MIL-L-3661B
27 March 1967
SUPERSEDING
MIL-L-3661A
11 August 1960

MILITARY SPECIFICATION

LAMPHOLDERS, INDICATOR LIGHTS, INDICATOR-LIGHT HOUSINGS, AND INDICATOR-LIGHT LENSES, GENERAL SPECIFICATION FOR

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

1. SCOPE

1.1 Scope. This specification covers the general requirements for lamphoiders, indicator lights, indicator-light housings, and indicator-light lenses including display and integral lamp driver network types and associated hardware. For the purpose of this specification, an indicator-light housing is an indicator light without a lens (see 6.5).

1.2 Classification.

1.2.1 *Type designation of lampholders and indicator-light housings.* The type designation of lampholders and indicator-light housings shall he in the following form, and as specified (see 3.2 and 6.2):

LH??	*/1*
Style (1.2.1.1)	Type (1.2.1.2)

1.2.1.1 *Style.* The style is identified by a two-letter symbol "LH" followed by a two-digit number.

1.2.1.2 *Type.* The applicable types based on circuit or mechanical parameters are identified by one or more digit numbers. The numbers shall follow and be separated from the style number by a slash mark.

1.2.2 *Type designation of lenses.* The type designation of lenses shall be in the following form, and as specified (see 3.2 and 6.2):

LC/?	*B*	*T*	*?*
Style (1.2.2.1)	Color (1.2.2.2)	Transmittance (1.2.2.3)	Lens material (1.2.2.4)

1.2.2.1 *Style.* The style is identified by a two-letter symbol "LC" followed by a two-digit number.

1.2.2.2 *Color.* The color of the lens shall be identified by a single letter in accordance with table I (see 3.4.9.2).

FSC 6250, 6210

TABLE I. *Color.*

Symbol	Color
B[1]	Blue
C	Colorless (clear) (D and N transmittance only).
G[1]	Green (identification).
R	Red (identification).
E	Red (aviation).
W	White (aviation) (T transmittance only).
Y	Yellow (aviation).
D	Black (opaque).
S	Gray (opaque).

[1] Not recommended for use with neon lamps.

1.2.2.3 *Transmittance.* The lens transmittance shall be identified by a single letter in accordance with table II.

TABLE II. *Transmittance.*

Symbol	Transmittance
D[1]	Diffusing[2]
N	Nondiffusing
T[3]	Translucent[3]
O[4]	Opaque[4]
B[5]	Translucent/black overlay[5]

[1] Not recommended for use with neon lamps.
[2] In these lenses diffusion shall be accomplished only by the surface closest to the lamp.
[3] In these lenses the diffusing media shall be dispersed throughout the transmitting glass or plastic material.
[4] In these lenses no light shall be transmitted or reflected.
[5] Lens, prior to black overlay, shall be translucent. External viewing portion of the lens excluding any legend(s) shall be covered with a black lusterless finish.

1.2.2.4 *Material.* The lens material shall be identified by a one-digit number in accordance with table III.

TABLE III. *Lens material.*

Symbol	Material
1	Glass (−65°C. to +200°C.)
2	Plastic (−55°C. to +71°C.)
3	Plastic (−55°C. to +125°C.)

1.2.3 *Type designation of indicator lights (non-replaceable lens type).* The type designation for indicator lights with non-replaceable lens and nomenclature display types shall be in the following form and as specified (see 3.2 and 6.2):

LHC82	*/1*	*BT1*
Style (1.2.3.1)	Type (1.2.1.2)	(1.2.2.2 to 1.2.2.4)

1.2.3.1 *Style.* The style is identified by a three-letter symbol "LHC" followed by a two-digit number.

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-B-626 — Brass, Leaded and Non-Leaded, Rods, Shapes, Forgings and Flat Products with Finished Edges, Bar, Flat Wire and Strip.

ZZ-R-765 — Rubber, Silicone: Low- and High-Temperature and Tear Resistant.

MILITARY

MIL-C-5541 — Chemical Films and Chemical Film Materials for Aluminum and Aluminum Alloys.

MIL-A-8625 — Anodic Coatings, for Aluminum and Aluminum Alloys.

MIL-P-17091 — Polyamide (Nylon) Plastic, Rigid: Molded Parts, Rods and Flats.

MIL-E-17555 — Electronic and Electrical Equipment and Associated Repair Parts, Preparation for Delivery of.

MIL-M-18012 — Markings for Aircrew Station Displays, Design and Configuration of.

MIL-M-19887 — Molding, Plastic, Polyamide Resin (Nylon) Glass-Fiber Filled and Molded Polyamide Resin Glass-Fiber Filled Plastic Parts.

MIL-M-20693 — Molding Plastic, Polyamide (Nylon), Rigid.

MIL-C-25050 — Colors Aeronautical Lights and Lighting Equipment, General Requirements for.

MIL-C-45662 — Calibration System Requirements.

STANDARDS

FEDERAL

FED-STD-3 — Colors, Aeronautical Lighting.

FED-STD-406 — Plastics: Methods of testing.

FED-STD-595 — Colors.

MILITARY

MS18235 — Lamp, Cartridge, Short Cylindrical, Plug-In, Incandescent, Plastic (Flat Lens Type).

MS18236 — Lamp, Cartridge, Stovepipe, Plub-In, Neon, Plastic (Curved Lens Type).

MS18237 — Lamp, Cartridge, Long Cylindrical, Plug-In, Neon, Plastic (Flat Lens Type).

MS18238 — Lamp, Cartridge, Short Cylindrical, Plug-In, Incandescent, Glass (Flat Type).

MS33558 — Numerals and Letters, Aircraft Instrument Dial, Standard Form of.

MIL-STD-105 — Sampling Procedures and Tables for Inspection by Attributes.

MIL-STD-108 — Definitions of and Basic Requirements for Enclosures for Electric and Electronic Equipment.

MIL-STD-130 — Identification Marking of U. S. Military Property.

MIL-STD-202 — Test Methods for Electronic and Electrical Components Parts.

MIL-STD-456 — Electronic Parts, Date and Source Coding for.

See Supplement-1 for list of applicable specification sheets.

(Copies of specifications, standards, drawings, required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer).

2.2 **Other publications.** The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

OFFICIAL CLASSIFICATION COMMITTEE

Uniform Freight Classification Ratings, Rules, and Regulations

(Application for copies should be addressed to the Official Classification Committee, 1 Park Avenue, at 33rd Street, New York, New York 10016)

NATIONAL BUREAU OF STANDARDS Handbook H28-Screw-Thread Standards for Federal Services.

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, D. C. 20401)

3. REQUIREMENTS.

3.1 **Qualification.** Lampholders, indicator lights, indicator-light housings and lenses 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 4.5 and 6.4). Unless otherwise specified on the individual specification sheets covering units with built-in lamps, qualification of lamps is not required. Built-in lamps should pass the qualification tests of the unit of which they form an integral part.

3.1.1 All applicants for qualification approval under this specification shall demonstrate that each of their items conforms to all the requirements specified in the applicable documents (see 3.2), singularly and in combination with all other previously qualified items, regardless of manufacture.

3.2 **Specification sheets.** The individual lampholders, indicator lights, indicator-light housings and lens requirements shall be as specified herein and in accordance with the applicable specification sheets. In the event of any conflict between the requirements of this specification and the applicable specification sheets, the latter shall govern.

3.3 **Materials.**

3.3.1 *General requirements.* Materials used in the manufacture of lampholders, indicator lights, indicator-light housings and lenses, shall be as specified herein and in the applicable specification sheet. However, when a definite material is not specified, a material shall be used which will enable the aforementioned items to meet the performance requirements of this specification. Acceptance or approval of any constituent material shall not be construed as a guarantee of the acceptance of the finished product.

3.3.2 *Metal and finishes.*

3.3.2.1 *Metals.* All metal parts, other than current-carrying parts, shall be of a corrosion-resistant material or shall be suitably plated to resist corrosion.

3.3.2.2 *Finishes.*

3.3.2.2.1 *Exterior.* The exterior surfaces, designed to be exposed at the front of the panel after assembly, shall have a black lusterless finish.

3.3.2.2.2 *Aluminum (only.)* Unless otherwise specified (see 3.2), all external aluminum parts shall be anodized in accordance with MIL-A-8625 and all internal aluminum parts shall be chemically treated in accordance with MIL-C-5541.

3.3.3 *Dissimilar metals.* When dissimilar metals are used in intimate contact with each other, protection against electrolysis and corrosion shall be provided. The use of dissimilar metals in contact, which tend toward active electrolytic corrosion (particularly brass, copper, or steel used in contact with aluminum or aluminum alloy), is not acceptable. However, metal plating or metal spraying of dissimilar base metals to provide similar or suitable abutting surfaces is permitted. The use of dissimilar metals separated by a suitable insulating material is also permitted. Dissimilar metals are defined in 6.3.

3.3.4 *Plastic material.* Cotton base laminations, cotton-, or cellulose-filled molding material shall not be used.

