

METRIC

MIL-L-45068D(AT)
22 June 1989
SUPERSEDING
MIL-L-45068C(AT)
13 August 1982

MILITARY SPECIFICATION

LIGHT, DOME, VEHICULAR, 24 VOLT DC

This specification is approved for use by the US Army Tank-Automotive Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers one type of dome light used in military vehicles equipped with nominal 24 volt (V) direct current (dc) electrical systems. The dome light contains a white and a blue lamp (see 6.1).

2. APPLICABLE DOCUMENTS

2.1 Government documents.

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

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: US Army Tank-Automotive Command, ATTN: AMSTA-GDS, Warren, MI 48397-5000, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 6220

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MIL-L-45068D(AT)

SPECIFICATIONS

FEDERAL

- QQ-S-571 - Solder: Tin Alloy, Tin-Lead Alloy, and Lead Alloy.

MILITARY

- MIL-C-22750 - Coating, Epoxy-Polyamide.
 MIL-C-46168 - Coating, Aliphatic Polyurethane, Chemical Agent Resistant.
 MIL-C-53039 - Coating, Aliphatic Polyurethane, Single Component, Chemical Agent Resistant.

STANDARDS

MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
 MIL-STD-130 - Identification Marking of US Military Property.
 MIL-STD-193 - Painting Procedures and Marking for Vehicles, Construction Equipment and Material Handling Equipment.
 MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts.
 MIL-STD-454 - Standard General Requirements for Electronic Equipment.
 MIL-STD-810 - Environmental Test Methods and Engineering Guidelines.
 MIL-STD-889 - Dissimilar Metals.
 MIL-STD-1184 - Electrical Components for Automotive Vehicles; Waterproofness Tests.
 DOD-STD-1866 - Soldering Process General (Non-Electrical).
 MS51073 - Light, Dome: 24 Volt DC.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Naval Publications and Forms Center, (ATTN: NPODS), 5801 Tabor Avenue, Philadelphia, PA 19120-5099.)

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those listed in the solicitation.

MIL-L-45068D(AT)

DRAWINGS

ARMY

7064671

- Lamp Assembly.

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

2.2 Non-Government publications. The following document forms a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issue of the documents cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B117

- Salt Spray (Fog) Testing, Method of.

(Application for copies should be addressed to American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

(Nongovernment standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 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. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.3) in accordance with 4.4.

3.2 Materials. Materials shall be as specified herein, on referenced drawings and in referenced standards and specifications (see 4.7.1).

3.2.1 Recycled, virgin and reclaimed materials. There are no requirements for the exclusive use of virgin materials. The use of recycled or reclaimed (recovered) materials is acceptable provided that all other requirements of this specification are met (see 4.7.1 and 6.4.1).

MIL-L-45068D(AT)

3.3 Design and construction. Construction of the dome light shall be as specified on Drawing 7064671 and MS51073 (see 4.7.1 and 4.7.2).

3.3.1 Soldering.

3.3.1.1 Electrical. Soldering of electrical connections shall be in accordance with requirement 5 of MIL-STD-454. The solder shall conform to SN 60, type RA of QQ-S-571 (see 4.7.1 and 4.7.2).

3.3.1.2 Non-electrical. Soldering of non-electrical assemblies shall be in accordance with DOD-STD-1866. Unless otherwise specified (see 6.2), the solder shall conform to SN 60, type RA of QQ-S-571 (see 4.7.1 and 4.7.2).

3.3.2 Mechanical interlock. The dome light switch shall incorporate a mechanical interlock to prevent the inadvertent energizing of any part of the light system except the blackout marker lights (see 4.7.2).

3.3.3 Dissimilar metals. The use of dissimilar metals shall be in accordance with MIL-STD-889. Except where necessary to complete an electrical circuit, contact between dissimilar metals, which would encourage galvanic action, shall be avoided. Where such contact is not necessary to complete an electrical circuit, but is otherwise avoidable, parts shall be insulated (see 4.7.1 and 4.7.2).

3.4 Performance.

3.4.1 Current draw. When supplied with an input voltage of 28 ± 1 V dc, the current draw of the dome light shall be no more than 0.45 amperes (A) in the blackout position, 0.75 A in the white light position and 0.0001 A in the off position (see 4.7.3.1).

3.4.2 Photometric. The photometric properties of the dome light shall meet the requirements on Drawing 7064671 (see 4.7.3.2).

