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MILITARY SPECIFICATION

LAMPS, GLOW

GENERAL SPECIFICATION FOR

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

1. SCOPE

- 1.1 This specification covers hermetically sealed glow lamps containing gases or vapors in which luminosity is produced by ionization of these gases for indicating and circuit control functions. The region of high luminosity is near the negative electrode (or cathode).

2. APPLICABLE DOCUMENTS

- 2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

QQ-S-781 - Strapping, Steel, Flat and Seals.
 PPP-B-566 - Boxes, Folding, Paperboard.
 PPP-B-585 - Boxes, Wood, Wirebound.
 PPP-B-601 - Boxes, Wood, Cleated-Plywood.
 PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner.
 PPP-B-636 - Boxes, Shipping, Fiberboard.
 PPP-B-676 - Boxes, Setup.
 PPP-T-60 - Tape: Packaging, Waterproof.
 PPP-T-76 - Tape, Pressure-Sensitive Adhesive Paper (For Carton Sealing).

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MIL-P-116 - Preservation, Methods of.
 MIL-B-43014 - Boxes, Water Resistant Paperboard, Folding, Setup and Metal-stayed.
 MIL-C-45662 - Calibration System Requirements.

STANDARDS

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MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
 MIL-STD-129 - Marking for Shipment and Storage.
 MIL-STD-147 - Palletized Unit Loads on 40" x 48" Pallets.
 MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts.
 MIL-STD-1285 - Marking of Electrical and Electronic Parts.

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring 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 sheets. In the event of any conflict between requirements of this specification and the specification sheet, the latter shall govern.
- 3.2 Qualification. The glow lamps furnished under this specification shall be products which are qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.4 and 6.2).

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3.3 General characteristics. The general characteristics of glow lamps shall be such that once a discharge has commenced, the voltage drop across the electrodes, remains essentially constant throughout an appreciable change in current flow. This entails the insertion of a current limiting resistor (see 3.4) so calculated that current cannot exceed a predetermined value. No post delivery aging or conditioning shall be required to achieve the stability and reliability needed to meet the applicable performance requirements stated herein.

3.4 Resistors. Unless otherwise specified (see 3.1), the current limiting resistors shall be located externally. Unless otherwise specified (see 6.1), external resistors shall not be furnished with the lamps.

3.5 Bulb shape, size and finish.

3.5.1 Bulb shape. The bulb shape shall be as specified (see 3.1) and shall be designated by letters as follows:

G - Globular.
S - Straight side.
T - Tubular.

3.5.2 Bulb size. The bulb size shall be expressed by a number denoting the greatest diameter in eighths of an inch; i.e., 4-1/2 would be 9/16 inch.

3.5.3 Bulb finish. Bulb finish for glow lamps shall be clear (colorless).

3.6 Lamp bases. Lamp bases shall be as specified (see 3.1) and shall be identified by the following symbols:

M - Medium screw.
CS - Candelabra screw.
DCB - Double contact bayonet candelabra.
DCBS - Double contact bayonet skirted.
MB - Single contact bayonet candelabra.
SMP - Single contact socket flange.
NB - Unbased wire leads treated to meet solderability requirements.

3.7 Electrode shapes. Electrode shapes shall be as specified (see 3.1) and shall be identified by the following symbols:

P2 - Split disk.
P3 - Split hemispherical plates.
P4 - Parallel disks.
PWS - Cylinder and helical electrode.
PW27 - Wire ring, flat plate.
W11 - Parallel posts.

3.8 Solderability of wire terminals. When tested in accordance with 4.7.2, the dipped surface of the type NB unbased wire leads shall be at least 95 percent covered with a new, smooth, solder coating. The remaining 5 percent of the lead surface shall show only small pinholes or rough spots, and these deficiencies shall not be concentrated in one area. Bare base metal and areas where the solder dip failed to cover the original coating are indications of poor solderability, and shall be cause for rejection. In case of dispute, the percent of coverage with pinholes or rough spots shall be determined by actual measurement of these areas, as compared to the total area.

3.9 Starting voltage. When tested in accordance with 4.7.3, the starting voltage shall be as specified (see 3.1).

3.10 Maintaining voltage (when specified, see 3.1). When tested in accordance with 4.7.4, the maintaining voltage shall be as specified (see 3.1).

3.11 Extinguishing voltage (when specified, see 3.1). When tested in accordance with 4.7.5, the extinguishing voltage shall be as specified (see 3.1).

