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MILITARY SPECIFICATION

LIGHTING, EMERGENCY EGRESS, SUB-ASSEMBLY

This specification is approved for use by the Naval Air Systems Command, Department of the Navy and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE.

1.1 Scope. This specification establishes the requirements for an Emergency Egress Lighting Subassembly, herein referred to as the lighting subassembly.

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.

SPECIFICATIONS

FEDERAL

QQ-C-320	Chromium Plating (Electrodeposited)
QQ-P-416	Plating, Cadmium (Electrodeposited)

MILITARY

DOD-D-1000	Drawings, Engineering And Associated Lists
MIL-S-5002	Surface Treatments And Inorganic Coatings For Metal Surfaces Of Weapons Systems
MIL-C-5015	Connector, Electrical, Circular Threaded, Air Type, General Specification For
MIL-E-5400	Electronic Equipment, Aerospace, General Specification For
MIL-C-5541	Chemical Conversion Coatings On Aluminum And Aluminum Alloys

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: the Commanding Officer, Naval Air Engineering Center, Systems Engineering and Standardization Department (SESD), Code 93, 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.

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MIL-C-6021	Casting, Classification And Inspection Of
MIL-H-6088	Heat Treatment Of Aluminum Alloys
MIL-H-6875	Heat Treatment Of Steels (Aircraft Practice), Process For
MIL-F-7179	Finishes And Coatings, Protection Of Aerospace Weapons Systems, Structures And Parts, General Specification For
MIL-I-8500	Interchangeability And Replaceability Of Component Parts For Aerospace Vehicles
MIL-S-8516	Sealing Compound, Polysulfide Rubber, Electric Connectors And Electric Systems, Chemically Cured
MIL-A-8625	Anodic Coatings, For Aluminum And Aluminum Alloys
MIL-E-17555	Electronic And Electrical Equipment, Accessories And Repair Parts, Packaging And Packing Of
MIL-F-18264	Finishes, Organic, Weapons System, Application And Control Of
MIL-N-18307	Nomenclature And Identification For Electronic, Aeronautical, And Aeronautical Associated Equipment Including Ground Support Equipment
MIL-P-19834	Plate, Identification, Metal Foil, Adhesive Backed
MIL-A-21180	Aluminum-alloy Castings, High Strength
MIL-S-23586	Sealing Compound, Electrical, Silicone Rubber, Accelerator Required
MIL-M-24041	Molding And Potting Compound, Chemically Cured, Polyurethane (Polyether-based)
MIL-C-27500	Cable, Electric, Aerospace Vehicle, General Specification For
MIL-T-28800	Test Equipment For Use With Electrical And Electronic Equipment, General Specification For
MIL-C-38999	Connector, Electrical, Circular, Miniature, High Density, Quick Disconnect (Bayonet, Threaded, And Breech Coupling), Environmental Resistant, Removeable Crimp And Hermetic Solder Contacts, General Specification For
MIL-H-81200	Heat Treatment Of Titanium And Titanium Alloys
MIL-C-83488	Coating, Aluminum, ION Vapor Deposited

STANDARDS

MILITARY

DOD-STD-100	Engineering Drawing Practices
MIL-STD-129	Marking For Shipment And Storage
MIL-STD-210	Climatic Extremes For Military Equipment
MIL-STD-454	Standard General Requirements For Electronic Equipment
MIL-STD-461	Electromagnetic Emission And Susceptibility, Requirements For The Control Of
MIL-STD-470	Maintainability Program Requirements (For Systems And Equipments)
MIL-STD-471	Maintainability Demonstration
DOD-STD-480	Configuration Control-Engineering Changes, Deviations and Waivers

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MIL-STD-481	Configuration Control - Engineering Changes, Deviations and Waivers (Short Form)
MIL-STD-704	Aircraft Electric Power Characteristics
MIL-STD-785	Reliability Program For Systems And Equipment Development And Production
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-965	Parts Control Program
MIL-STD-1472	Human Engineering Design Criteria For Military Systems, Equipment And Facilities
MIL-STD-1521	Technical Reviews And Audits For Systems, Equipment, And Computer Programs
MIL-STD-2068	Reliability Development Tests

HANDBOOKS

MILITARY

MIL-HDBK-5	Metallic Materials And Elements For Aerospace Vehicle Structures
MIL-HDBK-132	Protective Finishes
MIL-HDBK-694	Aluminum And Aluminum Alloys

2.1.2 Other Government documents, drawings, and publications. The following other Government documents and publications form a part of this specification to the extent specified herein.

NAVAL AIR SYSTEMS COMMAND

AD 1350	Engineering Drawings and Associated Data
SD-24	General Specification for Design and Construction of Aircraft Weapon Systems, Volume I, Fixed Wing Aircraft
SD-24	General Specification for Design and Construction of Aircraft Weapon Systems, Volume II, Rotary Wing Aircraft

NAVAL MATERIAL COMMAND

NAVMAT P-9492 Navy Manufacturing Screening Program

(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.)

2.2 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence, except for SD-24.

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3. REQUIREMENTS.

3.1 Emergency egress lighting subassembly description. The emergency egress lighting subassembly shall provide illumination of an aircraft emergency exit to enable rapid location of the exit by crewmembers and passengers inside the aircraft in the event of a crash or emergency landing on land or at sea when the visibility is reduced in the cabin compartment. The lighting subassembly, as referred to within this specification, shall consist of those components necessary to illuminate a single designated emergency escape exit. The lighting subassembly shall be comprised of a light element(s), a control unit with integral power source, cabling, connectors, and mounting hardware. Each lighting subassembly shall operate independently of any other lighting subassembly.

3.1.1 Single light element subassembly. A single light element subassembly shall be comprised of one light element and a control unit.

3.1.2 Dual light element subassembly. A dual light element subassembly shall be comprised of two light elements and a dual function control unit.

3.2 First article. When specified, a sample shall be subjected to first article inspection (see 4.4 and 6.3).

3.3 Characteristics.

3.3.1 Performance characteristics. The lighting subassembly shall be designed for use in emergency situations only. The lighting subassembly shall provide illumination as required herein for a minimum of 10 minutes within one second subsequent to removal of an inhibit signal provided by the aircraft (see 3.8.2). It shall be capable of operating in air or while submerged in fresh or sea water to a depth of 50 feet. It shall be capable of being deactivated prior to flight to meet specific mission requirements.

3.3.1.1 Light element performance. The luminance of each light element throughout the duration of operation specified in 3.3.1 shall be a minimum of two lumens per lighted linear foot per 3.63 steradians for a projected one-half inch minimum width from any viewing angle within ±65° of normal. Once actuated, light element output shall be continuous. The peak chromaticity (relative spectral radiance) of the light elements shall be within a range of 510-575 nanometers. The amount of light energy in the 600-900 nanometer range shall be compatible with the operating characteristics of second and third generation night vision goggles.

3.3.1.2 Control unit performance. The control unit for the lighting subassembly shall provide the electrical interface for the light element(s) and for the aircraft resources. It shall provide power, activation and control logic, status indications, and battery charging control for the lighting subassembly. The control unit shall be designed so that the application of a system ground provides the enable (arm) signal.

3.3.1.2.1 Electrical requirements. The lighting subassembly electrical system shall be in accordance with MIL-STD-704.

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3.3.1.2.1.1 Integral power source. The integral power source in the control unit shall be a nickel-cadmium rechargeable battery module capable of providing power for operation of the complete lighting subassembly. Subsequent to satisfactory preflight check and a 1.5 hour mission during which the battery module is charged in accordance with 3.8.1, the power source shall be capable of remaining installed without receiving a charge for a period of one week and still provide sufficient power to enable the lighting subassembly to meet the performance requirements stated herein.

3.3.1.2.1.2 Lighting subassembly status indicator. The status indicator shall contain a means for visually verifying:

a. That the battery charge is sufficient to enable the lighting subassembly to meet the performance requirements of 3.3.1.
b. The operational status of each lighting subassembly (function and disable).