3.3.4.1 *Thermoplastics.* Unless otherwise specified (see 3.2), thermoplastics shall not be used for fabricating indicator light housings and lampholder bases. When used for internal insulation the thermoplastic material shall be in accordance with type I of MIL-P-17091, type III, grade E of MIL-M-20693 or glass-reinforced nylon of MIL-M-19887, or shall be of a high temperature polycarbonate material which is self-extinguishing when tested in accordance with method 2021 of FED-STD-406.

3.3.5 *Silicone rubber.* Silicone rubber shall be in accordance with ZZ-R-765 when used as an "O" ring for external sealing devices.

3.4 **Design and construction.** Lampholders, indicator lights, indicator-light housings and lenses shall be so constructed as to insure proper operation when mounted in any position and shall conform to the design, construction, and physical dimensions as specified (see 3.2).

3.4.1 *Mounting hardware.* All mounting hardware shall be as specified (see 3.2) and need not be assembled when being furnished for inclusion in production equipment. For direct Government procurement, all mounting hardware shall be assembled to the lampholder in the order specified (see 3.2) or, shall be included in the unit package with the lampholder.

3.4.2 *Terminals.* The terminal design shall be as specified (see 3.2.)

3.4.2.1 *Solder terminals (when applicable)* Solder terminals shall be designed to accept two wire leads, AWG #20, per terminal unless otherwise specified (see 3.2) and shall be treated to facilitate soldering.

3.4.2.2 *Screw terminals (when applicable).* Screw terminals shall be provided with hardware, as specified (see 3.2).

3.4.2.3 *Terminal identification.* Lampholders, indicator lights and indicator-light housings, designed to accommodate neon lamps, shall be marked with a plus (+) sign at the terminal which is electrically connected to the center contact of the lamp used.

3.4.3 *Screw threads.* Screw threads on externally threaded parts, or parts subject to replacement or removal, shall be in accordance with Handbook H28. Threading of nonmetallic parts will not be permitted.

3.4.4 *Anti-rotational means.* Lampholders, indicator lights and indicator-light housings shall be designed with an anti-rotational mounting means.

3.4.5 *Panel accommodation.* Unless otherwise specified (see 3.2), indicator lights and indicator-light housings shall be designed to

accommodate panels up to 3/16-inch in thickness using applicable mounting hardware furnished. Mounting flanges shall be of the fixed type.

3.4.6 *Current-limiting resistors.* Current-limiting resistors used for neon indicator lights and housings shall have a ± 20 percent tolerance and the applicable ohmic value shall be as specified (see 3.2). The resistor shall be physically located internally to the indicator light or indicator-light housing.

3.4.7 *Press-to-test operation.* When specified (see 3.2), the light shall be such that the lamp may be tested by pressing on the lens of the assembly. When the pressure is released, the test circuit to the lamp shall be opened and the lens assembly shall return to its normal position.

3.4.8 *Lamp circuitry.* Lampholders, indicator lights, and indicator-light housings shall be designed with an electrically isolated lamp circuit.

3.4.8.1 *Lamp accommodation (not applicable to non-removable lens assemblies).* Panel mounted indicator lights and indicator-light housings shall be designed so that the lamp(s) can be replaced from the front of the panel. No tools of any type shall be required to replace the lamp(s).

3.4.8.2 *Plug-in cartridge type lamps.* Indicator-light housings using cylindrical plug-in lamps shall be designed to accommodate lamps in accordance with MS18235, MS18236, MS18237 and MS18238. Current limiting resistors required for neon lamps shall be built into the lamp cartridges .

3.4.9 *Lenses.*

3.4.9.1 *Lens fabrication.* The lens viewing area (window) shall be secured to a threaded metal bushing, as applicable (see 3.2).

3.4.9.2 *Color.* The lens color shall be in accordance with FED-STD-3 or MIL-C-25050, unless otherwise specified (see 3.2), and as follows:

3.4.9.2.1 *Symbol C (colorless).* Colorless is defined as a lens which does not change the color coordinates (±.01) of the calibrating lamp when measured from the front of the lens.

3.4.9.2.2 *Symbol B (blue).* The blue color shall be within the boundary formed by the interconnection of the points shown for the chromaticity coordinates.

Point	*X - Axis*	*Y - Axis*
1	.075	.240
2	.082	.268
3	.154	.220
4	.160	.244

3.4.9.2.3 *Symbol W (white), symbol Y (yellow), symbol E (red aviation).* White, yellow and red aviation colors shall be in accordance with category I (aviation colors).

3.4.9.2.4 *Symbol G (green), symbol R (red).* Green and red colors shall be in accordance with category II (identification colors).

3.4.9.2.5 *Symbol S (gray).* Gray color shall be in accordance with FED-STD-595, number 36231.

3.4.9.2.6 *Symbol D (black).* Black color shall be in accordance with FED-STD-595, number 37038.

3.4.9.3 *Mounting.* Lenses shall be so designed that when they are repeatedly removed and installed to their applicable mating holder (that is indicator-light housing etc.) that no physical contact will be imposed on the lamp envelope.

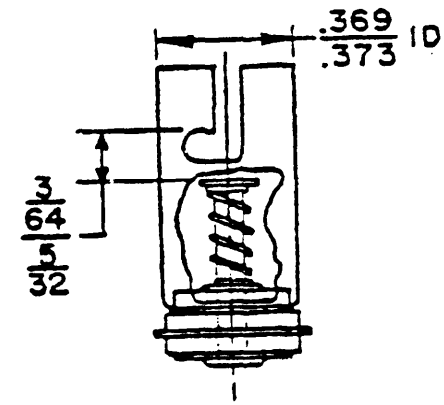
3.4.9.4 *Lamp retention.* Lenses, designed to accommodate midget flange base lamps, shall include a lamp retainer means.

3.4.9.5 *Marking*. When specified (see 6.2), symbols and legend to be displayed on lenses shall conform to MIL-M-18012 and the marking ratio specified in MS33558. Corners and ends of character strokes may exhibit radii.

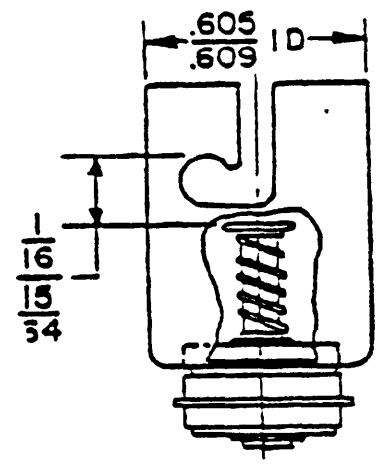
3.4.10 *Lamp contacts.*

3.4.10.1 *Contact and spring material.* Lamp contacts shall be of a copper base alloy and shall be suitably plated. Lamp contact springs shall be beryllium copper suitably plated or shall be of a corrosion-resistant steel. When the contact and contact spring are combined as an integral part (one piece of metal) copper beryllium alloy or phosphor bronze, suitably plated, shall be used.

3.4.10.1.1 *Moving contacts (bayonet locking holders).* The distance between the top of the moving contacts and the top of the locking slot shall be 3/64-inch minimum, 5/32-inch maximum for miniature lamp sockets, and 1/16-inch minimum, 15/64-inch maximum for candelabra lamp sockets (see figure 1).



MINIATURE LAMP SOCKETS



CANDELABRA LAMP SOCKETS

FIGURE 1. *Moving contacts.*

3.4.11 *Electromagnetic interference (see 3.2).* When required, lens designed for electromagnetic interference capability shall include an integral metal mesh. An electrical continuity shall exist between lens and housing.

3.5 Performance.

3.5.1 *Dielectric withstanding voltage.* Lampholders, indicator lights, and indicator-light housings shall withstand the voltage specified in 4.7.2 without arcing, flashover, or current flow in excess of 1 milliampere. The item shall be electrically operative after the test.

3.5.2 *Terminal strength.* When lampholders, indicator lights, and indicator-light housings are tested as specified in 4.7.3, there shall be no mechanical or electrical damage.

3.5.3 *Solderability.* Lampholders, indicator lights, and indicator-light housings shall be tested in accordance with 4.7.4. The soldered area shall show at least 95 percent coverage after the application of the dip-coated process.

3.5.4 *Temperature cycling.* When lampholders, indicator lights, indicator-light housings and lenses are tested as specified in 4.7.5, there shall be no mechanical or electrical damage, as applicable. The lens shall show no visual color degradation after the test.

3.5.5 *Sand and dust.* When specified (see 3.2), indicator lights shall be tested as specified in 4.7.6, there shall be no evidence of any dust inside the lamp assembly. The item shall be electrically operative after the test. The press-to-test unit shall be mechanically and electrically operative.

3.5.6 *Circuit continuity.* When indicator lights are tested as specified in 4.7.7, the indicator light continuity shall conform to the applicable circuitry (see 3.2).