3.12 Initial light output (when specified, see 3.1). When tested in accordance with 4.7.6, the initial light output shall be not less than specified (see 3.1).

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- 3.13 Leakage resistance (when specified, see 3.1). When tested in accordance with 4.7.7, the leakage resistance shall be not less than 100 megohms, unless otherwise specified (see 3.1).
- 3.14 Vibration (when specified, see 3.1). When tested in accordance with 4.7.8, lamps shall remain electrically and mechanically operative.
- 3.15 Shock. When tested in accordance with 4.7.9, lamps shall remain electrically and mechanically operative.
- 3.16 Life (when specified, see 3.1). When tested in accordance with 4.7.10, the average useful lamp life shall be as specified (see 3.1 and 6.3).
- 3.17 Electrode glow. When tested in accordance with 4.7.11, the indicator lamps with W11 electrode shapes (see 3.1) shall produce a corona coverage as specified. The absence of corona between the electrodes is permissible.
- 3.18 Marking. Lamps shall be marked in accordance with method I of MIL-STD-1285 with the military part number and the source code. Where physical size precludes the printing of required data on the lamp itself, the unit package shall be marked with the required identification. In addition, lamps containing radioactive materials shall be marked as specified in 3.18.1.
- 3.18.1 Radioactive marking. Lamps with intentionally added radioactive isotopes shall be marked in accordance with applicable Atomic Energy Commission (AEC) marking requirements. Where size precludes, mark radioactive information on the unit package.
- 3.19 Workmanship. Lamps shall be processed in such a manner as to be uniform in quality and shall be free of cracks, chips, sharp edges, and burrs on metal parts. Soldering, brazing, cementing, and wiring shall be thorough. Alinement of parts shall be accurate.

4. QUALITY ASSURANCE PROVISIONS

- 4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his 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 supplies and services conform to prescribed requirements.
- 4.1.1 Test equipment and inspection facilities. Test and measuring equipment and inspection facilities of sufficient accuracy, quality and quantity to permit performance of the required inspection shall be established and maintained by the supplier. The establishment and maintenance of a calibration system to control the accuracy of the measuring and test equipment shall be in accordance with MIL-C-45662.
- 4.2 Classification of inspection. The inspections specified herein are classified as follows:
- (a) Qualification inspection (see 4.4).
 (b) Quality conformance inspection (see 4.5).
- 4.3 Inspection conditions. Unless otherwise specified herein, all inspections shall be performed in accordance with the test conditions specified in the "General requirements" of MIL-STD-202.
- 4.4 Qualification tests.^{1/} Qualification tests shall be performed at a laboratory satisfactory to NAVSEC on sample units produced with equipment and procedures normally used in production. Examination and tests shall be as specified in 4.4.1.

^{1/}Application for qualification tests shall be made in accordance with "Provisions Governing Qualification SD-6" (see 6.2.1).

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4.4.1 Samples for qualification. Twenty lamps, of each type, shall be subjected to the examination and tests specified in table I in the order shown.

Table I - Qualification inspection.

Examination and test	Requirement paragraph	Examination test paragraph	Number of sample units to be inspected
Visual and dimensional	3.4 to 3.7 incl, 3.18 and 3.19	4.7.1	All
Solderability	3.8	4.7.2	All
Starting voltage in light	3.9	4.7.3	1-10
Starting voltage in total darkness	3.9	4.7.3	11-20
Maintaining voltage ^{1/}	3.10	4.7.4	All
Extinguishing voltage ^{1/}	3.11	4.7.5	1-10
Initial light output ^{2/}	3.12	4.7.6	1-10
Leakage resistance ^{1/}	3.13	4.7.7	11-20
Vibration	3.14	4.7.8	All
Shock	3.15	4.7.9	All
Life	3.16	4.7.10	All
Electrode glow ^{2/}	3.17	4.7.11	All

^{1/}Applicable only to circuit control lamps.

^{2/}Applicable only to indicator lamps with W11 electrodes.