3.3.1.3 Means of activation. The lighting subassembly shall automatically activate when it senses the loss of an inhibit signal, specified in 3.8.2, through the aircraft electrical interface.

3.3.2 Physical characteristics.

3.3.2.1 Size. The components of the lighting subassembly shall be of minimum size consistent with the capability of meeting the performance requirements stated in 3.3.1. The width of the light element shall be not greater than one inch. All light elements and electrical leads for a single model of aircraft shall be of a standard length, specified in the contract or purchase order, to facilitate interchangeability, i.e., the length of the light element shall be long enough to enable arrangement in an inverted "U" (⊓) configuration above the top and along the sides of a single light element emergency escape exit.

3.3.2.2 Mounting feature(s). The light element(s) and control unit shall be provided with mounting brackets which will withstand the dynamic crash loads specified in 3.3.5 and that have provisions for hard mounting to a structural member by means of mechanical fasteners.

3.3.2.3 Weight. A lighting subassembly (for exits requiring only one light element) shall weigh less than 5.0 pounds. On larger exits which require dual light elements, the weight of the lighting subassembly shall be not greater than 1.5 times the weight of the single light element lighting subassembly. Stringent control shall be exercised over the lighting subassembly weight to achieve a minimum weight consistent with required performance and structural strength.

3.3.2.4 Light element construction. Light elements shall be of one-piece construction which can be shaped easily during installation to conform to emergency exits of varying shapes and configuration. The light element shall be comprised of multiple point light sources that operate independently. Design of the light element shall be such that failure of a point light source shall not result in the failure of any other point light source within the light element.

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3.3.3 Systems effectiveness. The contractor shall implement a systems effectiveness program (see 6.2.2) which includes sub-programs in the reliability, maintainability, system safety, human engineering, quality assurance, and cost effectiveness disciplines. In order to assure maximum impact upon lighting subassembly design and maximum economy of effort, the program shall provide for accomplishing:

a. Thorough coordination among all of the systems effectiveness and related disciplines (i.e., reliability, maintainability, system safety, human engineering) in a manner providing the maximum timely consideration from all viewpoints of the effects of identified potential lighting subassembly deficiencies.
b. Integration of the systems effectiveness disciplines into the design, development, production, and quality assurance procedures in a manner assuring the timely systematic identification and investigation of subassembly deficiencies, and the timely development and implementation of appropriate remedial actions.

3.3.3.1 Reliability.

3.3.3.1.1 Reliability sub-program. The lighting subassembly reliability sub-program of the systems effectiveness program shall be developed and conducted in accordance with MIL-STD-785 and the approved systems effectiveness program plan. As a minimum, the reliability sub-program shall provide the following (see 6.2.2):

a. Reliability sub-program documented in the lighting systems effectiveness program plan and integrated with systems effectiveness, design, and test activities.
b. Subcontractor and supplier monitoring and control.
c. Design and program reviews.
d. Failure reporting, analysis, and corrective action.
e. Reliability modeling, predictions, allocations, and measurement.
f. Failure modes, effects, and criticality analysis.
g. A parts control program in accordance with MIL-STD-965, Procedure I.

3.3.3.1.2 Design reliability. The lighting subassembly shall be designed and constructed to meet or exceed a reliability of 0.999 for a mission. A mission shall be defined as a four-hour flight with operation in the inflight mode (operational standby) and on/off cycling followed by successful operation under the emergency conditions of 3.3.1. Lighting subassembly failure shall be defined as:

a. The loss of capability to illuminate at least 90 percent of the point light sources of each light element to meet the conditions of 3.3.1.1, such that no more than five point light sources per lighted linear foot are inoperable.
b. Inadvertent activation.

3.3.3.2 Maintainability.

3.3.3.2.1 Maintainability sub-program. The lighting subassembly maintainability sub-program of the systems effectiveness program shall be developed and conducted in accordance with MIL-STD-470 and the approved systems effectiveness program plan (see 6.2.2).

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As a minimum, the maintainability sub-program shall provide for the following:

a. Maintainability sub-program documented in the lighting systems effectiveness program plan and integrated with systems effectiveness, design, and test activities.
b. Maintainability design directed towards easily detectable failure symptoms, easy access to failed items, use of captive hardware, minimization of special tools and peculiar support equipment, and safety-oriented maintenance procedures.
c. Maintainability prediction and analysis.
d. Maintainability demonstration test.

3.3.3.2.2 Maintainability design. The lighting subassembly shall be designed to achieve at least the following maintainability levels:

a. The mean time to repair (MTTR) of the lighting subassembly at the organizational maintenance level shall be not greater than 15 minutes. Ninety percent of all corrective maintenance actions shall be accomplished within 30 minutes, excluding administrative and logistics delay time.
b. The direct maintenance man hours per flight hour (DMMH/FH) at the organizational level for preventive and corrective maintenance shall be not greater than 0.0025.

3.3.3.3 Safety. The lighting subassembly safety sub-program of the systems effectiveness program shall be developed and conducted in accordance with the applicable requirements of MIL-STD-882. Personnel hazards and safety considerations specified in MIL-STD-1472 shall receive special attention.

3.3.3.4 Human engineering. The design for user and maintainability requirements shall be in accordance with MIL-STD-1472.

3.3.4 Environmental conditions. The lighting subassembly shall be capable of operating after exposure to the following environmental conditions or extremes of MIL-STD-210:

a. A hot temperature extreme of 160°F (71°C).
b. A cold temperature extreme of -39°F (-39°C).
c. Concurrent high humidity and temperature extremes of 95 percent and 149°F (65°C), respectively.
d. Repeated shock pulses of 11g's for 20 milliseconds.
e. A low atmospheric pressure equivalent to an altitude of 50,000 feet.

Additional environmental conditions which the lighting subassembly must withstand shall include vibration, salt fog, and conditions conducive to the growth of fungus. The lighting subassembly shall be capable of operating in water ranging in temperature from -1°C to +40°C (30°F to 104°F) and in air ranging in temperature from -1°C to 50°C (30°F to 112°F).

3.3.5 Dynamic crash loads. The lighting subassembly shall be capable of withstanding loads defined by the crash impact conditions of table I. It shall be capable of operation as required herein subsequent to exposure to these loads.

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TABLE I. Crash impact conditions.

Impact Direction	Velocity Change (ft/sec)	Peak Acceleration (G) 1/	Pulse Duration (sec)
forward	50	24	0.130
downward	42	34	0.080
lateral	25	16	0.100
30° off forward	50	24	0.130

1/ Rise time to peak acceleration averaged to 70 percent of total pulse duration time.

Engineers, Incorporated, 400 Commonwealth Drive, Warrendale, PA 15096.)

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3.4 Design and construction. The lighting subassembly shall meet all the applicable requirements of MIL-E-5400 (Class 1A equipment) for design and construction except as otherwise specified herein. The equipment shall represent the simplest design consistent with meeting the functional requirements and service conditions specified herein.

3.4.1 Material, processes, and parts. The selection of material, standard parts, processes, corrosion protection, and design features to prevent corrosion shall be in accordance with the requirements of SD-24 and MIL-E-5400, except as otherwise specified herein.

3.4.1.1 Materials. Materials and their applicable specifications shall appear on all detail drawings. Use of materials which are not controlled by Government specifications nor specifically described herein shall be approved by the procuring activity prior to their use in the lighting subassembly. Particular care shall be given to close fitting parts in the choice of materials and corrosion control practices.

3.4.1.1.1 Metal parts. All metal parts shall be of the corrosion-resistant type or treated to render them resistant to corrosion. Unless protected against galvanic corrosion, dissimilar metals (as specified in MIL-STD-889) shall not be used in contact with each other. General design requirements governing the use of metals shall be in accordance with MIL-HDBK-5. General design requirements for aluminum and aluminum alloys shall be in accordance with MIL-HDBK-694.

3.4.1.1.1.1 Heat treatment. Heat treatment of aluminum parts shall be in accordance with MIL-H-6088. Heat treatment of steel parts shall be in accordance with MIL-H-6875. Heat treatment of titanium and titanium alloy parts shall be in accordance with MIL-H-81200.