3.5.7 *Contact resistance (not applicable to non-removable lens type indicator lights).*

3.5.7.1 *Wiping type contact.* The contact resistance of lampholders, indicator lights and indicator-light housings, employing spring-loaded contact assemblies, shall not be more than 1 ohm when tested as specified in 4.7.8 and 4.7.8.1.

3.5.7.2 *Static type contacts (for cylindrical plug-in lamps).* The contact resistance of static type lampholders, indicator lights, and indicator-light housings shall not be more than 50 milliohms when tested as specified in 4.7.8 and 4.7.8.2.

3.5.8 *Contact spring pressure (not applicable for non-removable lens type indicator lights).* The contact spring pressure for the following type lamps shall be within the specified range for the applicable type lamp socket when tested as specified in 4.7.9.

(a) Single contact T-3-¼ lamps, 24-72 ounces.

(b) Double contact candelabra bayonet base lamps, 48-144 ounces.

(c) Midget flange base lamps, 12-36 ounces.

3.5.9 *Torque.*

3.5.9.1 *Socket shell torques (applicable only to lampholders and indicator-light housings that are designed to accept bayonet base lamps).* When lampholders and indicator-light housings are tested as specified in 4.7.10.1, the socket shell shall withstand the applied torque with no resultant permanent damage.

3.5.9.2 *Lens torque.* The lens when tested as specified in 4.7.10.2, shall withstand the specified torque without any mechanical damage to the lens assembly or mating holder.

3.5.9.3 *Bushing torque.* Indicator-lights and indicator-light torque housings, that are bushing mounted, shall withstand the specified torque when tested in accordance with 4.7.10.3, without any mechanical or electrical damage.

3.5.9.4 *Dimmer torque.* Lenses, incorporating dimmer designs, shall withstand the specified torque when tested in accordance with 4.7.10.4. No mechanical damage shall occur.

3.5.10 *Sealings.* When specified (see 3.2), indicator lights shall be tested as specified in 4.7.11. There shall be no evidence of water leakage around the test enclosure opening.

3.5.11 *Salt spray (corrosion).* When lampholders, indicator-lights, indicator-light housings and lenses are tested as specified in 4.7.12, there shall be no evidence of excessive corrosion. Excessive corrosion is defined as that which interferes with the electrical or mechanical performance, or in the case of plated metals, corrosion which has passed through the plating and attacked the base metal. There shall be no warping, cracking, or other damage and the lenses shall show no color degradation.

3.5.12 *Life.*

3.5.12.1 *Electrical.* When lampholders and indicator lights are tested as specified in 4.7.13 and 4.7.14, there shall be no light intermittency noted during the test and the applicable lens shall have an even color distribution over the viewing area after the test.

3.5.12.2 *Mechanical (applicable to dimmer type indicator lights).* The light dimmer cover shall be capable of operation from extreme dim to extreme bright positions, without failure as specified in 4.7.15.

3.5.13 *Vibration.* When lampholders, indicator-lights, indicator-light housings and lenses are tested as specified in 4.7.16, the contact-spring pressure shall be as specified in 3.5.8, and there shall be no chipping, cracking, or crazing of materials, or loosening, bending, warping, or distortion of parts, and the orientation of rotatable indicator-light lenses shall not change.

3.5.14 *Shock.* When lampholders, indicator lights, indicator-light housings and lenses are tested as specified in 4.7.17, the contact-spring pressure shall be as specified in 3.5.8, and there shall be no chipping, cracking, or crazing of materials, or loosening, bending, warping, or distortion of parts.

3.5.15 *Moisture resistance.* When lampholders, indicator lights, indicator-light housings and lenses are tested as specified in 4.7.18, the insulation resistance shall be not less than 25 megohms, and the dielectric withstanding voltage shall be as specified in 3.5.1. There shall be no corrosion, the black finish (see 3.3.2.2.1) shall not be removed, and there shall be no decomposition, leaching out, or spreading of constituent materials, or other defect detrimental to the intended function of the lampholder, indicator light, indicator-light housing or lens, and no loss of color or discoloration.

3.5.16 *Luminance.* Indicator lights shall be tested in accordance with 4.7.19 and the brightness level shall be in accordance with 3.2, when specified.

3.6 **Marking.** Marking shall be in accordance with MIL-STD-130. Marking shall include the manufacturer's name or trademark, or code symbol (in addition, electronically controlled devices shall include date code) in accordance with MIL-STD-456, and the following:

3.6.1 *Lampholders and indicator - light housings.* Unless otherwise specified in the contract or order, the lampholders and indicator-light housings shall be marked with the type designation (see 3.2).

3.6.2 *Indicator lights.* For indicator lights that have a non-removable lens design, the

complete type designation shall be marked on the indicator light body unless otherwise specified (see 3.2).

3.6.3 *Lens.* The type designation for lenses (see 3.2) shall be marked on the unit package.

3.7 **Workmanship.** Lampholders, indicator lights, indicator-light housings and lenses shall be manufactured and processed in a careful and workmanlike manner in accordance with good design and sound practice and shall be free from defects that will affect life, serviceability, or appearance and the following:

(a) Indicator-light housings.

(1) No sharp edges shall be noticed on threaded and body parts.

(2) Terminals shall not be bent out of regular designed position.

(3) No solder splattering shall be noticed in the socket cavity or around the terminal header design.

(b) Lenses.

(1) No visual crazing or color degradation shall be noted.

(2) When illuminated under diffused light source, color dispersement shall be uniform.

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, the supplier may utilize his own facilities or any commercial laboratory acceptable to 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.

4.2 **Classification of inspection.** The examination and testing of lampholders, indicator lights, indicator-light housings and lenses shall be classified as follows:

(a) Component - materials inspection (see 4.3).

(b) Qualification inspection (see 4.5).

(c) Quality conformance inspection (see 4.6).

(1) Inspection of product (see 4.7.1).

(2) Inspection of preparation for delivery (see 4.8).

4.3 **Component-materials inspection.** Component-materials inspection shall consist of verification that the component-materials listed in table IV, used in fabricating the lampholders, indicator lights, indicator-light housings and lenses, are in accordance with the applicable referenced specifications or requirements prior to such fabrication. Such verification shall document actual tests, examination or other verifiable quality data.

TABLE IV. *Component-materials inspection.*

Component-material	Requirement paragraph	Applicable specification
Insulation:		
Plastic	3.3.4.1	MIL-M-20693, MIL-P-17091, MIL-M-19887, FED-STD-406
Silicone rubber	3.3.5	ZZ-R-765
Finish:		
Anodizing	3.3.2.2.2	MIL-A-8625, MIL-C-5541
Lens color	3.4.9.2	FED-STD-3, FED-STD-595, MIL-C-25050

4.4 **Inspection conditions.** Unless otherwise specified (see 3.2), all inspection shall be conducted at the ambient temperature, pressure, and humidity conditions specified in the "General Requirements" of MIL-STD-202.

4.4.1 *Test equipment and inspection facilities.* Test equipment and inspection facilities shall be of sufficient accuracy, quality, and quantity to permit performance of the required inspection. The supplier shall establish calibration of inspection equipment to the satisfaction of the Government. Calibration of standards which control the accuracy of the inspection equipment shall comply with the requirements of MIL-C-45662.

4.5 **Qualification inspection.**[1] Qualification inspection shall be conducted at a laboratory satisfactory to the Naval Ship Engineering Center. Qualification inspection shall consist of the inspection specified in table V, in the order shown.

4.5.1 *Samples for qualification.* All test units shall be tested with the lenses assembled to the units.

4.5.1.1 *Single submission.* Twelve sample lampholders, indicator lights, or basic indicator-light housings and at least one lens of each style, color, and transmittance shall be submitted for qualification inspection. As many different lens styles, colors, and transmittances as possible should be tested with each basic indicator-light housing sample to give the broadest representative sample used with each indicator light.

4.5.1.2 *Group submission (when applicable).* Samples shall be submitted as specified (see 3.2).

[1] Application for qualification tests shall be made in accordance with "Provisions Governing Qualification" (see 6.4 and 6.4.1).

4.5.2 *Test routine.* All sample units shall be subjected to the inspection of group I, table V. The sample units shall then be divided as specified in table V for groups II to V inclusive, and subjected to the group inspection for their particular group, in the order shown.

4.5.3 *Failures.*

4.5.3.1 *Removable lens type failure.* Failure in any of the applicable examinations or tests of table V shall be cause for refusal to grant qualification. Lamp failure will not be cause for failure of any parts tested, provided the test at which failure of lamp is noted, is stopped immediately and a new lamp is installed and the lamp immediately lights. The test shall then be continued.

4.5.3.2 *Non-removable lens type failure (excluding nomenclature display types).* Failure in any of the examinations or tests of table V, with the following exceptions, shall be cause for refusal to grant qualification:[1]

(a) Table V, group II, temperature cycling.

(b) Table V, group III, vibration and shock.