4.4.2 Retention of qualification. To retain qualification, the supplier shall forward a report at 24-month intervals to the qualifying activity. The qualifying activity shall establish the initial reporting date. The report shall consist of:

- (a) A summary of the results of the tests performed for inspection of product for delivery, group A, indicating as a minimum the number of lots that have passed and the number that have failed. The results of tests of all reworked lots shall be identified and accounted for.
- (b) A summary of the results of tests performed for qualification verification inspection (see 4.4.3), group B, including the number and mode of failures. The summary shall include results of all qualification verification inspection tests performed and completed during the 24-month period. If the summary of the test results indicates nonconformance with specification requirements, and corrective action acceptable to the qualifying activity has not been taken, action may be taken to remove the failing product from the qualified products list.

Failure to submit the report within 30 days after the end of each 24-month period may result in loss of qualification for that product. In addition to the periodic submission of inspection data, the supplier shall immediately notify the qualifying activity at any time during the 24-month period that the inspection data indicates failure of the qualified product to meet the requirements of this specification. In the event that no production occurred during the reporting period, a report shall be submitted certifying that the company still has the capabilities and facilities necessary to produce the item. If during two consecutive reporting periods there has been no production, the manufacturer may be required, at the discretion of the qualifying activity, to submit the lamps to testing in accordance with the qualification inspection requirements.

4.4.3 Qualification verification inspection. Qualification verification inspection shall consist of group B inspection (see 4.5.1.3). Except where the results of these inspections show noncompliance with the applicable requirements (see 4.5.1.4), delivery of products which have passed group A inspection (see 4.5.1.2) shall not be delayed pending the results of these qualification verification inspection.

4.5 Quality conformance inspection.

4.5.1 Inspection of product for delivery. Inspection of product for delivery shall consist of group A inspection (see 4.5.1.2).

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4.5.1.1 Inspection lot. An inspection lot shall consist of all lamps covered by a single part number, produced under essentially the same conditions, and offered for inspection at one time.

4.5.1.2 Group A inspection. Sample lamps shall be selected from each lot in accordance with inspection level II of MIL-STD-105 for the examination and tests specified in table II and shall be conducted in the order listed. The acceptance quality level (AQL) shall be as specified in table II.

Table II - Group A inspection.

Examination or test	Requirement paragraph	Examination and tests	AQL (percent defective)
Visual and dimensional	3.4 to 3.7 incl, 3.18 and 3.19	4.7.1	4
Solderability	3.8	4.7.2	1
Starting voltage in light	3.9	4.7.3	1
Maintaining voltage ^{1/}	3.10	4.7.4	1
Leakage resistance ^{1/}	3.13	4.7.7	1
Electrode glow ^{2/}	3.17	4.7.11	1

^{1/}Applicable only to circuit control lamps.

^{2/}Applicable only to indicator lamps with W11 electrodes.

4.5.1.3 Group B tests. Twenty sample lamps shall be selected from the first lot and every 24 months thereafter and shall be subjected to the tests specified in table III in the order listed. Samples selected shall have passed the group A inspection specified in 4.5.1.2. If one or more samples fail to pass the group B tests, the lot shall be subject to rejection. Sample units which have been subjected to the group B tests shall not be offered for delivery.

Table III - Group B tests.

Test	Requirement paragraph	Tests
Starting voltage in total darkness	3.9	4.7.3
Extinguishing voltage ^{1/}	3.11	4.7.5
Initial light output ^{2/}	3.12	4.7.6
Vibration	3.14	4.7.8
Shock	3.15	4.7.9
Life	3.16	4.7.10

^{1/}Applicable only to circuit control lamps.

^{2/}Applicable only to neon indicator lamps.

4.5.1.4 Noncompliance. If a sample fails to pass group B tests, the supplier shall take corrective action on the materials or processes, or both, as warranted, and on all units or product which can be corrected, and which were manufactured under essentially the same conditions, with essentially the same materials, processes, etc., and which are considered subject to the same failure. Acceptance of the product shall be discontinued until corrective action, acceptable to the Government, has been taken. After the corrective action has been taken, group B tests shall be repeated on additional sample units (all inspection, or the inspection which the original sample failed, at the option of the Government). Group A inspection may be reinstated; however, final acceptance shall be withheld until the group B retests has shown that the corrective action was successful. In the event of failure after test, information concerning the failure and corrective action taken shall be furnished to the cognizant inspection activity and the qualifying activity.

4.6 Test conditions.

4.6.1 Electrostatic and electromagnetic fields. The test area shall be relatively free of electrostatic and radiofrequency electromagnetic fields so as not to affect the firing potential of the lamps.