3.4.1.1.1.2 Castings. Aluminum alloy castings shall be in accordance with MIL-A-21180. All castings shall be classified in accordance with MIL-C-6021.

3.4.1.1.1.3 Magnesium and magnesium alloys. Magnesium and magnesium alloy parts shall not be used in the lighting subassembly.

3.4.1.1.2 Non-metallic parts. Non-metallic components shall be designed to minimize deterioration caused by abrasion, exposure to environmental conditions specified in 3.3.4, and petroleum, oil, lubricants, ozone, or hydraulic fluids. Non-metallic parts shall not support combustion or produce toxic gases when subjected to high temperature or flame. Additionally, the materials and finishes used in the lighting subassembly shall not be nutrients for micro-organisms.

3.4.1.1.3 Potting compounds. Potting compounds employed in the lighting subassembly shall be selected from those listed on the qualified products lists of MIL-S-8516, MIL-S-23586, and MIL-M-24041.

3.4.1.2 Corrosion protection. The contractor shall develop and implement a corrosion control program in which the components of the lighting subassembly shall be treated as external components. Corrosion protection practices employed in manufacturing the lighting subassembly shall be in accordance with MIL-STD-889 for dissimilar metals and with MIL-F-7179, Type I, for parts and surfaces of components.

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3.4.1.2.1 Finishes. Protective coatings and finishes shall not crack, chip, or scale when subjected to the general service environmental conditions specified in 3.3.4. Surface treatments and inorganic coatings for metal surfaces shall be applied in accordance with MIL-S-5002. Application and control of organic finishes shall be in accordance with MIL-F-18264 and MIL-HDBK-132.

3.4.1.2.2 Anodizing, chemical surface treatment, and chromium plating. All aluminum and aluminum alloy parts that are not subject to wear, abrasion, or erosion shall either be anodized in accordance with MIL-A-8625, Type II anodic coating, or receive a chemical conversion treatment in accordance with MIL-C-5541. Parts subject to wear, abrasion, erosion, or severe corrosion conditions shall be anodized in accordance with MIL-A-8625, Type II anodic coating. Anodic coatings for all aluminum and aluminum alloy parts subject to severe wear shall be in accordance with MIL-A-8625, Type III, except for parts that would normally be reworked during overhaul. For these parts, chromium plating shall be used in accordance with QQ-C-320, Class II.

3.4.1.2.3 Plating. Steel parts in contact with aluminum or aluminum alloys shall be cadmium plated in accordance with QQ-P-416, Type II, Class I, or coated with aluminum by ion vapor deposition in accordance with MIL-C-83488, Type II, Class I.

3.4.1.3 Cabling. Interconnecting cabling used within the lighting subassembly shall be constructed in accordance with MIL-C-27500.

3.4.1.4 Electrical connectors. Electrical connectors used within the lighting subassembly shall be in accordance with either MIL-C-5015 with standard finish or MIL-C-38999 Series II with a B shell finish. The lighting subassembly shall be provided with a MS-3102R-14S-6P electrical connector mounted on the control unit to provide an electrical interface with the aircraft resources of 3.8.

3.4.2 Electromagnetic interference (EMI). The contractor shall establish and implement an EMI program for the lighting subassembly. The subassembly shall comply with the requirements of MIL-STD-461, Parts 1 and 2 for Class A1b equipment modified as follows:

a. Delete the requirement of Part 1 (Deliverable Data Item Requirements) which requires an EMI control plan.
b. Delete all Part 2 requirements except CS02, CS06, RS02, and RS03.

3.4.2.1 Susceptibility limits.

a. For RS02, the limits of MIL-STD-461, Part 1, spike #2 apply. In addition, the power line phase of RS02 shall use 400 Hertz as the test frequency.
b. For CS06, the limits of MIL-STD-461, Part 2, spike #2 apply.

The lighting subassembly shall be considered susceptible to electromagnetic interference if the light elements become illuminated when subjected to the susceptibility signal. This definition shall apply whether the illumination is momentary (transient) or permanent in nature.

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3.4.3 Nomenclature and nameplate. Nomenclature assignments and nameplate approval for equipment identification shall be in accordance with MIL-N-18307.

3.4.4 Marking and decals. Labeling shall be in accordance with MIL-STD-1472 and MIL-P-19834.

3.4.5 Interchangeability. Parts and components of the lighting subassembly shall be interchangeable or replaceable in accordance with MIL-I-8500.

3.5 Documentation.

3.5.1 Drawings. Drawing requirements shall be specified in the contract in accordance with AD 1350 (see 6.2.1). Levels and types of drawings shall be in accordance with DOD-D-1000 and DOD-STD-100.

3.5.2 Maintenance procedures. The contractor shall prepare detailed maintenance procedures for troubleshooting, assembly, and disassembly procedures for the conduct of lighting subassembly maintenance at the organizational level (see 6.2.2). The procedures shall be in accordance with the maintenance concept of 3.6.1.1.

3.6 Logistics.

3.6.1 Maintenance.

3.6.1.1 Maintenance concept. Except for the battery module, the lighting subassembly shall be capable of being stored indefinitely and retain a minimum service life of five years. The battery module shall have a shelf life of two years and a service life of two years. Non-emergency operation of the subassembly during its service life shall be limited to the performance of go/no-go battery module checks at the organizational maintenance level. The design shall facilitate the removal and replacement of failed light elements, control units or battery modules, as applicable, at the organizational maintenance level. No repair of failed light elements, control units, battery modules, connectors, or mounting hardware shall be authorized. Battery charging shall be accomplished at the intermediate maintenance level.

3.6.1.2 Support equipment. Removal and replacement of light elements, control units, or battery modules at the organizational level shall be performed using common hand tools. Support equipment at the organizational level shall consist of a portable tester which can verify the operation of either one, or up to nine, installed lighting assemblies in an aircraft without operation of the engines or auxiliary power unit. A battery charger, used at the intermediate level, shall be capable of charge rates such that the battery module can be fully charged in either three hours or ten hours. Design and construction of peculiar support equipment shall comply with MIL-T-28800.

3.6.1.3 Maintenance training. Training requirements for the organizational and intermediate maintenance level shall be limited to on-the-job training of the maintenance personnel assigned to maintain the aircraft electrical systems using the maintenance procedures developed by the contractor in accordance with 3.5.2.

3.6.2 Supply. A minimum number of different parts shall be used to minimize supply requirements.

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3.7 Configuration management. The contractor shall establish, implement, and document a program for managing the lighting subassembly configuration in accordance with DOD-STD-480 and MIL-STD-481 (see 6.2.2).

3.8 Aircraft resources. The lighting subassembly will be provided the aircraft resources specified herein through the electrical connector specified in 3.4.1.4. The lighting subassembly shall be tested to determine compliance with these electrical and mechanical interface requirements of each specific aircraft. Failure to comply shall result in redesign and retest in accordance with first article requirements (see 4.4).

3.8.1 Battery trickle charge. When the aircraft is operating, a nominal 28 V dc trickle charge, 2.0 amperes maximum, will be provided through the "A" pin of the electrical connector. Its associated ground will be established through the "B" pin.

3.8.2 Lighting subassembly inhibit signal. When the aircraft is operating, a 18 ±2 V dc inhibit signal, 0.25 ampere maximum will be provided continuously until the aircraft enters an immediate emergency egress situation, when it will be removed. This signal will be provided through the "C" pin and grounded through the "D" pin of the electrical connector.

3.9 Workmanship. Workmanship shall be of the highest quality to assure optimum performance, reliability, and service life and shall be in accordance with MIL-STD-454, Requirement 9. The lighting subassembly shall be free from defects, burrs, and sharp edges. Particular attention shall be given to accuracy of dimensions, radii, fillets, and markings of parts and assemblies; thoroughness of welding, brazing, painting, and riveting; alignment of parts and tightness of assembly screws and bolts.

4. QUALITY ASSURANCE PROVISIONS.

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

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

a. First article inspections (see 4.4).
b. Development tests and inspections (see 4.5, 4.6, and 4.7).
c. Aircraft interface compatibility tests (see 4.7).
d. Quality conformance inspections (see 4.9).