4.5.4 *Retention of qualification.* In order to retain qualification the manufacturer shall forward via the Government inspector, to the activity responsible for qualification, a summary of the results of group C tests performed during the required period. Retention of qualification will be based on the test results. Failure to submit the summary will result in loss of qualification for that product.

[1] If one indicator fails any of the tests specified in 4.5.1.2 (a) or (b), it may be replaced by 6 of the same type indicators and the testing of that group resumed. Any further failure shall be cause for refusal to grant qualification.

TABLE V. *Qualification inspection.*

Examinations and tests	Requirement paragraph	Method paragraph
Group I (All 12 sample units)		
Visual and mechanical examination	3.2.3.3 to 3.4.10.1.1 incl., 3.6 and 3.7	4.7.1
Contact resistance	3.5.7	4.7.8.1[1] and 4.7.8.2[1]
Luminance	3.5.16	4.7.19[1]
Circuit continuity	3.5.6	4.7.7
Group II (3 sample units from group I)		
Bushing torque	3.5.9.3	4.7.10.3[1]
Temperature cycling	3.5.4	4.7.5
Solderability	3.5.3	4.7.4
Sand and dust	3.5.5	4.7.6[2]
Terminal strength	3.5.2	4.7.3
Lens torque	3.5.9.2	4.7.10.2[1]
Dimmer torque	3.5.9.4	4.7.10.4[1]
Socket shell torque	3.5.9.1	4.7.10.1[1]
Contact resistance	3.5.7	4.7.8.1[1] and 4.7.8.2[1]
Dielectric withstanding voltage	3.5.1	4.7.2.1 and 4.7.2.2[2]
Group III (3 sample units from group I)		
Bushing torque	3.5.9.3	4.7.10.3[1]
Terminal strength	3.5.2	4.7.3
Vibration	3.5.13	4.7.16
Shock (method I or II as specified)	3.5.14	4.7.17
Contact resistance	3.5.7	4.7.8.1[1] and 4.7.8.2[1]
Dimmer torque	3.5.9.4	4.7.10.4[1]
Lens torque	3.5.9.2	4.7.10.2[1]
Dielectric withstanding voltage	3.5.1	4.7.2.1 and 4.7.2.2[2]
Group IV (3 sample units from group I)		
Contact spring pressure	3.5.8	4.7.9[1]
Life (mechanical)	3.5.12.2	4.7.15[1]
Life (electrical)	3.5.12.1	4.7.13
Press-to-test operation	3.5.12.1	4.7.14[1]
Sealing	3.5.10	4.7.11[2]
Contact resistance	3.5.7	4.7.8.1[1] and 4.7.8.2[1]
Lens torque	3.5.9.2	4.7.10.2[1]
Dimmer torque	3.5.9.4	4.7.10.4[1]
Dielectric withstanding voltage	3.5.1	4.7.2.1 and 4.7.2.2[2]
Salt spray (corrosion)	3.5.11	4.7.12
Group V (3 sample units from group I)		
Moisture resistance	3.5.15	4.7.18
Sealing	3.5.10	4.7.11[2]
Dielectric withstanding voltage	3.5.1	4.7.2.1 and 4.7.2.2[2]

[1] As applicable.
[2] When specified (see 3.2).

4.6 Quality conformance inspection. Quality conformance inspection shall consist of groups A and B, and group C inspection, as applicable, as specified in 4.6.1 through 4.6.4.1.1.

4.6.1 *Inspection lot.* An inspection lot, as far as practicable, shall consist of all lampholders, indicator-light housings, lenses, or indicator lights shown on the same specification sheet, produced under essentially the same conditions and offered for inspection at one time.

4.6.2 *Group A inspection.* Group A inspection shall consist of the examination and tests specified in table VI, in the order shown.

4.6.2.1 *Sampling plan.* Statistical sampling and inspection shall be in accordance with MIL-STD-105 for ordinary inspection. The acceptable quality levels (AQL) shall be as specified in table VI. Major and minor defects shall be as specified in MIL-STD-105.

TABLE VI. *Group A inspection.*

Examination and tests	Requirement paragraph	Method paragraph	AQL Percent defective	
			Major	Minor
Visual and mechanical examination	3.2, 3.4 to 3.4.10.1.1 incl., 3.6 and 3.7	4.7.1	1.0	4.0
Contact resistance	3.5.7	4.7.8.1[1] and 4.7.8.2[1]		
Circuit continuity (Units with non-replaceable lenses)	3.5.6	4.7.7	1.0	.....
Dielectric withstanding voltage	3.5.1	4.7.2.1 and 4.7.2.2[2]		

[1] As applicable.
[2] When specified (see 3.2).

4.6.3 *Group B inspection.* Group B inspection shall consist of a sealing test as required by 3.5.10 and performed in accordance with 4.7.11. This test shall be performed every six months, utilizing 12 samples chosen at random from a current lot of material. No failures shall be allowed for group B inspection.

4.6.3.1 *Disposition of group B sample units.* Sample units subjected to group B inspection may be delivered as a part of the lot under the contract or order.

4.6.4 *Group C inspection.* Group C inspection shall consist of the tests specified in table VII, in the order shown. The sampling shall be as specified in 4.6.4.1. No failures shall be allowed for group C inspection except for non-replaceable units. Shipment of lots will not be held up pending completion of group C inspection.

TABLE VII. *Group C inspection.*

Tests	Requirement paragraph	Method paragraph
Group I (3 sample units)		
Contact spring pressure	3.5.8	4.7.9[1]
Temperature cycling	3.5.4	4.7.5
Solderability	3.5.3	4.7.4
Sand and dust	3.5.5	4.7.6[2]
Luminance	3.5.16	4.7.19
Terminal strength	3.5.2	4.7.3
Bushing torque	3.5.9.3	4.7.10.3[1]
Vibration	3.5.13	4.7.16
Shock (method I or II, as specified)	3.5.14	4.7.17
Dielectric withstanding voltage	3.5.1	4.7.2.1 and 4.7.2.2[2]
Group II (3 sample units)		
Moisture resistance	3.5.15	4.7.18
Dielectric withstanding voltage	3.5.1	4.7.2.1 and 4.7.2.2[2]
Group III (3 sample units)		
Salt spray (corrosion)	3.5.11	4.7.12
Group IV (3 sample units)		
Life (mechanical)	3.5.12.2	4.7.15[1]
Life (electrical)	3.5.12.1	4.7.13
Press-to-test operation	3.5.12.1	4.7.14[1]
Contact resistance	3.5.7	4.7.8.1[1] and 4.7.8.2[1]
Lens torque	3.5.9.2	4.7.10.2[1]
Dimmer torque	3.5.9.4	4.7.10.4[1]
Socket shell torque	3.5.9.1	4.7.10.1[1]
Dielectric withstanding voltage	3.5.1	4.7.2.1 and 4.7.2.2[2]

[1] As applicable.
[2] When specified (see 3.2).

4.6.4.1 *Sampling for group C inspection.* Twelve sample units of lampholders, indicator lights, or indicator-light housings of each style and at least one lens of each style, color and transmittance shall be selected once a year or after 100,000 units have been produced whichever comes first. Thereafter, twelve sample units shall be selected after 100,000 lampholders and so forth of each style have been produced or after three years, whichever comes first.

4.6.4.1.1 *Disposition of group C sample units.* Sample units subjected to group C

inspection shall not be delivered as part of the lot under the contract or order.

4.6.4.1.1 *Disposition of group C sample units.* Sample units subjected to group C inspection shall not be delivered as part of the lot under the contract or order.

4.6.4.2 *Noncompliance.* If a sample fails to pass group C inspection, the manufacturer shall take corrective action on the process and on all units of product which can be corrected and which were manufactured with the same conditions, materials, and processes, and are considered subject to the same test failure. Quality conformance inspection shall be discontinued until corrective action has been taken. After the corrective action, sample units shall be subjected to the necessary group C inspection (all inspections, or the failed inspections, at the option of the Government). Groups A and B inspection may be reinstituted; however, final acceptance shall be withheld until the group C inspection has shown that the corrective action was successful.

4.7 Methods of examination and test.

4.7.1 *Visual and mechanical examination.* Lampholders, indicator lights, indicator-light housings and lenses shall be examined to verify that the materials, design, construction, physical dimensions, marking, and workmanship are in accordance with the requirements of this specification and the applicable specification sheet.

4.7.2 *Dielectric withstanding voltage (see 3.5.1).* Lampholders, indicator lights and indicator-light housings shall be tested in accordance with 4.7.2.1, and when specified, in accordance with 4.7.2.2 (see 3.2).

4.7.2.1 *At atmospheric pressure.* Lampholders, indicator lights and indicator-light housings shall be tested in accordance with method 301 of MIL-STD-202. The following details shall apply:

(a) Test voltage: 1,000 volts, unless otherwise specified (see 3.2).

(b) Nature of potential: A.C.

(c) Duration of application: One minute for qualification and group C inspection, 5 seconds for other tests.