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4.6.2 Couplings and shields. Capacitive couplings and electromagnetic shields, including portions of the body, metal plates, dark enclosures, photometer spheres and electrical conductors, other than those connected to the lamp under test, shall be kept at least 6 inches from the lamp being tested for starting, maintaining and extinguishing voltages.

4.6.3 Alternating current test voltage and frequency. Alternating current (ac) test voltage shall be 60 hertz (Hz) sine wave having a harmonic content of not more than 3 percent root mean square (rms) of the fundamental. Life test ac voltage shall be 120 ± 3.6 volts ac rms and shall have a maximum crest factor of 1.45.

4.6.4 Direct current (dc) test voltage. Unless otherwise specified (see 3.1), dc life test voltage shall be 120 ± 1.2 volts. Dc test voltage shall be of sufficient magnitude for the lamp under test and shall have a ripple of less than 0.1 percent, except that for life testing the ripple shall be less than 1.0 percent.

4.6.5 Measurement in light. Measurement in light shall be made in an unobstructed ambient illumination of 5 to 50 footcandles.

4.6.6 Conditioning of lamps for measurement in dark. Lamps to be measured in total darkness shall have been held inoperative for a period of at least 24 hours and in total darkness (less than 0.1 footcandle ambient illumination) for a minimum of 10 seconds immediately prior to measurement.

4.6.7 Measurement in total darkness. Measurement in total darkness shall be made in a lighttight enclosure with no internal illumination.

4.6.8 Lamp mountings. For making electrical tests, based lamps shall be mounted in sockets which meet the inspection conditions specified herein; wire lead lamps may be suspended by their leads. For mechanical shock and vibration tests, based lamps shall be mounted by their normal mounting means; wire lead lamps shall be secured to the test fixture so as to prevent relative movement between lamp and fixture at the point of attachment.

4.7 Examination and tests.

4.7.1 Visual and dimensional examination. Lamps shall be visually and dimensionally examined to verify that the physical characteristics, dimensions, marking and workmanship are in accordance with the applicable requirements specified herein (see 3.4 through 3.7, 3.18, and 3.19).

4.7.2 Solderability. Wire lead lamps shall be tested in accordance with method 208 of MIL-STD-202 to determine conformance with the requirements specified in 3.8.

4.7.3 Starting voltage (see 3.9). The lamps shall be wired as shown on figure 1. For lamps with external resistors, R_1 shall be increased while continuously observing V_2 for the highest voltage reached just before the voltmeter indication decreases abruptly. For lamps with resistors in their bases, R_1 shall be increased while continuously observing V_1 for the highest voltage reached just before the ammeter indication increases abruptly and the lamp glows. The highest voltage reached is the starting voltage. The lamps shall be tested in light and in total darkness (see 4.6.5 through 4.6.7).

4.7.4 Maintaining voltage (see 3.10). The lamps shall be wired as shown on figure 1. With the lamp operated at the specified test current (see 3.1), the maintaining voltage shall be the voltage indicated on V_1 . This test is not applicable to lamps having resistors in their bases.

4.7.5 Extinguishing voltage (see 3.11). The lamps shall be wired as shown on figure 1. R_1 shall be decreased while continuously observing V_2 for the lowest voltage reached just before the voltmeter indication increases abruptly. The lowest voltage reached is the extinguishing voltage. This test is not applicable to lamps having resistors in their bases.

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4.7.6 Initial light output (see 3.12 and figures 2 through 5). Initial light output test shall be conducted as follows:

- (a) Mount the test and calibration lamps in the sphere as indicated on figure 2 so that the baffle prevents direct illumination of the diffusing glass by either lamp.
- (b) Energize the photomultiplier and allow approximately 15 minutes for warmup and stabilization. (See figure 3.)
- (c) Apply voltage to the calibration lamp as required for its calibrated light output (see figure 4).
- (d) Adjust the photomultiplier output to correspond with the known output of the calibration lamp. This adjustment is made by varying resistor R_1 on figure 3.
- (e) Without further adjustment of the photomultiplier, read the outputs of two additional calibration lamps, then adjust the photomultiplier output to the average of the three lamps.
- (f) Deenergize the calibration lamp.
- (g) Energize the test lamp and adjust transformer T on figure 5 so that the specified design current (see 3.1) flows through the test lamp.
- (h) Allow approximately 1 minute for the test lamp to stabilize then record light output indicated by voltmeter V_1 on figure 3.

After measuring five test lamps, the photometer shall be recalibrated as before and corrected for drift. Recalibration shall be with the same three calibration lamps.