3.5 Environmental.

3.5.1 High temperature. The insulation of the switch, electrical wiring and bulb sockets, and isolators shall show no evidence of melting, deformation, or cracking and the dome light shall meet the requirements of 3.4.1 and 3.4.2 after storage and during and after operation at temperatures as high as 75 degrees Celsius ($^{\circ}\text{C}$) (see 4.7.4.1).

3.5.2 Low temperature. The insulation of the switch, electrical wiring and bulb sockets, and isolators shall show no evidence of deformation, or cracking and the dome light shall meet the requirements of 3.4.1 and 3.4.2 after storage and during and after operation at temperatures as low as minus ($-$) 55°C (see 4.7.4.2).

3.5.3 Shock. The dome light shall evidence no cracking, breakage, loosened or distorted parts or other physical damage and shall meet the

MIL-L-45063D(AT)

requirements of 3.4.1 and 3.4.2 after exposure to sawtooth shock pulses having a peak value of 25 gravity units (g) and duration of 7 milliseconds (ms) (see 4.7.4.3).

3.5.4 Vibration. The dome light shall evidence no cracking, breakage, loosened or distorted parts or other physical damage and shall meet the requirements of 3.4.1 and 3.4.2, after exposure to simple harmonic motion having an amplitude of 0.75 millimeters (mm) (1.5 mm maximum total excursion) in the frequency range of 10 to 55 to 10 hertz (Hz) with a sweep time of 1 minute (see 4.7.4.4).

3.5.5 Corrosion. The dome light shall meet the requirements of 3.4.1 and 3.4.2, after prolonged exposure to a salt laden atmosphere (see 4.7.4.5).

3.5.6 Waterproofness. The dome light shall meet the waterproofness requirements of MIL-STD-1184 for type II, class 1 components and 3.4.1 and 3.4.2 (see 4.7.4.6).

3.5.7 Fungus. The dome light shall meet the requirements of 3.4.1 and 3.4.2 and evidence no microbial growth after exposure to conditions favorable to fungal growth (see 4.7.4.7).

3.6 Finish. Unless otherwise specified (see 6.2), all exposed surfaces requiring a paint topcoat shall be finished in accordance with MIL-STD-193. Topcoats shall conform to MIL-C-22750, MIL-C-46168, type optional, or MIL-C-53039 (see 4.7.1 and 4.7.2).

3.7 Identification marking. Identification marking shall be in accordance with MIL-STD-130 and shall include the following (see 4.7.2).

Dome light - 24 volts DC
Federal stock number
Date of manufacture (month, year)
Military part number
Manufacturer's identification
US

3.8 Workmanship. Workmanship shall be such as to assure a product free of burrs, scratches, sharp edges, and chips (see 4.7.2).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order (see 6.2), 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 or witness any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

MIL-L-45068D(AT)

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

4.2 Classification of inspection:

- a. First article inspection (see 4.4).
- b. Quality conformance inspections (QCI) (see 4.5).
- c. Control tests (see 4.6).

4.3 Inspection conditions. Unless otherwise specified herein, all inspections shall be conducted under the following conditions:

- a. Temperature $25 \pm 10^{\circ}\text{C}$.
- b. Relative humidity: Uncontrolled room ambient.
- c. Atmospheric pressure: Site pressure.

4.3.1 Temperature stabilization. Except as otherwise specified herein or in referenced specifications, test specimens shall be thermally stabilized for 1 hour prior to being subjected to tests.

4.4 First article inspection. When first article is required (see 3.1), first article inspection shall be performed on three first article samples. Unless otherwise specified (see 6.2), first article samples shall be inspected as specified in table I.

TABLE I. Classification of inspection.

Title	Requirement	Inspection	First article sample			Quality conformance		Control
			1	2	3	Examination	Tests	
Materials and construction	3.2 thru 3.3.1.2, 3.3.3, and 3.6	4.7.1	X	X	X			
Defects	3.3 thru 3.3.3 and 3.6 thru 3.8	4.7.2	X	X	X	X		

MIL-L-45068D(AT)

TABLE I. Classification of inspection. - Continued.

Title	Requirement	Inspection	First article sample			Quality conformance		Control
			1	2	3	Examination	Tests	
Current draw	3.4.1	4.7.3.1	X	X	X		X	X
Photometric	3.4.2	4.7.3.2	X	X	X		X	X
High temperature	3.5.1	4.7.4.1	X					X
Low temperature	3.5.2	4.7.4.2	X					X
Shock	3.5.3	4.7.4.3		X				
Vibration	3.5.4	4.7.4.4			X			
Corrosion	3.5.5	4.7.4.5			X			
Waterproofness	3.5.6	4.7.4.6		X				
Fungus	3.5.7	4.7.4.7	X	X	X			

4.5 Quality conformance inspection.4.5.1 Sampling.

4.5.1.1 Lot formation. An inspection lot shall consist of all the dome lights from an identifiable production period, from one manufacturer, submitted at one time for acceptance.