4.3 Quality assurance program. The contractor shall develop a quality assurance program for testing, demonstrating, and maintaining quality and performance of the lighting subassemblies. A quality assurance program plan

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(QAPP) shall be prepared by the contractor and implemented during the development and fabrication of the lighting subassemblies (see 6.2.2). As a minimum, the QAPP shall include test plans and procedures organized to:

a. Compliment one another without overlap or omission to verify compliance with the specification and the contract.
b. Expose the equipment to realistic environments to reveal or detect incipient design and fabrication defects.
c. Establish and control pass/fail criteria, tolerances and test levels for parts, components, and systems.
d. Maximize efficient use of resources including facilities and personnel.
e. Collect, coordinate, and assess failure data from all tests to affect corrective action.

4.4 First article inspection. First article inspection shall consist of the examinations and tests specified in 4.6 and 4.7. The procuring activity reserves the right to witness all first article testing.

4.4.1 Samples. Unless otherwise specified in the contract or purchase order (see 6.3), as soon as practicable after the award of either, the manufacturer shall submit four single element and one dual element lighting subassemblies for test. The samples shall be of the same construction, workmanship, components, and materials to be used during production. The first article inspection samples shall be furnished to the government as specified in the contract or purchase order (see 6.2.1).

4.4.2 First article test report. The contractor shall prepare a first article inspection plan prior to submission of first article samples for test. Upon completion of the first article inspection, all the applicable inspection reports, and when applicable, recommendations and comments pertinent for use in maintaining production shall be included in a comprehensive test report (see 6.2.2).

4.5 Development test I (DT-I) program. The DT-I program for the lighting subassembly shall commence prior to the engineering proofing article I (EPA-I) review (see 4.7.1) and shall be completed prior to the EPA-II review (see 4.7.2) as shown in the schedule of figure 1. The DT-I program shall comprise all contractor conducted engineering development tests and inspections necessary to prepare the lighting subassembly for DT-II. Planning and reporting shall be in accordance with 4.8.

4.6 Development test II (DT-II) program. The DT-II program for the lighting subassembly shall commence subsequent to the engineering proofing article II (EPA-II) review (see 4.7.2) and shall be completed prior to the production proofing article (PPA) review (see 4.7.3) as shown in the schedule of figure 1. The DT-II program shall include, as a minimum, the following Government conducted tests for individual escape exit components:

a. Dynamic crash load tests (see 4.6.1).
b. Environmental tests (see 4.6.2).
c. Underwater performance tests (see 4.6.3).

LIGHTING SUBASSEMBLY DEVELOPMENT PROGRAM SEQUENCE OF EVENTS

	Program Initiation	Component Demonstration & Validation	System Validation	Production
		DT-I	////////// DT-II //////////	
Tests		**Contractor** 1. Dynamic crash loads 2. Environmental 3. Underwater performance	**Government** 1. Dynamic crash loads 2. Environmental 3. Underwater performance 4. First article review	
Reviews		• EPA-I	• EPA-II/FMA-I	• PPA/PCA / FMA-II

FIGURE 1. Lighting subassembly review and test schedule.

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4.6.1 Dynamic crash load tests. The signal control box shall demonstrate compliance with the requirements of 3.6 on the basis of crash load tests to be conducted by the procuring activity. The signal control box will be mounted to a rigid test frame through which the crash loads shall be applied.

4.6.2 Environmental tests. The procuring activity will conduct environmental tests to determine the compliance of the signal control box with the requirements of 3.7. The failure criteria of MIL-STD-810 apply to all tests in addition to specific failure criteria cited for each test. The general test performance guidance provided in MIL-STD-810 shall be followed for all environmental tests.

4.6.2.1 High temperature test. The lighting subassembly shall be subjected to the high temperature test of MIL-STD-810 Method 501.2 per the following procedures:

Step 1 - Prepare the test item in accordance with general test performance guidance.

Step 2 - Raise the internal chamber temperature to 49°C (120°F).

Step 3 - Maintain internal chamber temperature for 6 hours at 49°C (120°F).

Step 4 - Raise the internal chamber temperature to 71°C (160°F) within a time period of one hour and then maintain at that temperature for four additional hours.

Step 5 - Lower the internal chamber temperature to 49°C (120°F) within a time period of one hour.

Step 6 - Repeat steps 3, 4, and 5 two additional times (making a total of three 12-hour cycles).

Step 7 - Adjust the internal chamber temperature to the highest operating temperature under which the test item is designed to operate and maintain until temperature stabilization of the test item is reached.

Step 8 - Operate the test item until the item is stabilized or as specified in the equipment specification and obtain results in accordance with general test performance guidance.

Step 9 - Return the test item, nonoperating, to standard ambient conditions and stabilize.

Step 10- Operate and inspect the test item and obtain results in accordance with general test performance guidance.

The lighting subassembly shall be tested in the inflight mode. Illumination of the lighting subassembly during the high temperature test shall constitute a failure. The highest temperature at which it shall be tested shall be 50°C. Operation of the lighting subassembly during the test shall be limited to step 8 above. It shall be actuated by removal of the simulated inhibit signal and shall provide illumination of the specified intensity

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(see 3.3.1.1) for a period of 10 minutes. Failure of the lighting subassembly to pass this test shall constitute a failure of the high temperature requirement.

4.6.2.2 Low temperature test. The lighting subassembly shall be subjected to the low temperature test of MIL-STD-810, Method 502.2 per the following procedure:

Step 1 - Prepare the test item in accordance with general test performance guidance.

Step 2 - Lower the internal chamber temperature to the storage temperature -57°C (-79°F) or as specified in the equipment specification and maintain for a period of 24 hours after stabilization.

Step 3 - Inspect the test item in accordance with general test performance guidance.

Step 4 - Adjust the internal chamber temperature to the lowest temperature under which the test item is designed to operate as specified in the equipment specification and maintain until temperature stabilization of the test item is reached.

Step 5 - Operate the test item until the item is stabilized or for the time specified in the equipment specification and obtain results in accordance with general test performance guidance.

Step 6 - Return the test item, nonoperating, to standard ambient conditions and stabilize.

Step 7 - Operate and inspect the test item and obtain the results in accordance with general test performance guidance.

NOTE: The rate of temperature change (steps 2, 4, and 6) may be the maximum attainable by the chamber but shall not exceed 10°C (18°F) per minute.

The lighting subassembly shall be tested in the inflight mode. Illumination of the lighting subassembly during the low temperature test shall constitute a failure of the test. The lowest temperature at which it shall be tested shall be -1°C. Operation of the lighting subassembly shall be limited to step 5 above. It shall be actuated by removal of the simulated inhibit signal and shall provide illumination of the specified intensity (see 3.3.1.1) for a period of 10 minutes. Failure of the lighting subassembly to pass this test shall constitute a failure of the low temperature requirement.

4.6.2.3 Humidity test. The lighting subassembly shall be subjected to the humidity test of MIL-STD-810, Method 507.2 per the following procedure:

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Step 1 - Prepare the test item in accordance with general test performance guidance. Prior to starting the test, the internal chamber temperature shall be at standard ambient with uncontrolled humidity.

Step 2 - Gradually raise internal chamber temperature to 65°C (149°F) and the relative humidity to 95 (+5, -3) percent over a period of two hours.

Step 3 - Maintain conditions of step 2 for not less than six hours.

Step 4 - Maintain 85 percent, or greater, relative humidity and reduce internal chamber temperature in 16 hours to 30°C (86°F).

Step 5 - Repeat steps 2, 3, and 4 for a total of 10 cycles (not less than 240 hours). Figure 2 is an outline of the humidity cycle for this procedure.

Step 6 - At the end of the tenth cycle, while still at 30°C (86°F) and 85 percent relative humidity, operate the test item and obtain results in accordance with general test performance guidance.

Step 7 - Remove and inspect the test item and obtain results in accordance with general test performance guidance.