(d) Points of application (with specimen properly mounted on a metal panel with all associated hardware):

(1) Between all unground, terminals and ground (with dummy lamp).[1]

(2) Between lamp circuit terminals (with no lamp).[2]

4.7.2.2 *At reduced barometric pressure.* Lampholders, indicator lights and indicator-light housings, designed for operation above 10,000 feet shall be tested as specified in 4.7.2.1 and in accordance with method 105 of MIL-STD-202. The following details and exceptions shall apply:

(a) Test voltage: 250 volts, unless otherwise specified (see 3.2).

(b) Test-condition letter — — —C.

4.7.3 *Terminal strength (see 3.5.2).* Lampholders, indicator lights and indicator-light housings shall be tested in accordance with method 211 of MIL-STD-202 and 4.7.3.1 or 4.7.3.2, as applicable.

4.7.3.1 *Solder and screw terminals.* Lampholders, indicator lights and indicator-light housings shall be tested as follows:

(a) Test-Condition letter:

(1) Solder terminals — A.

[1] Dummy lamp means no filament.

[2] For non-removable lens type design and electronically controlled indicator lights, the point of application shall be from each terminal to ground.

(2) Screw terminals — E.

(b) Applied force: Solder: 2 pounds.

4.7.3.2 *Wire - lead terminals.* Indicator lights having permanently set wire-lead terminations shall be tested as specified in 4.7.3.1 with the folowing exception:

(a) Test-condition letter — C.

(b) Load: 2-1½ pounds.

4.7.4 *Solderability (see 3.5.3).* Lampholders, indicator lights and indicator-light housings shall be tested in accordance with method 208 of MIL-STD-202. The following detail shall apply:

(a) Number of terminals to be tested: Minimum of two terminals per unit.

4.7.5 *Temperature cycling (see 3.5.4).* Lampholders, indicator lights and indicator-light housings mated with an applicable lens shall be subjected to the temperature cycling test in accordance with method 102 of MIL-STD-202. The following details and exceptions shall apply:

(a) Test-condition letter—D.

(1) Steps 2 and 4 shall be omitted.

(2) Test conducted with lamp installed but not energized.

(3) Lenses shall be tested separately at the temperature specified (see 3.2), if the lens temperature exceeds that of the applicable lampholder or indicator-light housing.

(b) Measurement after test — with an appropriate lamp installed when applicable. The specimens shall be energized and observed for any visual electrical malfunction; that is, low light output or intermittency. The lens shall be observed for any visual color discrepancy; that is, lack of color uniformity, hot spots, or faded coloring (washout).

(c) Examination—After the test, lenses shall be examined for looseness of parts, chipping and cracking of glass, discoloration, and other damage.

4.7.6 *Sand and dust (see 3.5.5).* Indicator lights shall be tested in accordance with Method 110, test condition A, of MIL-STD-202 and as follows:

(a) The indicator light shall be mounted on a rigid metal panel in such a way that the sand will not impinge directly on it.

(b) During the test the indicator light shall not be energized.

4.7.7 *Circuit continuity (see 3.5.6).* Indicator lights shall be tested to determine conformance of the actual circuit.

4.7.8 *Contact resistance (see 3.5.7).* The contact resistance of the lamp electrical circuit shall be tested in accordance with method 307 of MIL-STD-202 as applicable (see 4.7.8.1 and 4.7.8.2).

4.7.8.1 *Moving type contacts (not applicable to non-removable lens designs or to lamp housings with integral resistor).* The contact resistance of lampholders, indicator lights and indicator-light housings, accommodating T-1-¾ midget flange base lamps, T-3-¼ bayonet base lamps and double contact candelabra base lamps, shall be tested in accordance with 4.7.8 and as follows:

(a) Preparation for test—An applicable test plug (see figures 2, 3, and 4) shall be inserted into the lens or socket of lampholder or indicator-light housing. If plug (figure 2) is inserted into the lens, the lens shall then be tight-

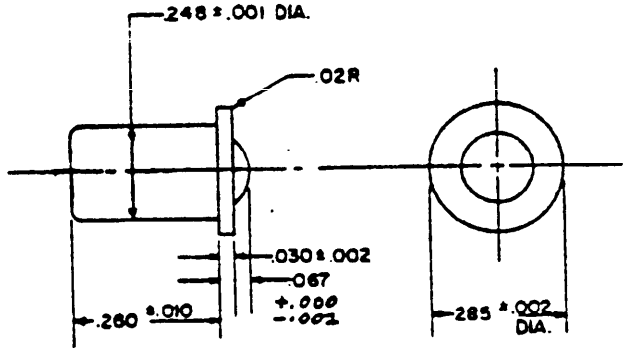
ened by hand in the indicator-light housing.

(b) Method of connection — Between two lamp terminals.

(c) Test current—0.1 ampere at 6 volts d.c.

(d) Number of lamp insertions—3.

(e) Number of measurements per insertion—one measurement. (The average of three readings shall be the contact resistance).



MATERIAL:
BRASS QQ-B-626
COMP 22, 1/2 HARD.