4.5.1.2 Sampling for examination. Samples for quality conformance examination shall be selected in accordance with general inspection level II of MIL-STD-105.

4.5.1.3 Sampling for testing. Samples for quality conformance testing shall be selected in accordance with inspection level S-3 of MIL-STD-105.

4.5.2 Examination.

4.5.2.1 Acceptable quality level (AQL). Each sample selected in accordance with 4.5.1.2 shall be examined to determine conformance to the following AQL's:

Classification	AQL
Major	1.0
Minor	2.5

4.5.2.2 Classification of defects. For examination purposes, defects shall be classified as listed in table II.

MIL-L-45068D(AT)

TABLE II. Classification of defects.

Category	Defect	Method of examination
Critical	None	
Major	<u>AQL 1.0% Defective</u>	
101	Dimensions affecting interchangeability, out of tolerance (see 3.3).	SIE 1/
102	Nonconformance in design and construction (see 3.3 thru 3.3.3).	Visual
103	Faulty workmanship affecting performance (see 3.8).	Visual
Minor	<u>AQL 2.5% Defective</u>	
201	Dimensions not affecting interchangeability, out of tolerance (see 3.3).	SIE
202	Improper finish (see 3.6).	Visual and functional
203	Improper marking (see 3.7).	Visual
204	Faulty workmanship affecting appearance (see 3.8).	Visual

1/ SIE = Standard Inspection Equipment.

4.5.3 Test. Samples selected in accordance with 4.5.1.3, shall be subjected to the quality conformance tests specified in table I, and shall conform to an AQL of 1.0.

4.6 Control tests. Control tests shall be conducted on 2 dome lights from each 100 produced except that not more than 4 or less than 2 may be selected in any 30-day period. Samples shall be selected from a lot which has passed the quality conformance examination specified in 4.5.2 and the quality conformance tests specified in 4.5.3, and shall be subjected to the control tests specified in table I.

4.7 Methods of inspection.

4.7.1 Materials and construction. Conformance to 3.2 through 3.3.1.2, 3.3.3, and 3.6 shall be determined by inspection of contractor records providing proof or certification that design, construction, processing, and materials conform to requirements. Applicable records shall include drawings, specifications, design data, receiving inspection records, processing and quality control standards, vendor catalogs and certifications, industry standards, test reports, and rating data.

MIL-L-45068D(AT)

4.7.2 Defects. Conformance to 3.3 through 3.3.3 and 3.6 through 3.8 shall be determined by examination for the defects listed in table II. Examination shall be visual, functional, or by measurement with standard inspection equipment.

4.7.3 Performance.

4.7.3.1 Current draw. To determine conformance to 3.4.1, 28 ± 1 V dc shall be applied to the input connection of the dome lamp. The electrical circuit shall be completed by making electrical contact with the body and door of the dome lamp. The dome lamp switch shall be rotated from the off to blackout and white light positions.

4.7.3.2 Photometric. To determine conformance to 3.4.2, the dome light shall be operated in the circuit specified in 4.7.3.1, and tested at a distance of 1.2 meters (m) from the filament as specified on Drawing 7064671.

4.7.4 Environmental.

4.7.4.1 High temperature. To determine conformance to 3.5.1, the dome light shall be stored at a temperature of $75 \pm 3^{\circ}\text{C}$ for a period of 24 hours and then operated continuously at this temperature for 4 hours with input voltage at 28 ± 1 V dc. Subsequently, the dome light shall be subjected to the tests specified in 4.7.3.1 and 4.7.3.2 and examined for evidence of damage.

4.7.4.2 Low temperature. To determine conformance to 3.5.2, the dome light shall be stored at a temperature of $-55 \pm 3^{\circ}\text{C}$ for a period of 24 hours and then operated continuously at this temperature for 4 hours with input voltage at 28 ± 1 V dc. Subsequently, the dome light shall be subjected to the tests specified in 4.7.3.1 and 4.7.3.2 and examined for evidence of damage.