Subsequent to the completion of the humidity test, it shall be removed from the test apparatus and within one hour tested to determine its capability to be actuated and to provide illumination of the specified intensity (see 3.3.1.1) for a period of 10 minutes. Failure of the lighting subassembly to pass this test shall constitute a failure of the humidity requirement.

4.6.2.4 Fungus test. The lighting subassembly shall be subjected to the fungus test of MIL-STD-810, Method 508.3, Section II. Fungal growth in or on any component of the lighting subassembly shall constitute a failure. Subsequent to the completion of the fungus test, it shall be removed from the test apparatus and within one hour tested to determine its capability to be actuated and to provide illumination of the specified intensity (see 3.3.1.1) for a period of 10 minutes. Failure of the lighting subassembly to pass this test shall constitute a failure of the fungus requirement.

4.6.2.5 Salt fog test. The lighting subassembly shall be subject to the salt fog test of MIL-STD-810, Method 509.2, Procedure I. It shall not be actuated during the test. Subsequent to completion of the salt fog test, the lighting subassembly shall be removed from the test apparatus and 48 hours later shall be tested to determine its capability to be actuated and to provide illimination of the specified intensity (see 3.3.1.1) for a period of 10 minutes. Failure of the lighting subassembly to pass this test shall constitute a failure of the salt fog requirement.

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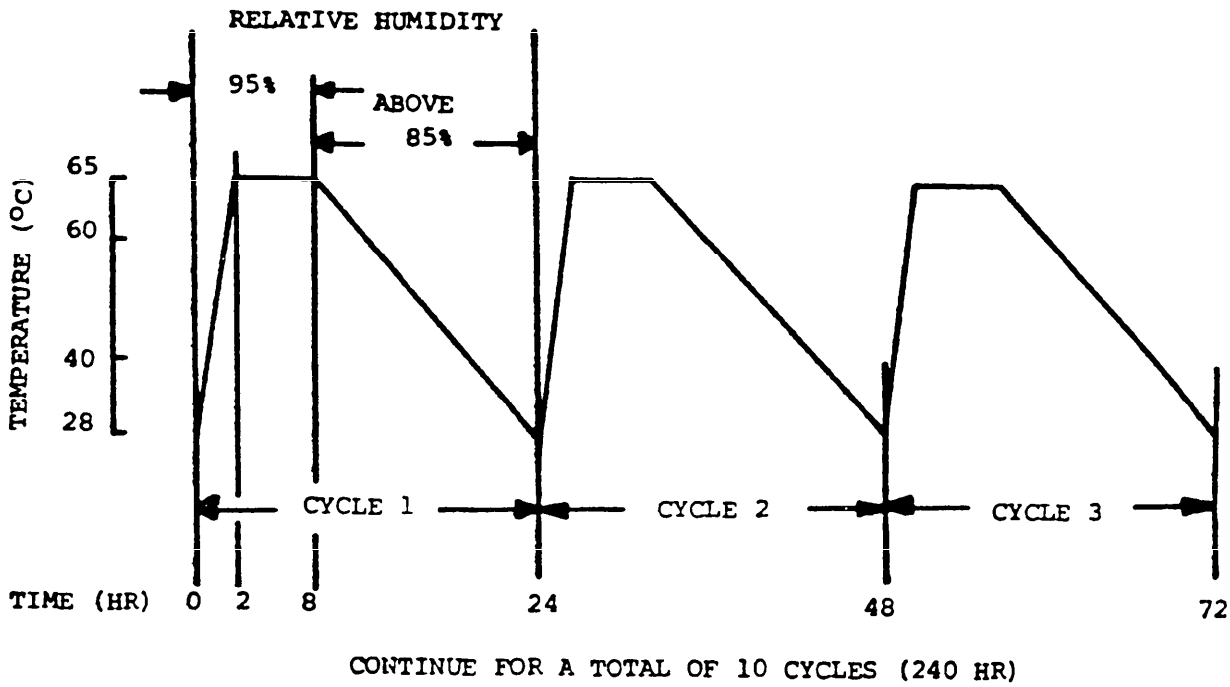

FIGURE 2. Humidity cycle.

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4.6.2.6 Vibration test. The lighting subassembly shall be subjected to the vibration test of MIL-STD-810, Method 514.3, per the following procedure:

a. The lighting subassembly shall be vibrated along each axis in accordance with the following test levels, frequency range, and times:

(1)	Vibration Test Curve:	Figure 3, Curve M
(2)	Vibration Frequency Range:	Figure 4
(3)	Test Time per Axis:	Three hours

b. The lighting subassembly shall be hard-mounted on the test jig in the manner designed for aircraft installation and shall be tested while in the inflight mode. The lighting subassembly shall not be actuated during the test and illumination of it during vibration shall constitute a failure of the test. Subsequent to the completion of the vibration test, it shall be removed from the test apparatus and tested to determine its capability to be actuated and to provide illumination of the specified intensity (see 3.3.1.1) for a period of 10 minutes. Failure of the lighting subassembly to pass this test shall constitute a failure of the vibration requirement.

4.6.2.7 Shock test. The lighting subassembly shall be subjected to the shock test of MIL-STD-810, Method 516.3, Procedure I. The shock pulse shall be sawtooth in accordance with MIL-STD-810 as shown by figure 516.3-4. The test shocks shall be applied with the lighting subassembly hard-mounted in the manner designed for aircraft installation. It shall be tested in the inflight mode. It shall not be actuated during the test and illumination of the lighting subassembly during shock application shall constitute a failure. Subsequent to the completion of the shock test, it shall be removed from the test apparatus and tested to determine its capability to be actuated and to perform as illumination of the specified intensity (see 3.3.1.1) for a period of 10 minutes. Failure of the lighting subassembly to pass this test shall constitute a failure of the shock requirement.

4.6.2.8 Low pressure test. The lighting subassembly shall be subjected to the low pressure (altitude) test of MIL-STD-810, Method 500.2, per the following procedure:

Step 1 - Prepare the test item in accordance with general test performance guidance, and maintain standard ambient temperature during the entire test.

Step 2 - Decrease the chamber pressure to 429.1 millimeters of Hg (16.9 inches of Hg or 15,000 feet above sea level) at a rate not to exceed 2,000 feet per minute and maintain for not less than one hour.

Step 3 - With the test item not operating, return the chamber to standard ambient conditions at a rate not to exceed 2,000 feet per minutes.

Step 4 - Operate and inspect the test item and obtain results in accordance with general test performance guidance.