FIGURE 2. *Midget flange base test plug.*

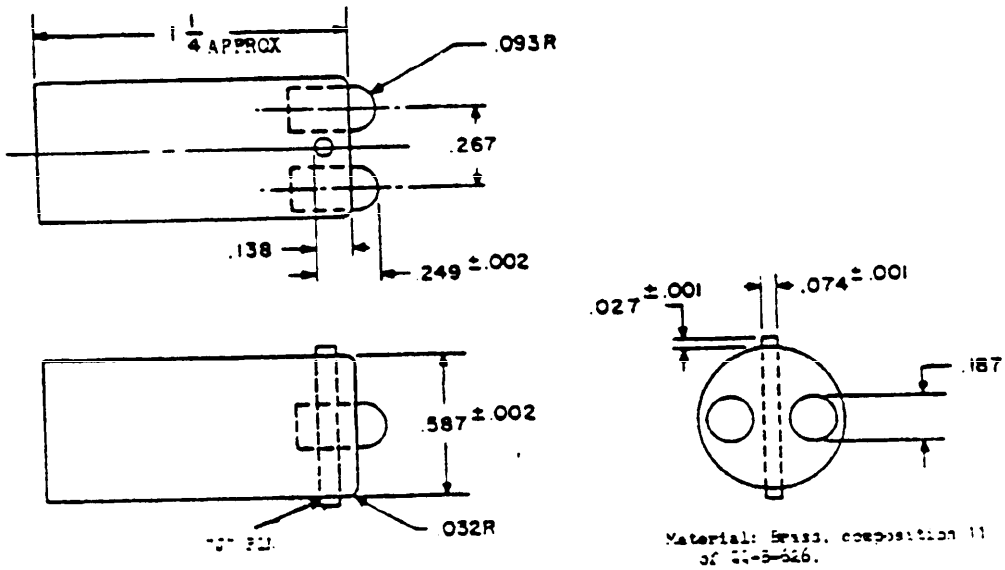


FIGURE 3. *Double contact candelabra bayonet test plug.*

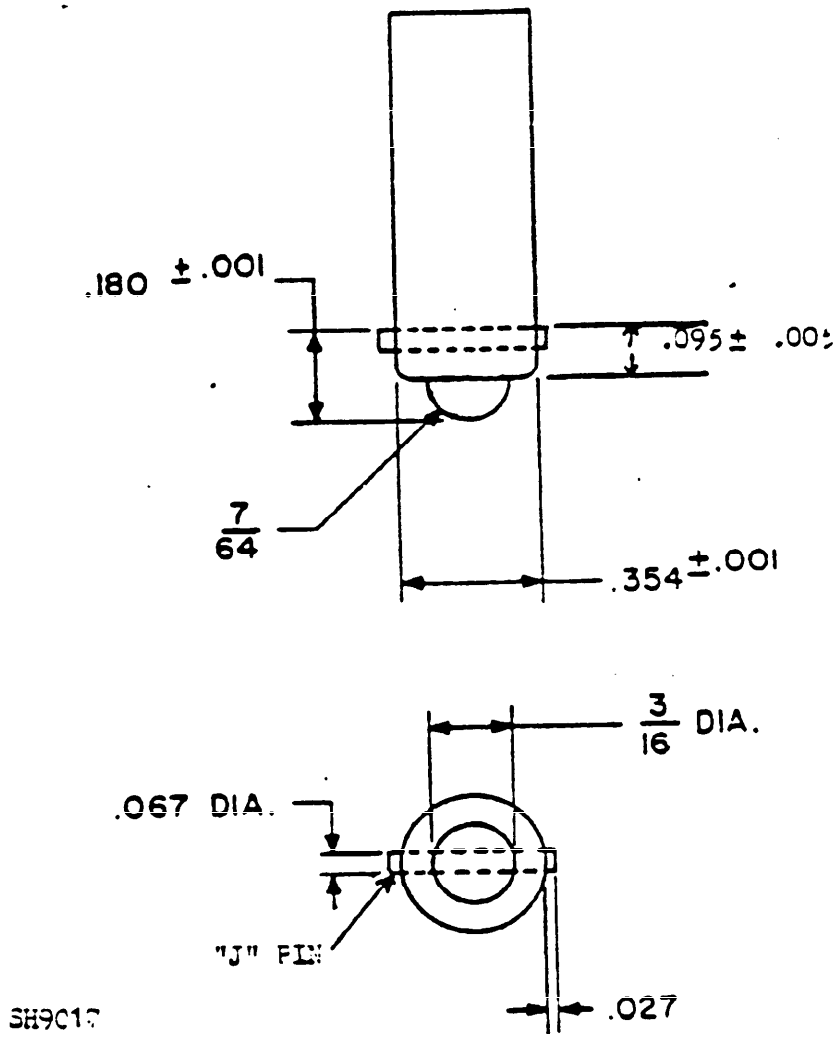


FIGURE 4. *Miniature bayonet base test plug.*

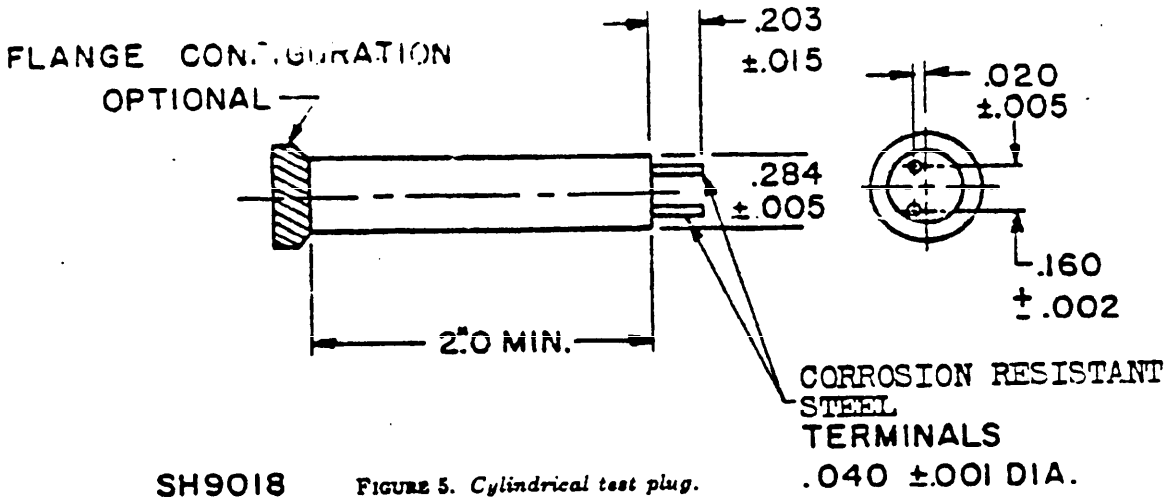
4.7.8.2 *Static type contacts.* The contact resistance of lampholders, indicator lights, and indicator-light housings accommodating cylindrical plug-in cartridge type lamps shall be tested in accordance with 4.7.8 and as follows:

(a) Preparation for test—An applicable test plug (see figure 5) shall be completely inserted and withdrawn a minimum of twenty times into the applicable indicator-light housing, indicator light or lampholder.

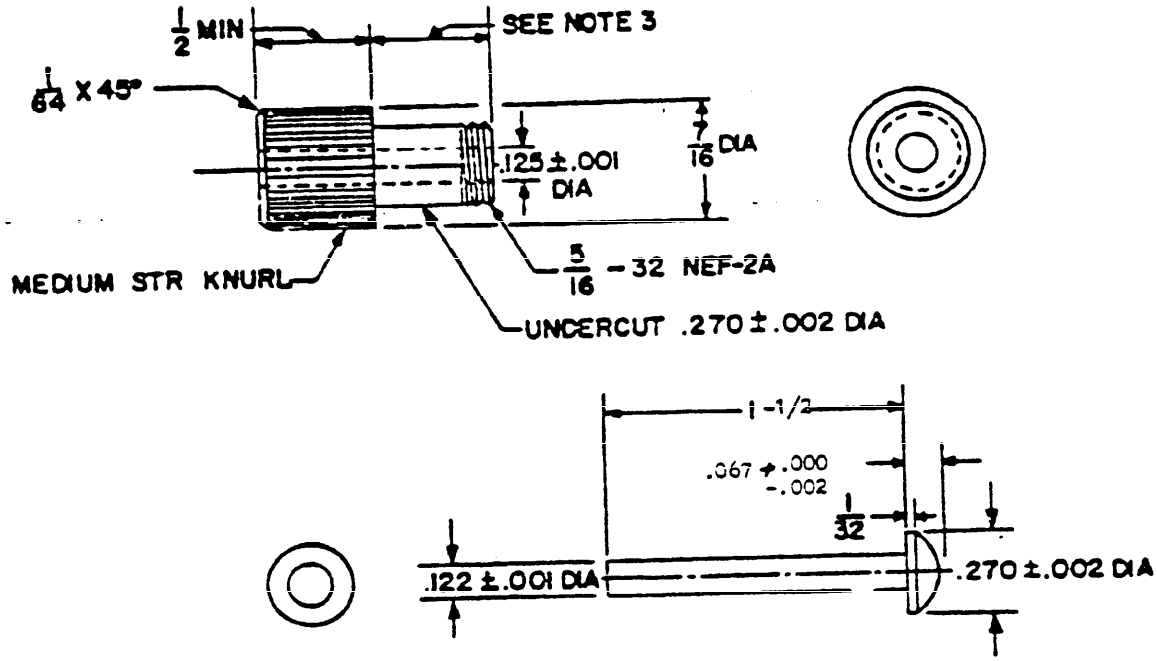
(b) Method of connection — Between two lamp terminals.

(c) Test current — 0.1 ampere at 6 volts d.c.

4.7.9 *Contact-spring pressure (see 3.5.8).* Lampholders, indicator-light housings and indicator lights, as applicable, employing spring loaded lamp contact assemblies shall be firmly mounted with their associated hardware and tested as specified in 4.7.9.1 or 4.7.9.2, as applicable.



SH9018 FIGURE 5. *Cylindrical test plug.*



NOTES:

1. ALL DIMENSIONS IN INCHES.
2. TOLERANCES ARE ±1/64 ON FRACTIONS.
3. THE SHANK LENGTH SHALL BE AS REQUIRED (see 3.2).

SH9019

FIGURE 6. *Test plugs for midget-flange-base-indicator-light housings (contact-spring-pressure test).*

4.7.9.1 *Midget flange base holders.* For midget flange base holders, a test plug (see figure 6), shall be inserted to maximum engagement. The spring force shall then be measured and shall be within the minimum spring pressure specified. The test plug plunger shall then be depressed 0.043 ± .002 and the spring force shall again be measured and shall not exceed the maximum spring pressure specified. Lampholder springs shall then be subjected to a minimum of 500 cycles of operation from the minimum depressed position to .043 ± .002 past the minimum depressed position. Following the 500 cycles, minimum spring force shall again be measured and shall be as specified.

4.7.9.2 *Bayonet type holders.* For bayonet base holders, the applicable test plug (figure 3 or 4), shall be inserted but not locked in the lamp socket. A force shall then be applied gradually to the test plug until there is sufficient pressure on the contact spring to permit the plug to be turned freely into the locking position. The contact spring force shall be measured and be as specified. Remove the "J" locking pins from the applicable test plug (figure 3 or 4), or make a duplicate plug without "J" pins. Insert the test plug to a depth of 0.255 inch for miniature, or 0.316 inch for candelabra types below the hook in the "J" slot (see figure 7). Then withdraw the plug until the contact reaches its fully extended positions. Repeat

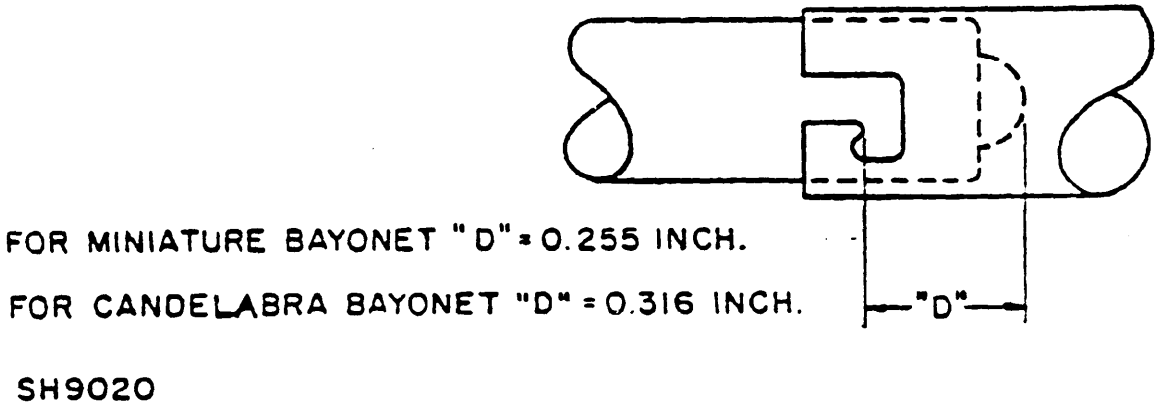


FIGURE 7. *Bayonet base — "J" locking engagement.*

this operation a minimum of 500 cycles. At end of test, measure the contact spring pressure and value shall be within the limits specified.

