of each light system shall be checked functionally and shall conform to the requirements of 3.7.2 and 3.7.3. The environmental tests shall be conducted in accordance with MIL-STD-810, procedure I and shall consist of the following:

MIL-L-85314A

<u>TEST</u>	<u>MIL-STD-810 METHOD</u>
Temperature-altitude	504
Rain <u>1/</u>	506
Humidity	507
Fungus	508
Salt fog	509
Dust <u>1/ 2/</u>	510
Explosive atmosphere	511
Vibration	514
Shock <u>3/</u>	516

- 1/ The light assembly shall be operating during this test.
- 2/ Step 3 of the dust test shall be performed immediately after reaching stabilization of the temperature requirements of step 2.
- 3/ The shock pulse shall be as shown in MIL-STD-810, figure 516.2-1 for flight vehicle equipment.

* 4.6.8 Reliability. The reliability (MTBF/service life) of each light system shall be determined in accordance with MIL-STD-781, test plan III, test level C.

4.6.9 Weight. The weight shall be determined on any scale capable of weighing to the nearest one ounce.

5. PACKAGING

5.1 General. All major units and parts of the equipment shall be preserved, packaged, packed and marked for the level of shipment specified in the contract or order in accordance with MIL-E-17555 and MIL-STD-794. In the event the equipment is not covered in MIL-E-17555, the method of preservation for level A shall be determined in accordance with the selection chart in Appendix D of MIL-STD-794 (Note 6.2).

5.2 Marking. In addition to any special marking by the contract or order, each unit package and exterior container shall be marked in accordance with MIL-STD-129.

6. NOTES AND CONCLUDING MATERIAL

6.1 Intended use. The strobe anti-collision aircraft light system is intended to be suitable as a supplement to or replace existing anti-collision lighting system(s) as a means to reduce the risk of mid-air collisions through visual detection of nearby aircraft.

6.2 Ordering data. Acquisition documents should specify the following:

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

MIL-L-85514A

- b. Type of light system desired (see 1.2).
- c. Selection of applicable levels of preservation, packaging, and packing (see 5.1).

6.3 Contract data requirements. Data requirements are not applicable in this specification.

6.4 First article. When first article is required for inspection and approval (3.2 and 4.3), the contract shall specify the following provision for first article inspection. When a contractor is in continuous production of the light systems from contract to contract, consideration should be given to waive the first article inspections. If inspection is required, indicate:

- a. If first article inspections are conducted at the contractor's plant or a Government approved laboratory, an inspection report shall be forwarded to the acquiring activity for verification.
- b. That the approval of first article samples or the waiving of the first article inspection shall not relieve the contractor of his obligation to fulfill all other requirements of the specification and contract.

6.5 International standardization agreements. When an amendment, revision or cancellation of this specification is proposed which will affect or violate any international agreement, the preparing activity will take appropriate reconciliation action through international standardization channels including departmental standardization offices, if required.

6.6 Changes from previous issue. The margins of this specification are marked with asterisks to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

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Preparing Activity:
 Navy - AS
 (Project No. 6220-0317-1)

MIL-L-85314A

* TABLE I. Sample size, acceptance criteria, examinations and tests of the assemblies per MIL-STD-105.

Inspection	Paragraph		Sample size	Acceptance criteria
	Requirement	Method		
Visual examination	3.6 through 3.6.6, 3.10, 3.11 and 3.13 through 3.15	4.6.1.1	Every assembly for major defects and Inspection Level II for minor defects	Reject any assembly with a major defect. An acceptable quality level (AQL) of 4.0 defects per 100 units (DHU) for minor defects
Electrical power	3.7.1	4.6.2	Every power supply	Reject any defective unit
Flash rate	3.7.2	4.6.3	Inspection Level S-1	An AQL of 2.5 DHU
Light intensity	3.7.3	4.6.4	Inspection Level S-1	An AQL of 2.5 DHU
Electromagnetic interference	3.7.4	4.6.5	Inspection Level S-1	An AQL of 2.5 DHU
Packaging	5.1	4.6.1.2	Inspection Level S-2	An AQL of 2.5 DHU

MIL-L-85314A

* TABLE II. Classification of defects for visual examination of the assemblies.

MAJOR	MINOR
<p>101. Any material imperfection, foreign matter embedded, sliver, burr, or sharp edge inside or outside the light assembly.</p> <p>102. Any burn, surface unclean, rough, misaligned or containing any crack, nick, or other flaw.</p> <p>103. Any component missing, malformed, fractured, or otherwise damaged.</p> <p>104. Any tear, patch, mend, abraded area, frayed or cut insulation.</p> <p>105. Any component loose or otherwise not securely retained.</p> <p>106. Incorrect assembling or improper position of any component.</p> <p>107. Any functioning part that works with difficulty.</p> <p>108. Any faulty workmanship or other irregularities.</p> <p>109. Lens not transparent, crazed, cracked, discolored or not glass. (Light assemblies only)</p> <p>110. Any measurement not within specified dimension and tolerance.</p> <p>111. Any spot or stain. <u>1/</u></p> <p>112. Any corrosion, scale, pit or dent.</p> <p>113. Type not as specified.</p>	<p>201. Any identification marking missing, insufficient, incorrect or illegible.</p> <p>202. Finish of any component not as specified or does not approximately match specified color.</p>

MIL-L-85314A

TABLE II. Classification of defects for visual examination of the assemblies (continued).

MAJOR	MINOR
<p>114. Any marking, other than identification, missing or not as specified.</p> <p>115. Any component not as specified or any defect of component or defect of assembly, not herein classified. <u>1/</u></p> <p>116. Any component, component part or required operation omitted or any operation improperly performed, not herein classified. <u>1/</u></p>	

1/ The defect shall be classified and scored as a major defect when it seriously affects the serviceability or appearance, otherwise it shall be classified and scored as a minor defect.

MIL-L-85314A

TABLE III. Classification of defects for packaging.

ITEM	DEFECTS
Exterior and interior markings	Missing, incorrect, incomplete, illegible; of improper size, location, sequence or method of application; markings not the same on the interior and exterior containers.
Workmanship	Inadequate application of the components, such as incomplete closure of the unit package, intermediate package, container flaps, or loose strappings, etc.; bulging or distortion of the containers.
Exterior and interior weight	Number per container is more or less than required; gross or net weight exceeds the requirement.

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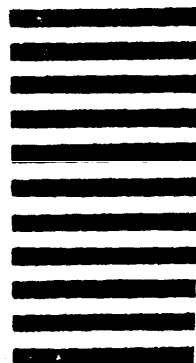
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