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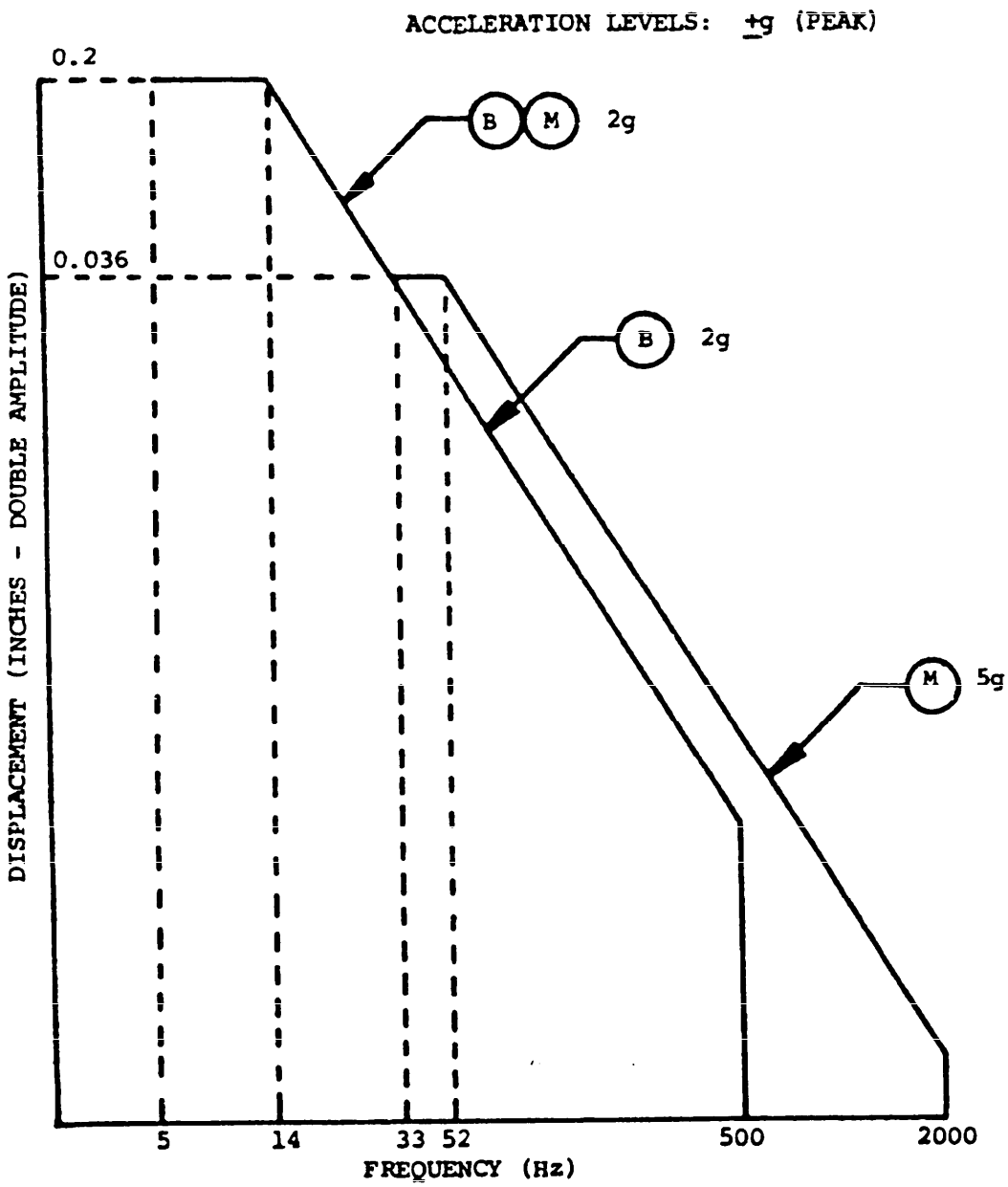

FIGURE 3. Vibration test curve.

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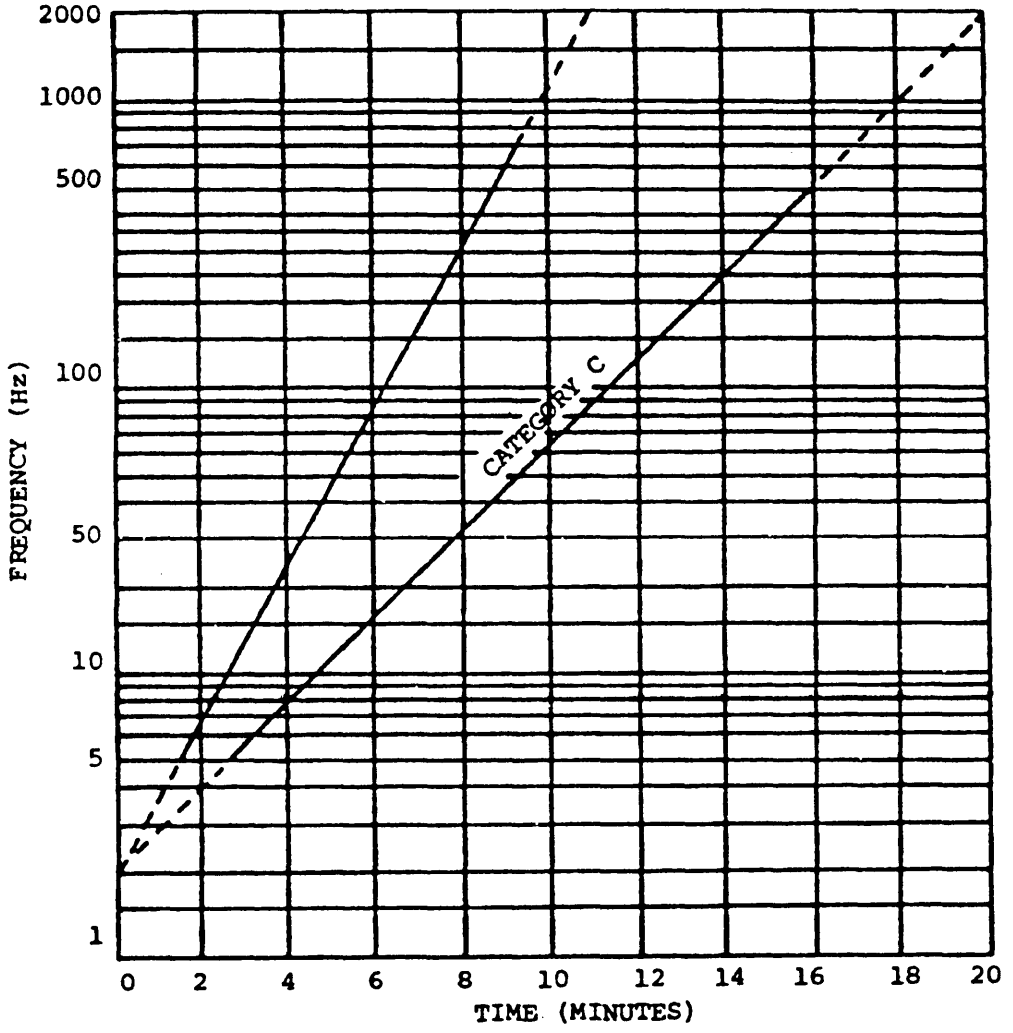

FIGURE 4. Logarithmic sweep.

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The lighting subassembly shall be tested in the inflight mode. During step 4, it shall be actuated and shall provide illumination of the specified intensity (see 3.3.1.1) for a period of 10 minutes. Failure of the lighting subassembly to pass this test shall constitute a failure of the low pressure requirement.

4.6.3 Underwater performance tests. Underwater performance tests will be conducted by the Government to evaluate the operation of the lighting subassembly while immersed in simulated water at various levels of turbidity. The lighting subassembly will be installed in a manner and configuration which resembles a representative aircraft installation as closely as is practical. The following performance functions and parameters, as a minimum, shall be evaluated and verified:

a. Activation functioning (see 3.3.1.3).
b. Duration of operation (see 3.3.1).
c. Water operation (see 3.3.1).
d. Activation time (see 3.3.1).
e. Illumination (see 3.3.1.1).

4.7 Reviews. Hardware reviews will be conducted as described herein by the procuring activity with contractor representatives in attendance. The objective of these events shall be to ensure that the lighting subassembly design conforms to specification requirements and is compatible with the aircraft in which it will be installed. The events shall be conducted in the sequence shown in figure 1. The Government will prepare a plan for each of the reviews at least 30 days prior to the scheduled commencement of each review. The contractor shall prepare the minutes of all events (see 6.2.2). The minutes shall include the contractor response to the design deficiency reporting requirements of 4.8.3.

4.7.1 Engineering proofing article (EPA-I) review. The contractor shall prepare a lighting subassembly EPA-I for each configuration specified in 3.1.1 and 3.1.2 for evaluation by the Government. The EPA-I shall be representative of the planned final design and shall be fully operable. Components need not be manufactured by production processes. The objective of the EPA-I review shall be to determine compliance of the EPA-I article with the design requirements of this specification. As a minimum, the following design features and requirements shall be verified.

a. Activation time (see 3.3.1.).
b. Deactivation capability (see 3.3.1).
c. Compatibility with night vision goggles (see 3.3.1.1).
d. Lighting subassembly status indicator (see 3.3.1.2.1.2).
e. Means of activation (see 3.3.1.3).
f. Size (see 3.3.2.1).
g. Mounting features (see 3.3.2.2).
h. Weight (see 3.3.2.3).
i. Light element construction (see 3.3.2.4).
j. Aircraft resources compatibility (see 3.8).

