

TABLE II. Enclosure design.

Symbol	Seal
1 - - - - -	Unsealed
2 - - - - -	Dripproof
3 - - - - -	Watertight

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

- L-P-410 - Plastic, Polyamide (Nylon), Rigid: Rods, Tubes, Flats, Molded and Cast Parts.
- ZZ-R-765 - Rubber, Silicone: Low-and High-Temperature and Tear Resistant.
- PPP-B-566 - Boxes, Folding, Paperboard.
- PPP-B-636 - Box, Fiberboard.
- PPP-B-676 - Boxes, Setup.
- PPP-T-60 - Tape: Pressure-Sensitive Adhesive, Waterproof, for Packaging.
- PPP-T-76 - Tape, Pressure-Sensitive Adhesive Paper (For Carton Sealing).

MILITARY

- MIL-M-14 - Molding Plastics and Molded Plastic Parts, Thermosetting.
- MIL-P-116 - Preservation, Methods of.
- MIL-W-5088 - Wiring, Aircraft, Installation of.
- 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-20693 - Molding Plastic, Polyamide (Nylon) Rigid.
- MIL-C-45662 - Calibration System Requirements.
- MIL-I-81023 - Inductor, 28V, D.C. Laboratory Test, General Specification for.

(See supplement 1 for list of applicable specification sheets.)

STANDARDS

FEDERAL

Fed. Test Method Std No. 406 - Plastics, Method of Testing.

MILITARY

- MIL-STD-12 - Abbreviations for Use on Drawings and in Technical-Type Publications.
- 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-129 - Marking for Shipment and Storage.
- MIL-STD-130 - Identification Marking of US Military Property.
- MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts.
- MIL-STD-454 - Standard General Requirements for Electronic Equipment.
- MIL-STD-456 - Electronic Parts, Date and Source Coding for.
- MIL-STD-758 - Packaging Procedures for Submarine Repair Parts Utilizing Transparent, Flexible, Heat Sealable Films.
- MS18209 - Lamp, Incandescent, Single Contact Midget Flanged Base (T-1-3/4 Bulb).
- MS24515 - Lamp - Sub-Miniature.
- MS25237 - Lamp, Incandescent, Single Contact Midget Flanged Base (T-1-3/4 Bulb).

(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.)

2.2 Other publications. The following document forms 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.

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. 20402.)

3. REQUIREMENTS

3.1 Detail requirements for individual styles of switches. Detail requirements or exceptions applicable to individual styles of switches shall be as specified in the applicable complementary document (e.g. specification sheet, drawings, or other document). In the event of any conflict between requirements of this specification and the complementary documents, the latter shall govern (see 6.2).

3.2 Qualification and preproduction.

3.2.1 Qualification. Switches furnished under this specification and covered by specification sheets, 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 6.3.1).

3.2.2 Preproduction. Switches furnished under this specification and not covered by specification sheets shall be products which have passed the preproduction inspection specified in 4.6. This preproduction inspection shall be performed after award of contract and prior to production (see 6.3.2).

3.3 Material. Material shall be as specified herein. However, when a definite material is not specified, a material shall be used which will enable the switches to meet the performance requirements of this specification. Acceptance or approval of any constituent material shall not be construed as a guaranty of the acceptance of the finished product.

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

3.3.1.1 Ferrous metals. Ferrous material shall not be used for current-carrying parts except for feed-through terminals in headers.

3.3.1.2 Dissimilar metals. When dissimilar metals (as defined in MIL-STD-454, requirement 16) 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.

3.3.2 Plastics.

3.3.2.1 Thermosetting. Unless otherwise specified (see 3.1), thermosetting plastics shall be in accordance with MIL-M-14; however, cotton or wood-flour-filled materials shall not be used.

3.3.2.2 Thermoplastics. Thermoplastics shall not be used for major structural parts, that is, switch housing, terminal header and assembly frame. When used for other parts, the thermoplastic material shall be in accordance with MIL-P-20693 or L-P-410, or shall be of a high temperature polycarbonate material which is self-extinguishing when tested in accordance with method 2021 of FED-STD-406.

3.3.3 Rubber. All rubber shall be in accordance with ZZ-R-765.

3.3.4 Finish. Unless otherwise specified (see 3.1), 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. Unless otherwise specified (see 3.1), bezels, mounting flanges, barriers, mounting bushings and associated mounting hardware that are designed to be exposed at the front of the panel after assembly shall have a black lusterless finish.