4.7.7 Leakage resistance (see 3.13). The lamp and specified series resistor in the test circuit (see figure 1) shall be connected with an ammeter or galvanometer of suitable range. V_2 shall be open-circuited. R_1 shall be adjusted to apply 45 ± 1 volts to V_1 . V_1 and A shall be recorded. The leakage resistance shall be computed as $R_L = \frac{V_1}{A} - R_2$. Unless R_2 is in the lamp base, it may be omitted from the circuit when this test is conducted.

4.7.8 Vibration (see 3.14). The glow lamps shall be subjected to the vibration test, method 204 of MIL-STD-202. The following details shall apply:

- (a) Mounting - As specified in 4.6.8.
- (b) Test condition - C.

4.7.9 Shock (see 3.15). Lamps shall be tested in accordance with 4.7.9.1 or 4.7.9.2, as specified (see 3.1).

4.7.9.1 Method I. Lamps shall be tested in accordance with method 207 of MIL-STD-202. The following details shall apply:

- (a) Mounting fixture - In accordance with figure 207-4A.
- (b) Electrical load - Not applicable.

4.7.9.2 Method II. Lamps shall be tested in accordance with method 213 of MIL-STD-202. The following details shall apply:

- (a) Mounting - See 4.7.8.
- (b) Test condition - C.

4.7.10 Life (see 3.16). The glow lamp with specified series resistor shall be operated at the specified test current (see 3.1, 4.7.3, and 4.7.4) until the end of useful life (see 4.7.10.1) is reached. Life testing shall be interrupted once per day. Circuit components shall be tested on dc and correct polarity shall be observed when testing lamps which have polarity indicated (see 3.18). Indicator lamps shall be tested on ac.

4.7.10.1 End of useful life. End of useful life is defined as the time at which the following changes occur, as applicable:

- (a) Circuit components. When starting voltage exceeds the specified initial max value by 5-volts.
- (b) Standard brightness indicators. Decrease in light output to 50 percent of the initial value.
- (c) High brightness indicators. Starting voltage equals the nominal circuit voltage (see 3.1).

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4.7.11 Electrode glow (see 3.17). Indicator lamps shall have a minimum initial corona coverage of 30 percent of the electrode length (see 3.1), when operated at rated current and voltage for 1 minute. The 30 percent minimum corona coverage shall begin within 1 mm from the electrode tips (as shown on figure 6) and shall be continuous on each electrode when viewed as shown on figure 7.

4.8 Inspection of preparation for delivery. Sample packages and packs and the inspection of the preservation-packaging, packing and marking for shipment and storage shall be in accordance with the group A and B quality conformance inspection requirements of MIL-P-116. The sampling and inspection of the packing and marking for shipment and storage shall be in accordance with the quality assurance provisions of the applicable container specification and the marking requirements of MIL-STD-129.

5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging. Preservation and packaging shall be level A or C, as specified (see 6.1).

5.1.1 Level A.

5.1.1.1 Cleaning. Lamps shall be cleaned in accordance with MIL-P-116, process C-1.

5.1.1.2 Drying. Lamps shall be dried in accordance with MIL-P-116.

5.1.1.3 Preservative application. Preservatives shall not be used.

5.1.1.4 Unit packaging. Unless otherwise specified (see 6.1), lamps shall be packaged ten each in accordance with MIL-P-116, method III, insuring compliance with the general requirements paragraph under methods of preservation (unit protection) and the physical protection requirements paragraph therein. The lamps shall be individually protected by the use of noncorrosive separators, trays or other die-cut or molded inserts. The unit container shall conform to PPP-B-566 or PPP-B-676 at the supplier's option.

5.1.2 Level C. Lamps shall be clean, dry, and packaged in a manner that will afford adequate protection against corrosion, deterioration and physical damage during shipment from supply source to the first receiving activity.

5.2 Packing. Packing shall be level A, B or C, as specified (see 6.1).

5.2.1 Level A. The packaged lamps shall be packed in fiberboard containers conforming to PPP-B-636, class weather resistant, style optional, special requirements. In lieu of the closure and waterproofing requirements in the appendix of PPP-B-636, closure and waterproofing shall be accomplished by sealing all seams, corners and manufacturer's joint with tape, two inches minimum width, conforming to PPP-T-60, class 1 or PPP-T-76. Banding (reinforcement requirements) shall be applied in accordance with the appendix to PPP-B-636 using non-metallic or tape banding only.