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4.7.2 Engineering proofing article II (EPA-II) review. The contractor shall prepare a lighting subassembly EPA-II for each configuration specified in 3.1.1 and 3.1.2 for evaluation by the Government. The EPA-II shall be manufactured by production processes and shall be of the final proposed design. The EPA-II shall be conducted subsequent to the completion of all development testing as shown in figure 1. All design changes determined necessary as a result of development testing shall be incorporated into the EPA-II prior to the conduct of the review. The lighting subassembly compliance with the design requirements listed in 4.7.1 shall be verified.

4.7.2.1 Field maintainability article I (FMA-I) demonstration. The organizational level maintainability of the lighting subassembly shall be demonstrated using Method 9 of MIL-STD-471. The adequacy of available test equipment, tools, and support equipment shall be determined during the demonstration test. The organizational maintenance procedures developed by the contractor will be used to isolate and repair all simulated and actual failures.

4.7.2.2 Reliability verification. The lighting subassembly shall demonstrate a reliability of 0.995 at the lower 90 percent confidence limit for the mission specified in 3.3.3.1.2. The contractor shall utilize reliability assessments and the cumulative results of development, demonstration, and operational tests to verify compliance with this requirement. The contractor shall prepare an evaluation plan to describe the methods to be used to evaluate/measure the reliability of the lighting subassembly. The evaluation plan shall be described in the reliability section of the system effectiveness program plan (see 6.2.2).

4.7.2.3 Testing baseline configuration audit (TBCA). A testing baseline configuration audit (TBCA) shall be conducted by the contractor, with a procuring activity representative in attendance. The audit shall be conducted in accordance with MIL-STD-1521, within forty-five days of the completion of the EPA-II review. The objective of the TBCA shall be to formally examine the EPA-II lighting subassembly against its technical documentation in order to establish a testing baseline for DT-II testing. This documentation package, as a minimum, shall include a complete set of level 2 drawings prepared in accordance with DOD-D-1000 (see 6.2.2). The approved documentation package, as a result of the TBCA, shall constitute the approved testing baseline configuration.

4.7.2.4 Materials and processes review. The procuring activity will conduct an in-depth review of the planned materials and processes to determine compliance with 3.4.1. In preparation for the review, the contractor shall ensure that each drawing has complete materials and process call-outs. In addition, the contractor shall prepare a parts list or parts tree by subassembly and assembly breakdown and listing thereon, for each part, all applicable drawing numbers (see 6.2.2).

4.7.3 Production proofing article (PPA) review. The contractor shall prepare a PPA. The PPA shall represent the frozen design of the proposed final baseline configuration (see 3.7) embodying all approved changes from previous design reviews or tests. All parts of the article shall be manufactured by production processes. The article shall be inspected to ensure that production components fit when selected at random and that the compatibility of production parts is acceptable.

of the tests specified below, and the results of each test

III shall be subjected to each

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4.7.3.1 Physical configuration audit (PCA). As part of the PPA, a PCA shall be performed. The PCA shall be comprised of a physical audit conducted in accordance with MIL-STD-1521 and the PPA review. The PCA shall formally examine the PPA against its technical documentation in order to establish a final (production) baseline. The final baseline configuration shall comprise the EPA-II configuration with the modifications required to obtain lighting subassembly performance, strength, and environmental protection in accordance with the requirements specified herein. Following the completion and approval of all development testing, the contractor shall prepare technical documentation to describe the final baseline configuration completely (see 6.2.2). This documentation package shall include, but not be limited to:

a. A complete shortage list.
b. A set of acceptance test procedures and associated test data.
c. An engineering drawing index.
d. A list of approved material review board actions on waivers.
e. A proposed DD Form 250, "Material Inspection and Receiving Report".
f. A list of approved nomenclature and nameplates.
g. A set of level 3 drawings and change documents assembled by the top drawing number.

4.7.3.2 Field maintainability article II (FMA-II) demonstration. Achievement of the maintainability demonstration shall be verified in accordance with 4.7.2.1 (see 6.2.2).

4.7.3.3 Reliability verification. Achievement of the reliability verification shall be verified in accordance with 4.7.2.2 (see 6.2.2).

4.8 Test plans and reports.

4.8.1 Test plans.

4.8.1.1 Contractor conducted tests. The Government reserves the right to witness all contractor conducted tests. All testing shall be conducted in accordance with the approved test plans. Prior to the commencement of contractor conducted tests, the contractor shall plan and develop detailed test requirements (see 6.2.2). Planning shall include the following elements:

a. Test purposes, prerequisites, schedule, conditions, pre-test and post-test events, and procedures.
b. Test facilities, test support equipment, government furnished equipment, safety precautions, emergency procedures, test fixtures, personnel stations and individual responsibilities, test article configuration and position of all components and controls.
c. Data to be obtained during the test; data acquisition, reduction, and analysis requirements; type and format of test records.
d. Instrumentation requirements.
e. Make available to the procuring activity a test plan 30 days prior to test for review and acceptance.
f. Notification to the Government procuring activity 15 days prior to the conduct of each test.

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4.8.1.2 Government conducted tests. For each test to be conducted by the Government, the Government will notify the contractor not less than 15 days prior to the conduct of each test and will provide the contractor with a copy of each test plan for review.

4.8.2 Test reports. The contractor shall prepare reports of all tests which he conducts (see 6.2.2). Reports shall be prepared in conformance to MIL-STD-831 and in the format described in figure 5. They shall include, but not be limited to:

a. Elements defined by the test plan and implemented in the test.
b. Deviations from the test plan with justification for each deviation.
c. Actual test data and supporting data as required by the test plan.
d. Test results, observations, graphical presentations, analyses, anomalies, problems encountered, design deficiencies.
e. Contractor response to the design deficiency reporting requirements of 4.8.3.
f. Conclusions and recommendations.

4.8.3 Deficiency and failure reporting.

4.8.3.1 Design deficiency reporting. Government witnesses or participants in tests or reviews who note system design or specification deficiencies will record those deficiencies on the in-process design conformance inspection deficiency report form (see figure 6). These forms shall provide the means to establish and maintain a closed loop discrepancy reporting system. Within 30 days following the completion of a test or review, the contractor shall prepare the following in the space provided for contractor action on the forms and make available to the Government:

a. Contractor proposed remedial action or reason for rejection of the discrepancy.
b. Effect of proposed remedial action upon the lighting subassembly and its performance.
c. Planned schedule for implementing the remedial action within the time limits specified in the contract or purchase order.

4.8.3.2 Failure reporting, analysis, and corrective action. The contractor shall implement and maintain a comprehensive failure reporting, analysis, and corrective action (FRACA) system to identify, report, investigate, analyze, and correct all problems and failures pertaining to the lighting subassembly. The FRACA system shall meet the failure reporting requirements of MIL-STD-2068. The system shall encompass all deliverable lighting subassembly hardware as well as test equipment, test personnel, test procedures, operating instructions, and installation instructions. The system shall provide for investigation and engineering analysis by a failure analysis board (FAB) of each problem or failure, followed where appropriate by laboratory analysis of the failed item. The FRACA system shall be applied throughout development and production.

4.8.4 Summary report. The contractor shall prepare a summary report in accordance with MIL-STD-831 at the end of each development test program phase (see 6.2.2).

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1. TITLE PAGE

   a. Company Name and Address.
   b. Report Number.
   c. Date of Release.
   d. Author's Name, Title, and Signature.
   e. Reviewers' Names, Titles, and Signatures.
   f. Report Title.
   g. Contract Title.
   h. CDRL (DD Form 1423) Number.
   i. DID (DD Form 1664) Number.

2. ABSTRACT

   a. Synopsis of Testing Conducted (i.e., the number of tests conducted in the series covered in the report and the location of the test(s) covered in relation to the test series and test program).
   b. Synopsis of Findings (i.e., brief statement describing the successes, failures, anomalies, and problems encountered during the reported tests).