3.4 Design and construction. Switches covered by this specification shall be of the design, construction, and physical dimensions specified (see 3.1).

3.4.1 Terminals. Unless otherwise specified (see 3.1), terminals shall be of the solder-lug type and shall be designed so that the wires can be mechanically secured prior to soldering. Terminals shall be solder coated; electroplated tin, or gold plated. When electroplated, the coating shall be 0.0002 inch minimum thickness, over a copper undercoat of 0.0002 inch minimum thickness. For gold-plating, the coating shall be 0.00005 inch minimum thickness over a copper undercoat of 0.0001 inch minimum thickness.

3.4.1.1 Identification of terminals. Terminals shall be identified to indicate the contact arrangement of the switch or lamp circuit, as applicable (see 3.1). When specified (see 3.1), terminal identification shall be augmented by a circuit schematic. There shall be no overmarking of terminals.

3.4.2 Plunger. The operating plunger shall be insulated from all current-carrying parts.

3.4.3 Switch housing (when applicable, see 3.1). The switch housing shall be as specified.

3.4.4 Switch functions. A multistation, pushbutton switch shall incorporate two or more pushbutton stations on a common frame. The following functions may be provided (see 6.2):

3.4.4.1 Independent. There shall be no mechanical linkage. Individual pushbutton stations shall have independent functions.

3.4.4.2 Momentary interlocking. Each pushbutton station shall have momentary action, and only one button shall be depressed to actuation at one time.

3.4.4.3 Locking with master release. Each pushbutton station shall lock down when depressed and shall release by depressing a special momentary release station. One or more pushbuttons may be depressed at one time, but all shall release simultaneously.

3.4.4.4 Locking with remote release. Each pushbutton station shall lock down when depressed and shall release by energizing an electromagnetic device incorporated into the pushbutton switch. One or more pushbuttons may be depressed at one time but all shall release simultaneously.

3.4.4.5 Locking and interlocking. Each pushbutton station shall lock down when depressed and shall release by depressing any other button. Only one pushbutton shall be depressed to actuation at one time.

3.4.4.6 Independent locking and interlocking. Each pushbutton station shall lock down when depressed and shall release only by pushing it again. Only one pushbutton may be depressed at one time.

3.4.4.7 Locking and interlocking with master release. Each pushbutton station shall lock down when depressed and shall release by depressing a special momentary release station. Only one pushbutton may be depressed at a time.

3.4.4.8 Locking and interlocking with remote release. Each pushbutton station shall lock down when depressed and shall release by energizing an electromagnetic device. Only one pushbutton may be depressed at a time.

3.4.4.9 Remote release and lockout. The energizing of an electromagnetic device shall release all stations and then shall prevent actuation of any station until the electromagnetic device is deenergized.

3.4.4.10 Tease-proof. One pushbutton station in a multistation switch shall always be in a down position with its associated circuitry activated. Depressing any other pushbutton station shall not cause deactuation of activated circuits until pushbutton station being depressed is positively committed to activating its associated circuitry.

3.4.5 Circuit characteristic (when applicable, see 3.1). Switch station circuitry shall be as specified.

3.4.6 Lamps (when applicable, see 3.1).

3.4.6.1 Circuitry. The lamp circuit shall be independent of the switch circuit and shall be insulated from the switch housing.

3.4.6.2 Replacement. The lamps shall be replaceable from the front of the panel with the complete assembly mounted in the panel. Unless otherwise specified (see 3.1), tools shall not be required to replace the lamp.

3.4.6.3 Contact and springs. 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 corrosion resistant steel. When the contact and contact spring are combined as an integral part (one piece of metal), copper beryllium alloy, suitably plated, shall be used.

3.4.6.4 Type. Unless otherwise specified (see 3.1), switches shall accept type T-1-3/4 midget flange-base lamps.

3.4.6.5 Failure. Lamp failure shall not be considered a unit failure if, when the lamp failure is noted, a new lamp is installed immediately and the lamp functions. The test being performed shall then be continued as required.