5.2.2 Level B. The packaged lamps shall be packed in fiberboard containers conforming to PPP-B-636, class domestic, style optional, special requirements. Closures shall be in accordance with the appendix thereto.

5.2.3 Level C. The packaged lamps shall be packed in shipping containers in a manner that will afford adequate protection against damage during direct shipment from the supply source to the first receiving activity. These packs shall conform to the applicable carrier rules and regulations.

5.2.4 Unitized loads. Unitized loads, commensurate with the level of packing specified in the contract or order, shall be used whenever total quantities for shipment to one destination equal 40 cubic feet or more. Quantities less than 40 cubic feet need not be unitized. Unitized loads shall be uniform in size and quantities to the greatest extent practicable.

5.2.4.1 Level A. Lamps, packed as specified in 5.2.1, shall be placed on pallets in conformance with MIL-STD-147, load type 1, with a fiberboard cap (storage aid 4) positioned over the load.

5.2.4.2 Level B. Lamps, packed as specified in 5.2.2, shall be palletized as specified in 5.2.4.1 except that the fiberboard caps shall be class domestic.

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5.2.4.3 Level C. Lamps, packed as specified in 5.2.3, shall be unitized with pallets and caps of the type, size and kind commonly used for the purpose and shall conform to the applicable carrier rules and regulations.

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

5.4 General.

5.4.1 Exterior containers. Exterior containers (see 5.2.1, 5.2.2 and 5.2.3) shall be of a minimum tare and cube consistent with the protection required and shall contain equal quantities of identical stock numbered items to the greatest extent practicable.

5.4.2 Navy procurements. For Navy procurements the use of polystyrene loose fill material (such as strips, strands and beads) is prohibited for packaging and packing applications.

5.4.3 Army procurements. (See 5.1.1.4, 5.2.1, 5.2.2 and 5.2.4.2.) All unit containers shall either be weather resistant or overwrapped with waterproof barrier materials. Containers conforming to PPP-B-566 or PPP-B-676 shall be overwrapped with waterproof barrier materials or shall conform to MIL-B-43014. For level A packing when quantities per destination are less than a unitized load, the fiberboard containers shall not be banded but shall be placed in a close fitting box conforming to PPP-B-601, overseas type; PPP-B-621, class 2, style 4 or PPP-B-585, class 3, style 2 or 3. Closure and strapping shall be in accordance with the applicable container specification except that metal strapping shall conform to QQ-S-781, type I, class B. For level B packing, fiberboard boxes shall be weather resistant as specified in level A and the containers shall be banded. Weather resistant fiberboard caps shall be used for level B unitized loads.

6. NOTES

6.1 Ordering data. Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Applicable specification sheet (see 3.1).
- (c) Part number of required lamp (see 3.1).
- (d) Whether external resistor shall be furnished with the lamp (see 3.4).
- (e) Marking (see 3.18).
- (f) Levels of preservation, packaging, packing, and applicable marking (see 5.1 and 5.2).

6.2 Qualification. With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified in the division in the applicable Qualified Products List, QPL 15098, whether or not such products have actually been so listed by that date. The attention of the suppliers is called to the requirement, and manufacturers are urged to arrange to have the products submitted to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the Qualified Products List is the Naval Ship Engineering Center, Prince Georges Center, Center Building, Hyattsville, Maryland 20782, and information pertaining to qualification of products may be obtained from that activity. Applications for qualification tests may be made in accordance with "Provisions Governing Qualification SD-6" (see 6.2.1).

6.2.1 Copies of SD-6, "Provisions Governing Qualification", may be obtained upon application to Commanding Officer, Naval Publication and Forms Center, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120.

6.3 Average life data. The specified average useful lamp life (see 3.1) is based upon operating the lamps at the specified design current. If approval is obtained from the qualifying activity, the supplier may provide test results from his periodic testing to substantiate the average life requirements.

6.4 Nominal watts (see 3.1). Nominal watts include power expended in the series resistors.

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6.5 Characteristic gas and glow color (see 3.1). Characteristic gas and glow color are indicative of lamp construction and performance. Other gases may be included and may alter the specified glow color.

6.6 Cross-reference. Glow lamps having American National Standards Institute (ANSI) numbers and former industry lamp numbers are cross-referenced in table IV.

Table IV - Cross-reference.