3. TABLE OF CONTENTS

4. LIST OF TABLES

5. LIST OF ILLUSTRATIONS

6. TEST DESCRIPTION

   a. Test Purpose.
   b. Test Article (i.e., provide a complete detailed description of the test article configuration, including a description of each change from previous test article configuration with supporting rationale for each change).
   c. Test Fixture.
   d. Data to be Acquired/Measured During Test.
   e. Instrumentation (i.e., provide nomenclature, model number, part number, serial number, and calibration record for each piece of test instrumentation, including data transmission and recording systems, and provide a chart depicting camera locations citing for each the lens focal length, film speed, and type of film).
      Transducer location shall be included.
   f. Test Procedures.
   g. Data Reduction and Analysis Techniques.
   h. Test Classification Criteria.

FIGURE 5. Example of test report format.

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7. TEST RESULTS

a. Test Data Matrix.
b. Test Data Graphical Presentations.

(1) Single Test Smoothed Graphs.
(2) Running/Trend Graphs Covering All Tests to Date for Specific Types of Data.

c. Analysis of Test Results.
d. Description of Test and/or Test-to-Test Anomalies.
e. Description of Design Deficiencies.
f. Proposed Test Classification with Supporting Rationale.

8. CONCLUSIONS AND RECOMMENDATIONS

9. PROPOSED REMEDIAL ACTION

a. Description and Supporting Rationale.
b. Proposed Incorporation Point Within Program.

10. PROGRAM FOR NEXT INTERVAL

11. APPENDICES

a. Motion Picture Films and Video Tapes.
b. List of References.
c. Bibliography.
d. List of Test Witnesses.
e. Quality Assurance Records for Test Article.
f. Disposition of Test Article.
g. Instrumentation Records.
h. Test Data Analysis Worksheets.
i. Data Tapes.
j. Calibration Records.
k. Failure Reports.

FIGURE 5. Example of test report format - Continued.

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CHIT NO. _____

IN-PROCESS DESIGN CONFORMANCE INSPECTION
FOR THE LIGHTING SUBASSEMBLY

INSPECTION LOCATION: INSPECTION DATE: _____

ITEM INSPECTED: _____
REQUIREMENT REFERENCE (spec/para.): _____

SUBJECT:

DESCRIPTION OF DEFICIENCY:

DEFICIENCY AFFECTS: SAFETY ☐ RELIABILITY ☐ MAINTAINABILITY ☐
PERFORMANCE ☐ DESIGN/SPEC COMPLIANCE ☐

RECOMMENDATION:

_____ _____
ORIGINATOR'S NAME/ORGANIZATION SUBMITTED DUPLICATE CHIT

CONTRACTOR ACCEPTS ☐ REJECTS ☐
REMEDIAL ACTION OR REASON FOR REJECTION:

NADC ACCEPTS ☐ REJECTS ☐ CONTRACTOR'S COMMENTS

CHIT CLOSED _____ DATE _____
SIGNATURE

FIGURE 6. Example of in-process design conformance inspection deficiency report.

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4.9 Quality conformance inspections. Quality conformance inspections shall be performed on all production lighting subassemblies using acceptance test procedures (see 4.8.1.1) approved by the procuring activity and shall include the following production tests to ensure conformance to this specification:

a. Visual examinations (see 4.9.1).
b. Performance tests (see 4.9.2).
c. Photometric tests (see 4.9.2).
d. Radiometric tests (see 4.9.3).
e. Manufacturing environmental stress screenign (see 4.9.5).

4.9.1 Visual examinations. The complete lighting subassembly shall be visually inspected to verify conformance to this specification and its approved engineering documentation with respect to all requirements not covered by the tests of 4.9.2, 4.9.3, and 4.9.4.

4.9.2 Performance tests. The lighting subassembly shall be tested to verify performance in accordance with 3.3.1.

4.9.3 Photometric tests. Each lighting subassembly shall be tested to verify luminance in accordance with 3.3.1.1.

4.9.4 Radiometric tests. Each lighting subassembly shall be tested to verify radiance in accordance with 3.3.1.1.

4.9.5 Manufacturing environmental stress screening. Each shop replaceable assembly and weapons replaceable assembly which contains electronic parts shall be subjected to environmental screening consisting of random vibration and thermal cycling as a part of the assembly's acceptance test. The environmental tests may be conducted simultaneously or consecutively, depending upon the capabilities of the available test facilities. The equipment under test shall be operational and monitored for proper operation during both thermal and random vibration testing; except the equipment shall be non-operational during chamber cool-down to permit parts to become cold. All failures occuring during these tests shall be corrected and the test resumed. The enviromental screening procedures, adapted from NAVMAT P-9492, shall be imposed on all items fabricated to this specification including spares. Plans for environmental stress screening shall be prepared and documented in the contractor's acceptance test plans and procedures.

5. PACKAGING.

5.1 General. All components and parts of the lighting subassembly shall be preserved, packaged, and packed in accordance with MIL-E-17555 prior to shipment. In the event a component or unit is not covered by MIL-E-17555, the method of preservation for Level A shall be determined in accordance with the selection chart of Appendix D of MIL-STD-794. Shipping containers shall be marked in accordance with MIL-STD-129.

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6. NOTES.

6.1 Intended use. It is intended to install the lighting subassembly in all aircraft in which:

a. Passengers or crew are not located immediately next to an emergency escape exit.
b. Passengers or crew are mobile and may move about the aircraft in flight.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. Drawings (see 3.5.1).
c. First article (see 3.2).

6.2.2 Data requirements. The data requirements identified below shall be developed as specified herein and by the applicable data item description (DID) (DD Form 1664) and delivered to the Government in accordance with the approved CDRL. Deliverable data required by this specification are cited in the following paragraphs.

Paragraph No.	Data Requirement Title	Applicable DID No.
3.3.3, 4.7.2.2	Systems Effectiveness Program Plan (SEPP)	DI-R-5420
3.3.3.1.1, 3.3.3.2.1	Report, Reliability Allocation	DI-R-2114
3.3.3.1.1, 3.3.3.2.1	Maintainability Allocations Report Reliability Prediction Report	DI-R-7107 DI-R-7082
3.3.3.1.1, 3.3.3.2.1	Maintainability Predictions Report Reliability Mathematical Models	DI-R-7108 DI-R-7081
3.3.3.1.1, 3.3.3.2.1	Failure Mode, Effects, and Criticality Analysis Report	DI-R-7085
3.5.1, 4.7.2.3	Drawings, Engineering and Associated Lists	DI-E-7031
3.5.2	Operating and Maintenance Instructions	DI-M-4712
3.7	Plan, Configuration Management	DI-E-2035A
3.7	Report, Configuration Status Accounting	DI-E-2039
4.3	Quality Assurance Program Plan (QAPP)	UDI-R-20330

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Paragraph No.	Data Requirement Title	Applicable DID No.
4.3	Plan, Quality Assurance Program Plan	UDI-R-21374A
4.4.2	First Article Test Report	UDI-T-23790
4.7, 4.7.2.2, 4.7.2.3, 4.7.2.4, 4.7.3.1, 4.7.3.2, 4.7.3.3	Minutes of Formal Reviews, Inspections, and Audits	DI-E-3118
4.8.1.1	Test Plan	DI-T-5204
4.8.2	Test Reports	DI-T-2072
4.8.4	Report, Final (Short Form)	UDI-E-21353A

6.3 First article. When a first article inspection is required, the item will be tested and should be a sample selected from the first 50 single light element production items and the first 25 dual light element production items. The first article should consist of four single light element items and one dual light element item. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, tests, and approval by the first article.

Preparing activity
Navy-AS
(Project 6220-N335)

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NOTE: This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification 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.

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER

2. DOCUMENT TITLE

3a. NAME OF SUBMITTING ORGANIZATION

4. TYPE OF ORGANIZATION *(Mark one)*

- ☐ VENDOR
- ☐ USER
- ☐ MANUFACTURER
- ☐ OTHER *(Specify)*: _____

b. ADDRESS *(Street, City, State, ZIP Code)*

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional

b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional

c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional

8. DATE OF SUBMISSION *(YYMMDD)*

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)

DD FORM 1426, 82 MAR

PREVIOUS EDITION IS OBSOLETE.