3.4.7 Lens (when applicable, see 3.1). The lens design shall be as specified and shall permit the application of legends, when applicable, (see 6.2). Abbreviations on the legends shall be in accordance with MIL-STD-12. The lens, excluding the switch housing mating portion, shall be of heat resistant thermoplastic material, or thermosetting plastic as specified (see 3.1). The lens shall be removable from the front of the panel. The lens shall not rotate or loosen during the applicable tests. The lens shall be free from defects which will prevent it from meeting luminous distribution and color requirements. Threaded plastic lens shall not be used (see 3.4.12).

3.4.7.1 Snap-in type. Snap-in lens shall be designed to have a lens removal force between 2 and 4 pounds, and after 50 insertions and withdrawals, the lens removal force shall not have varied over 50 percent from the measured initial lens removal force. Snap-in lens shall not be used for push-pull operative switches.

3.4.7.2 Color. The lens color shall be as specified (see 3.1) and shall be evenly distributed over the lens face. Unless otherwise specified (see 3.1), the lens color shall be in accordance with table III.

3.4.7.3 Luminance. The measured photometric brightness in foot lambert shall be as specified (see 3.1). Tests shall be made under dark conditions, using lamps with a 0.34 ± 0.02 mean spherical candlepower. An average of three readings shall be made across the face of the lens, when unit is illuminated.

3.4.8 Color filters (when applicable, see 3.1). The color of color filters shall be in accordance with table III and shall be of one of the following types:

3.4.8.1 Cap filters. Cap filters used to convert clear incandescent lamps to colored lamps shall be as specified (see 3.1).

3.4.8.2 Lens assembly filters. The design, material, and thickness of filters used in lens assemblies (behind lens and diffuser plates) shall be as specified (see 3.1).

3.4.9 Mounting and spacer barriers (when applicable, see 3.1). Mounting and spacer barriers, shall be of the design and color specified.

3.4.10 Panel seals (when applicable, see 3.1). Unless otherwise specified, panel seals shall be fabricated from silicon rubber conforming to class III of ZZ-R-765 and shall be of the design, and grade as specified.

3.4.11 Switch contacts. Unless otherwise specified (see 3.1), the switch contacting surfaces shall be of a silver or silver alloy material.

3.4.12 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 shall not be permitted.

3.4.13 Attitude. Unless otherwise specified (see 3.1), switches shall be so constructed as to insure proper operation when mounted in any position.

TABLE III. Chromaticity limits for illuminated colors.

Colors	Chromaticity limits 2100° Kelvin ^{1/}	
	x	y
Green	.195 .286 .234 .143	.713 .637 .575 .650
Yellow	.530 .544 .571 .584	.442 SL ^{2/} .402 SL ^{2/}
Amber	.596 .607 .625 .636	.380 SL ^{2/} .351 SL ^{2/}
Red	.655 .667 .690 .702	.324 SL ^{2/} .287 SL ^{2/}
Blue	.194 .240 .184 .135	.254 .213 .147 .187
White	y is not less than .400 x is not greater than .510 $y - y_0$ is not numerically greater than $0.03x$ (y_0 is the y coordinate of the Planckian radiator for a given x)	

^{1/}The chromaticities of the diffusing lenses or colored filters expressed as x and y coordinates on the CIE chromaticity diagram shall lie within areas bounded by the coordinates listed for each color, using source illuminate of 2100°K.

^{2/}SL-Spectrum Locus (where intersected by other of coordinate pair).

3.5 Solderability. When switches are tested as specified in 4.8.2, 95 percent of the total length of fillet, which is between the standard wrap wire and the terminal, shall be tangent to the surface of the terminal being tested. There shall be no pinholes, or voids. A ragged or interrupted line at the point of tangency between the fillet and the terminal under test shall be considered a defect. After the test there shall be no evidence of fracture, loosening of parts, or any other mechanical failure of the switches.

3.6 Switch actuation and circuit configuration. When switches are tested as specified in 4.8.3, the switch-circuit configuration shall conform to the specified diagram (see 6.2). Switches shall make and break the required circuits in all positions. The making and breaking of circuits shall be positive. The switches shall function as specified (see 3.4.4 and 6.2).

3.7 Contact resistance.

3.7.1 Switch terminals. When measured as specified in 4.8.4.1, the resistance across the switch terminals shall not exceed 25 milliohms, unless otherwise specified (see 3.1).

3.7.2 Lamp terminals (when applicable, see 3.1). When measured as specified in 4.8.4.2, the resistance across the lamp terminals shall not exceed 1.0 ohm.