Military part no.	ANSI	Former lamp no.
M15098/1-001	A9A-T	NE-2ET
M15098/1-002	C2A-T	NE-2HT
M15098/1-003	A2A-T	NE-2AT
M15098/2-001	5AC	NE-68
M15098/2-002	5AG-A	NE-76
M15098/2-003	5AH	NE-83
M15098/2-004	RT2-32-1A	---
M15098/2-005	5AJ	NE-86
M15098/3-001	W1A	AR-1
M15098/3-002	R2A	NE-34
M15098/4-001	J5A	NE-30
M15098/5-001	J2A	AR-3
M15098/5-002	B7A	NE-45
M15098/6-001	J3A	AR-4
M15098/6-002	B9A	NE-48
M15098/7-001	B5A	NE-17
M15098/8-001	L5A	NE-32
M15098/9-001	R9A	NE-42
M15098/10-001	B1A	NE-51
M15098/10-002	B2A	NE-51H
M15098/11-001	C7A	NE-2D
M15098/11-002	C9A	NE-2J
M15098/11-003	A1G	---
M15098/11-004	A1H	---
M15098/12-001	R1A	NE-79

6.7 THE MARGINS OF THIS SPECIFICATION ARE MARKED "*" TO INDICATE WHERE CHANGES (ADDITIONS, MODIFICATIONS, CORRECTIONS, DELETIONS) FROM THE PREVIOUS ISSUE HAVE BEEN 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.

Custodians:

Army - EL
Navy - SH
Air Force - 82

Review activities:

Army - EL, MI, ME
Navy - SH, EC
Air Force - 82
DSA - GS

User activities:

Navy - AS, OS, CG, MC

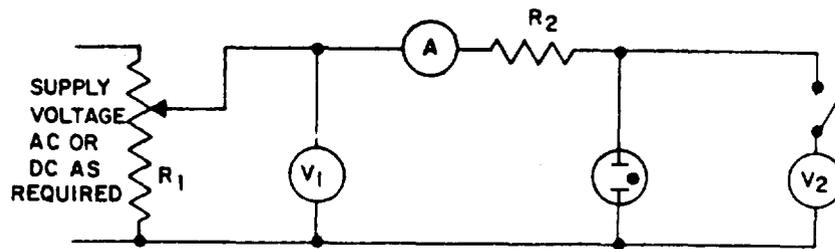
Preparing activity:

Navy - SH

Agent:

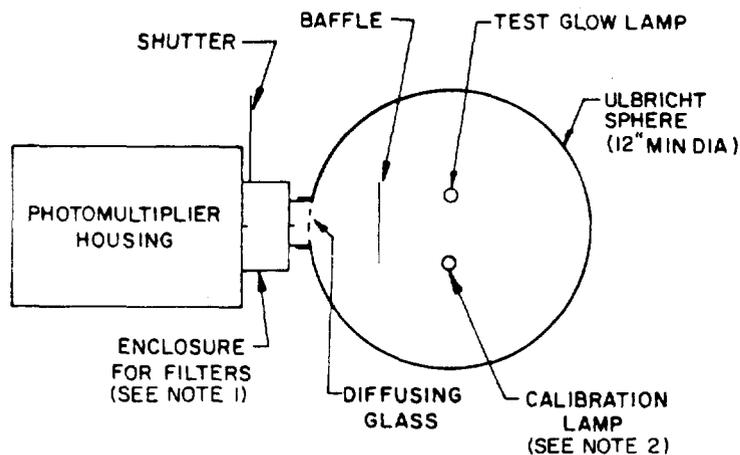
DSA - ES
(Project 6240-0210)

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- R_1 - Resistance divider.
 V_1 - Voltmeter.
 A - Ammeter (impedance less than 1 percent of series impedance R_2).
 For ac measurements use a thermocouple ammeter.
 R_2 - Series resistor-magnitude, as specified for lamp under test (see 3.1).
 V_2 - Voltmeter (VTVM, 10 megohms or more input resistance).

Figure 1 - Design voltage and current test circuit.