4.7.10 *Torque (see 3.5.9).*

4.7.10.1 *Socket shell torque (applicable to bayonet base type sockets only).* Lampholders and indicator-light housings shall be mounted by their normal mounting means. An applicable bayonet locking plug shall be inserted and locked in the socket. A torque of 4 $^{+1}_{-0}$ pound-inches shall be applied for one minute to the test plug at the end nearest the socket in a plane perpendicular to the centerline of the socket and in a clockwise direction. The plug shall then be released and fully engaged and released five times by normal hand pressure. The specimen shall then be lamped and energized to denote any electrical failure. The specimen shall be examined for evidence of mechanical damage as noted by any abnormal movement of the socket shell (see 3.5.9.1).

4.7.10.2 *Lens torque (not applicable to non-removable lens type indicator lights (see 3.5.9.2)).* The lampholder or indicator-light housing shall be mounted in its normal man-

ner and the lens shall be fully engaged into its mating holder. A torque of 3 pound-inches shall be applied to the lens in the direction of tightening unless otherwise specified (see 3.2).

4.7.10.3 *Bushing torque (when applicable) (see 3.5.9.3).* Lamphoiders and indicator-light housings shall be mounted on a rigid metal panel by their normal mounting means with its associated hardware. A torque of 20 pound-inches, unless otherwise specified (see 3.2), shall be applied to the mounting nut.

4.7.10.4 *Dimmer torque (applicable to lenses incorporating iris or other dimming means) (see 3.5.9.4).* Dimmer torque shall be tested as follows:

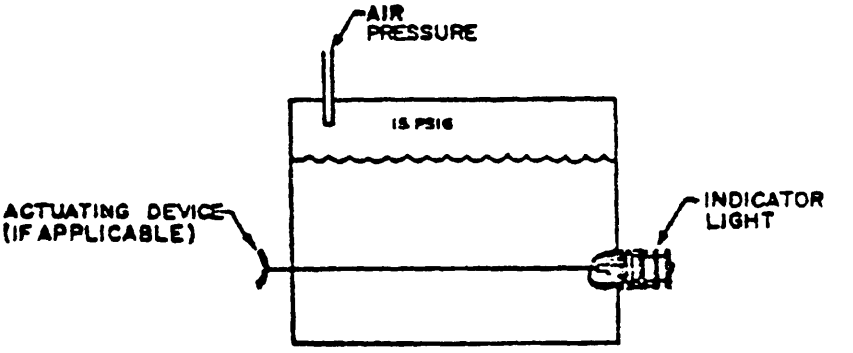
(a) Method of mounting—The lens shall be fitted on its appropriate mating holder.

(b) Direction of torque—With the lens securely mounted, a torque of 10 pound-inches, unless otherwise specified (see 3.2), shall be applied to the dimmer portion in both clockwise and counterclockwise direction.

(c) Measurement—The torque required to move the dimmer over the limit of its travel in both clockwise and counterclockwise direction shall not exceed 2 pound-inches and the movement shall be smooth.

4.7.11 *Sealing (see 3.5.10).*

4.7.11.1 *Watertight.* Before conducting this test, all gaskets which normally can be replaced in service without disassembly of the indicator light proper, shall be disassembled from the indicator light and then reassembled with the indicator light. The indicator light shall be mounted on a test enclosure (see figure 8) by its normal mounting means, submerged in water to a depth of 6 ± 2 inches and subjected to a gradually increasing pressure at the rate of 1 pound per square inch gage (p.s.i.g.) every 2 minutes, until a pressure of 15 p.s.i.g. is reached. This pressure shall be maintained for 30 minutes. During this period of maximum pressure, shutter-type lens design indicators shall be operated for 25 cycles of complete clockwise and counterclockwise operations while submerged. For press-to-test units, the units shall be operated for 25 cycles of complete switching actuations while submerged. During the test, the indicator light shall be observed for evidence of water leakage (see figure 8).



NOTE: ENCLOSED INDICATOR LIGHTS SHALL HAVE AN OPENING IN THE BODY TO OBSERVE IF LEAKAGE OCCURS AROUND THE SEALED SHAFT AND BUSHING.

SH9C21

FIGURE 8. *Seal test enclosure.*

4.7.11.2 *Dripproof.* Specimens shall be subjected to the dripproof test of MIL-STD-108 with a five-gallon quantity of water flowing over the specimen for a period of five minutes duration. The water stream shall be directed within 12 inches above the test specimen.

4.7.12 *Salt spray (corrosion) (see 3.5.11).* Lampholders, indicator lights, indicator-light housings and lenses shall be tested in accordance with method 101 of MIL-STD-202. The following details shall apply:

(a) Test-condition letter—A.

(b) All lampholders, indicator-light housings and lenses shall be tested individually with lamps installed in either the lampholder or lens, whichever is applicable.

(1) Lampholders shall be suspended by the terminals so the open end of the holder is down.

(c) All indicator lights shall be tested with an applicable mating lens and a lamp installed. The indicator lights shall be suspended in a horizontal position. Separate samples shall be used for this test.

(d) After the test, the following examinations shall be made:

(1) All units shall be examined for corrosion of the base metal.

(2) Lenses shall be examined for visual discoloration.

(3) Lamps shall be removed from the specimens tested in 4.7.12 (b) and the inside of the socket or lens shank shall be examined for corrosion.

(4) Lenses shall be capable of mating with the appropriate indicator-light housing.

(5) Specimens tested in 4.7.12 (c) shall be disassembled, relamped and assembled.

4.7.13 *Life (see 3.5.12.1).* Indicator lights with removable lenses shall be mounted on a ⅛-inch aluminum panel and shall be subjected to 1,000 hours of continuous operation with the lamp of the highest wattage and voltage the holder will accommodate. Ambient temperature shall be 55 ± 2°C. Nonremovable lens type assemblies shall be subjected to the same test for 2,000 hours. On completion of test, the specimens shall be allowed to return to normal temperature, then subjected to the following tests:

(a) Visual and mechanical examination.

(b) Visual color check of lens.

(c) Seal (if applicable to the test specimen).

For multi-lamp assemblies, all lamps that are lighted in any normal mode of operation shall be lighted during this test.

4.7.14 *Press-to-test operation (when applicable) (see 3.5.12.1).* The lampholder (with lamp and appropriate lens installed) shall be mounted on a rigid metal panel. A 15-pound force shall be applied directly in line with the lens until the lens traverses at least one-half its overtravel. The force shall then be reduced until the lens regains its initial position. The force shall be applied and released linearly at a rate of not more than 10 cycles per minute with a lamp duty cycle of 1 second on and 5 seconds off. Three thousand (3,000) cycles so defined shall be performed. A suitable monitoring circuit shall be used to denote proper electrical operation during this test. The following detail shall apply:

(a) Circuit—The [illegible] lights shall be such that the indicating circuit will be open before and during the time the test circuit is closed, and the test circuit will be open before and during the time the indicating circuit is closed.

4.7.15 *Life (mechanical) (see 3.5.12.2).* The dimmer covers on dimming lights shall be subject to 5,000 cycles of operation from the extreme dim to the extreme bright position and return to the extreme dim position. Lamps shall not be operated during this test, but shall be energized for approximately one minute after the test to indicate whether the units are electrically operable.

4.7.16 *Vibration (see 3.5.13).* Lampholders, indicator-light housings and lenses shall be tested in accordance with method 204 of MIL-STD-202. The following details shall apply:

(a) Method of mounting — Specimens shall be mounted on a rigid metal panel which is secured to a suitable base plate. Two of the specimens shall contain the highest voltage lamps that the holders can accommodate and the other specimen shall be tested with no lamp installed. All units shall have lens installed as applicable.

(b) Specimens with lamps shall be energized at rated lamp voltage during the tests.[1]

(c) Test-condition letter—A.

(d) During the tests the specimens with the lamps installed shall be observed for any visual light intermittency. There shall be no rotation of lens or mis-orientation of legend in rotatable indicator-light lenses.

(e) After the tests, the lampholders or indicator lights that did not have a lamp installed, shall be tested for proper operation by installing a lamp and applying an appropriate voltage across the terminals. If the lampholder has a press-to-test-feature, the press-to-test-feature shall be tested for proper operation. If the lampholder has a dimmer feature, the dimmer shall be tested for proper operation.

4.7.17 *Shock (see 3.5.14).* Lampholders, indicator lights, and indicator-light housings, each with appropriate lenses shall be tested as specified in 4.7.17.1 or, when specified (see 3.2) in accordance with 4.7.17.2.