4.7.4.3 Shock. To determine conformance to 3.5.3, the dome light shall be mounted to simulate actual installation in use and subjected to 12 shocks according to MIL-STD-202, method 213, test condition G, except the peak value shall be 25 g, the nominal duration shall be 7 ms and the velocity change shall be 0.8 meter per second (m/s). Subsequently, the dome light shall be subjected to tests specified in 4.7.3.1 and 4.7.3.2 and examined for evidence of damage.

4.7.4.4 Vibration. To determine conformance to 3.5.4, the dome lights shall be mounted to simulate actual installation in use using suitable mounting apparatus to assure that the mounting is free from resonances over the test frequency range. The specimens shall be subjected to a simple harmonic motion having an amplitude of 0.76 mm (1.5 mm maximum total excursion), the frequency being varied uniformly between the approximate limits of 10 and 55 Hz. The entire frequency range from 10 to 55 to 10 Hz

MIL-L-45068D(AT)

shall be traversed in approximately 1 minute. This motion shall be applied for a period of 2 hours in each of three mutually perpendicular directions for a 6 hour total. Subsequently, the dome light shall be subjected to the tests specified in 4.7.3.1 and 4.7.3.2 and examined for evidence of damage.

4.7.4.5 Corrosion. To determine conformance to 3.5.5, the dome light shall be subjected to the salt spray (fog) specified in ASTM B117 for a period of 200 hours. Subsequently, the dome light shall be subjected to the tests specified in 4.7.3.1 and 4.7.3.2.

4.7.4.6 Waterproofness. To determine conformance to 3.5.6, the dome light shall be subjected to the test specified in MIL-STD-1184, method 100, procedure 1. Subsequently, it shall be subjected to the tests specified in 4.7.3.1 and 4.7.3.2.

4.7.4.7 Fungus. To determine conformance to 3.5.7, the dome light shall be subjected to the test as specified in MIL-STD-810, method 508.3 for a period of 90 days. Subsequently, it shall be subjected to tests specified in 4.7.3.1 and 4.7.3.2 and examined for evidence of microbial growth.

5. PACKAGING

5.1 Preservation, packaging, packing, and marking. Preservation, packaging, packing, and marking for the desired level shall be in accordance with the applicable packaging requirements specified by the contracting authority (see 6.2).

6. NOTES

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

6.1 Intended use. The dome light covered by this specification is intended for use in military vehicles to provide interior vehicle lighting. The blue (blackout) lamp maintains blackout security while providing illumination to permit operational tasks within the vehicle.

6.2 Ordering data. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Issue of DODISS to be cited in the solicitation and, if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- c. If first article samples are required (see 3.1).
- d. If the solder for non-electrical assemblies shall be other than as specified (see 3.3.1.2).
- e. If finish shall be other than as specified (see 3.6).
- f. If responsibility for inspection shall be other than specified (see 4.1).

MIL-L-45068D(AT)

- g. If first article sample size and specific tests for each sample shall be other than specified (see 4.4 and 6.3).
- h. Arrangements for first article inspection, approval of test results and disposition of first article (see 6.3).
- i. Selection of applicable level and packaging requirements (see 5.1).

6.3 First article. When first article inspection is required, the contracting officer should provide specific guidance to offerers whether the first article sample(s) should be a preproduction sample, an initial production sample, a first production item or a standard production item from the contractor's current inventory; the number of samples to be inspected as specified in 4.4; and (when applicable) the specific tests to be performed on each sample. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.4 Definitions.

6.4.1 Recovered materials. "Recovered materials" means materials that have been collected or recovered from solid waste (see 6.4.2).

6.4.2 Solid waste. "Solid waste" means (a) any garbage, refuse, or sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility; and (b) other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities. It does not include solid or dissolved material in domestic sewage, or solid or dissolved material in irrigation return flows or industrial discharges which are point sources subject to permits under section 402 of the Clean Water Act, (33 U.S.C. 1342 et seq.), or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) (Source: Federal Acquisition Regulations, section 23.402).

6.5 Subject term (key word) listing.

Illumination, vehicular.
Current draw
Waterproofness

MIL-L-45068D(AT)

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

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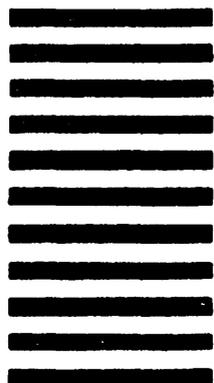


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DOCUMENT IDENTIFIER (Number) AND TITLE

MIL-L-45068D(AT); Light, Dome, Vehicular, 24 Volt DC

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