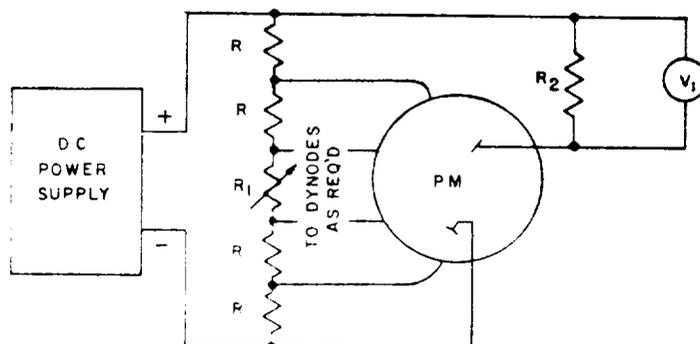


NOTES:

- For testing neon indicator lamps, the filter shall be such that the photomultiplier frequency response approximates that of the normal eye. The Corning #CS4-107 filter, or equal, is satisfactory.
- Calibrate for light output at 3 month intervals, or less, using calibration lamps versus primary standard lamps. Primary standard lamps may be procured from the National Bureau of Standards.

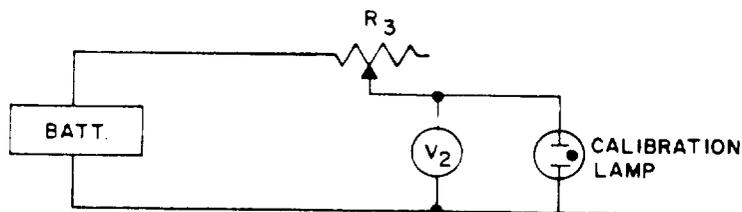
Figure 2 - Test fixture.

MIL-L-15098D



- PM - Photomultiplier.
- R - Voltage divider resistors (as required).
- R₁ - Calibration resistor.
- R₂ - PM load resistor.
- V₁ - Voltmeter (VTVM).

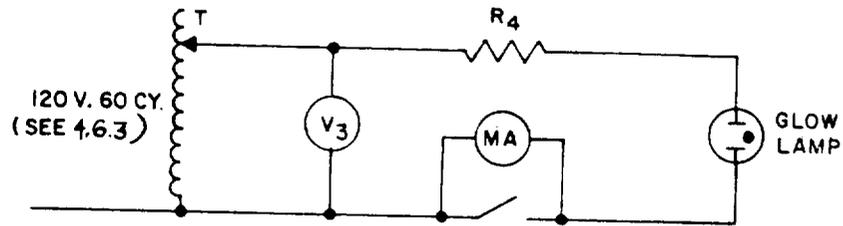
Figure 3 - Photomultiplier wiring diagram.



- BATT - Battery.
- R₃ - Voltage dropping resistor.
- V₂ - Voltmeter (VTVM).

Figure 4 - Calibration lamp wiring diagram.

MIL-L-15098D



R₄ - Series resistor for glow lamp (see 3.4).
 T - Variable transformer.
 MA - Milliammeter low reading.
 V₃ - Voltmeter (VTVM)

Figure 5 - Test lamp wiring diagram.

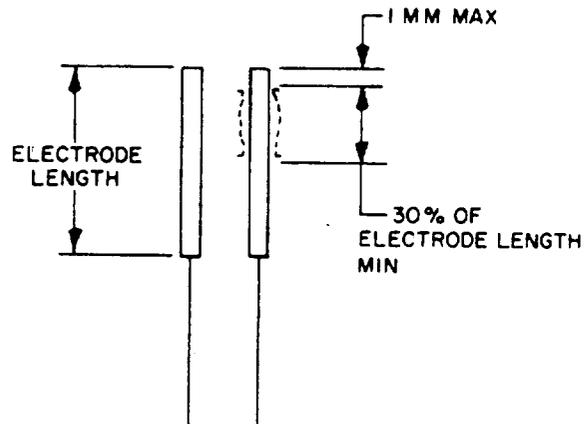


Figure 6 - Electrode tips.

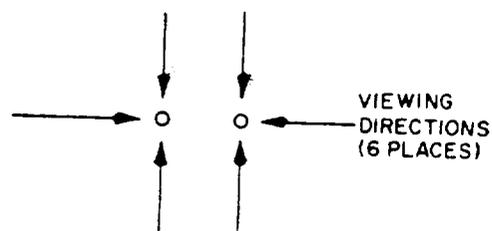


Figure 7 - Top view of electrodes.

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)* - Optionalb. WORK TELEPHONE NUMBER *(Include Area Code)* - Optionalc. MAILING ADDRESS *(Street, City, State, ZIP Code)* - Optional

8. DATE OF SUBMISSION (YYMMDD)

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