4.7.17.1 *Method I.* Specimens shall be tested in accordance with method 213 of MIL-STD-202. The following details shall apply:

(a) Mounting method — By normal mounting means. During this test, each specimen shall carry a suitable lamp, not energized, and shall be fitted with its appropriate lens.

(b) Test-condition—I.

(c) Number of blows—Three blows in each direction of the three principal axes (total of 18 blows).

(d) Measurement after shock (when applicable)—contact spring pressure and contact resistance shall be measured as specified in 4.7.8 and 4.7.9.

(e) Examination—After the test, lampholders, indicator lights, indicator light housings and lenses shall be

[1] If a lamp fails, the test shall be stopped immediately and a new lamp installed. If the new lamp lights, the test shall be resumed.

Schematic and wiring diagrams not as [illegible]

examined for chipping and cracking of materials, and loosening, bending, warping, and distortion of parts. The lampholder shall be energized immediately after the test (lamp failure excluded).

4.7.17.2 *Method II.* Specimens shall be tested in accordance with method 207 of MIL-STD-202. The following details shall apply:

(a) Mounting method — By normal mounting means. During this test each specimen shall carry a suitable lamp, not energized, and shall be fitted with the appropriate lens.

(b) Measurements after shock — The specimen shall be energized immediately after the test.

(c) Examination—After the test, lampholders, indicator lights, indicator-light housings and lenses shall be examined for chipping and cracking of materials, loosening, bending, warping, distortion of parts and satisfactory operation.

4.7.18 *Moisture resistance (see 3.5.15).* Lampholders, indicator lights, indicator-light housings and lenses shall be tested in accordance with method 106 of MIL-STD-202, except that steps 7a and 7b shall not be performed. The following details shall apply:

(a) Mounting—Lampholders, indicator lights, and indicator-light housings shall be mounted by normal mounting means on a noncorrosive panel positioned 15 degrees from the vertical, with the terminal end of the lampholder, indicator light, or indicator-light housing higher than the lens end. No lens or cap shall be installed on lampholders, indicator lights or indicator-light housings for this test. Lenses shall be suspended by a nylon or wax string.

(b) Final measurements — Upon completion of a 24-hour drying period following step 6 of the final cycle, the following measurement shall be made on lampholders, indicator lights, and indicator-light housings:

(1) Dielectric withstanding voltage in accordance with 4.7.2.

(c) Examination—After the test, lampholders, indicator lights, indicator-light housings and lenses shall be examined for corrosion, removal of any material finish, decomposition, leaching out, and spreading of constituent materials, and other defects.

4.7.19 *Luminance (see 3.5.16).* Indicator lights shall be tested under dark conditions using aged and selected lamps with a 0.34 ± .02 mean spherical candlepower. An average of three readings shall be made across the face of the lens when the unit is illuminated, except for nomenclature display types, a minimum of 10 readings shall be taken.

4.8 **Inspection of preparation for delivery.** Sample items and packs shall be inspected for conformance with section 5 of this specification.

5. PREPARATION FOR DELIVERY

5.1 Domestic shipment and early equipment installation.

5.1.1 *Lampholders, indicator lights, indicator-light housings and lenses.*

5.1.1.1 *Preservation and packaging.* Preservation and packaging which may be the supplier's commercial practice shall be suf-

ficient to afford adequate protection against corrosion, deterioration and physical damage during shipment from the supply source to the using activity and until early installation.

5.1.1.2 *Packing.* Packing shall be accomplished in a manner which will insure acceptance by common carrier, at lowest rate, and will afford protection against physical or mechanical damage during direct shipment from the supply source to the using activity for early installation. The shipping containers or method of packing shall conform to the Uniform Freight Classification Ratings, Rules and Regulations or other carrier regulations as applicable to the mode of transportation and may conform to the supplier's commercial practice.

5.1.1.3 *Marking.* Shipment marking information shall be provided on interior packages and exterior shipping containers in accordance with the contractor's commercial practice. The information shall include nomenclature, Federal stock number or manufacturer's part number, contract or order number, contractor's name and destination.

5.2 **Domestic shipment and storage or overseas shipment.** The requirements and levels of preservation, packaging, packing and marking for shipment shall be specified by the procuring activity (see 6.2).

5.2.1 The following provides various levels of protection during domestic shipment and storage or overseas shipment, which may be required when procurement is made.

5.2.1.1 *Preservation, packaging, packing and marking.* Lampholders, indicator lights, indicator-light housings and lenses shall be preserved and packaged level A or C; packed level A or B and marked in accordance with MIL-E-17555, as specified.

6. NOTES

6.1 **Intended use.** The lampholders, indicator lights, indicator-light housings and lenses covered by this specification are intended for use as panel display and indicating functions on electrical, electronic, and communication equipment.

6.2 **Ordering data.** Procurement documents should specify the following:

(a) Title, number, and date of this specification.

(b) Title, number, and date of the applicable specification sheet, and the complete type designation (see 1.2 and 3.2).

(c) Whether lens is to be marked with symbols and legend (see 3.4.9.5).

(d) Whether lamps are to be furnished, and if so, indicate lamp number and whether to be installed.

(e) Preservation, packaging, packing and marking required if other than as specified in 5.1 (see 5.2).

6.2.1 *Indicator lights.* Indicator lights with removable lens designs (excluding nomenclature display type units), may be procured by combining the type designation of the indicator-light housing and the indicator-light lens; for example LH76/1-LC16BN.

6.3 **Dissimilar metals.** Dissimilar metals are defined in table IX.

(a) Contact between a member of any one group and another member of the same group is considered as contact of similar metals. Contact between a member of one group and a member of any other group is considered as contact of dissimilar metals, except for zinc, tin, and cadium, as listed in groups II and III, and for stainless steel as listed in groups II, III, and IV.

(b) Unless specifically indicated by the procuring activity, all other metals are considered dissimilar with respect to each other and with respect to any of the materials listed in table IX.

(c) Where reference is made to a metal in a particular group, the reference applies to the metal on the surface of the part; that is, zinc means zinc castings, as well as zinc electroplate, zinc hot dip, or zinc metal spray.

(d) Different metals in contact, even though similar, should be employed in assemblies in such a manner that the smaller part is cathodic or protected and the larger part is anodic or corroded, if any corrosion takes place.

TABLE IX. *Grouping of metals.*

Group I	Group II	Group III	Group IV
Magnesium alloys (most anodic)	Anodized aluminum Aluminum Aluminum alloys Zinc Cadmium Tin Stainless steel	Zinc Cadmium Steel Lead Tin Stainless steel	Copper and its alloys Nickel and its alloys Chromium Stainless steel Gold Silver (most cathodic)

6.4 With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in applicable Qualified Products List whether or not such products have actually been so listed by that date. The attention of the suppliers is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification, in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the qualified products list is the Naval Ship Engineering Center, Department of the Navy, Washington, D. C. 20360, and information pertaining to qualification of products may be obtained from that activity. Application for Qualifications tests shall be made in accordance with "Provisions Governing Qualification" (see 6.4.1).

6.4.1 Copies of "Provisions Governing Qualification" may be obtained upon application to Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pennsylvania, 19120.

6.5 **Definitions.** For the purpose of this specification, the following definitions apply:

6.5.1 *Lampholder.* A lampholder is an electrical device which accommodates a lamp both electrically and mechanically, but does not provide for the use of an indicator-light lens.

6.5.2 *Indicator light.* An indicator light is an indicator-light housing and indicator-light lens assembled as a unit.

6.5.3 *Indicator-light housing.* An indicator-light housing is an electrical device which accommodates a lamp both electrically and mechanically, and provides for the use of an indicator-light lens.

6.5.4 *Indicator-light lens.* An indicator-light lens is a device having a mounting means and a glass or plastic window through which light is transmitted.

6.6 Usable lamps. The usable lamps (see 2) may be purchased under MIL-L-6363 (Lamp, Incandescent) or MIL-L-15098 (Lamps, Glow), as applicable.

Custodians:

Army—EL

Navy—SH

Air Force—11

Review activities:

Army—EL, MU

Navy—SH, AS

Air Force—11, 85

User activities:

Army

Navy—MC

Preparing activity:

Navy—SH

(Project 6250-0081)

'NSTRUCTIONS: In a continuing effort to make our standardization documents better, the DoD provides this form for use in bmitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge *(DO NOT STAPLE)*, and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

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.

(Fold along this line)

(Fold along this line)

DEPARTMENT OF THE NAVY

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 12503 WASHINGTON D. C.
POSTAGE WILL BE PAID BY THE DEPARTMENT OF THE NAVY

Commander
Naval Ship Engineering Center
Center Building-Sec 61247
Prince George's Center
Hyattsville, MD 20782

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE

AME 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

. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
r. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

DD FORM 1426 PREVIOUS EDITION IS OBSOLETE.