3.8 Simultaneity. When switches are tested as specified in 4.8.5, the make and break of contacts associated with any one station shall be simultaneous to within 25 milliseconds (ms).

3.9 Thermal shock. When switches are tested as specified in 4.8.6, there shall be no mechanical or electrical damage. There shall be no discoloration or deformation of the lens.

3.10 Vibration, high frequency. Unless otherwise specified (see 3.1), when switches are tested as specified in 4.8.7, there shall be no opening or closing of contacts in excess of 10 microseconds (usec). During the test there shall be no visual indication of light intermittency. After the test, there shall be no mechanical damage or impairment of operation.

3.11 Shock. Unless otherwise specified (see 3.1), when switches are tested as specified in 4.8.8, there shall be no opening or closing of contacts in excess of 10 usec for method I or 20 ms for method II. There shall be no change in operation, mechanical damage, broken, loose, deformed or displaced parts, or impairment of normal operation.

3.12 Terminal strength. When switches are tested as specified in 4.8.9, there shall be no breakage, loosening, or rotation of terminals, and no damage to the switch shall occur.

3.13 Lamp retention (when applicable, see 3.1). When tested as specified in 4.8.10, lamps shall be held captive within the removable portion of the lens assembly. The captive means shall be capable of retaining the appropriate lamp retention adapter.

3.14 Torque strength of plunger. When switches are tested as specified in 4.8.11, the plunger shall withstand the applied torque without damage.

3.15 Strength of actuator and actuator stop. When switches are tested as specified in 4.8.12, there shall be no malfunction or damage upon application of the static load.

3.16 Dielectric withstanding voltage. When switches are tested as specified in 4.8.13, there shall be no arcing, flashover, breakdown, or current flow in excess of 1 milliampere (ma).

3.17 Salt spray (corrosion). When switches are tested as specified in 4.8.14, there shall be no evidence of excessive corrosion, nor shall there be warping, cracking, or other damage, and when applicable the lenses shall show no color fading. NOTE: 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.

3.18 Insulation resistance. Unless otherwise specified (see 3.1), when switches are tested as specified in 4.8.15, the insulation resistance shall be not less than 1,000 megohms.

3.19 Moisture resistance. Unless otherwise specified (see 3.1), when switches are tested as specified in 4.8.16, the insulation resistance, immediately after conclusion of the test and while the switches are still in the humidity chamber, shall be not less than 10 megohms. At the end of the drying period, the insulation resistance shall be not less than 100 megohms. At the conclusion of the test, there shall be no evidence of breaking, cracking, spalling, or loosening of terminals. There shall be no evidence of pitting of plated metal surfaces, and when applicable, the lenses shall show no color fading.

3.20 Mechanical endurance. When switches are tested as specified in 4.8.17, there shall be no evidence of mechanical damage or malfunction.

3.21 Sand and dust (when applicable, see 3.1). When switches are tested as specified in 4.8.18, there shall be no evidence of degradation of switching functions, and they shall be mechanically and electrically operative.

3.22 Seal (when applicable, see 3.1).

3.22.1 Watertight. When switches are tested as specified in 4.8.19.1, there shall be no leakage past the panel seals as determined by visual examination.

3.22.2 Dripproof. When switches are tested as specified in 4.8.19.2, there shall be no leakage of water into the test enclosure as determined by visual examination.

3.23 Overload. When switches are tested as specified in 4.8.20, there shall be no mechanical or electrical failure.

3.24 Electrical endurance. When switches are tested as specified in 4.8.21, there shall be no electrical or mechanical failure. The lenses shall show no surface deterioration.

3.25 Marking. Switches shall be marked in accordance with MIL-STD-130, with the following information:

- (a) Manufacturer's name, trademark, or code symbol (the code symbol shall be in accordance with MIL-STD-456).
- (b) Military part number, type designation or manufacturer's part number when not covered by a specification sheet.
- (c) Date code in accordance with MIL-STD-456.

3.26 Workmanship. Switches shall be processed in such a manner as to be uniform in quality and shall be free from defects that will affect life, serviceability, or appearance.

3.26.1 Lens (when applicable, see 3.1). Lens shall be free from open surface bubbles or internal bubbles which may be observed with lamps energized.

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 own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 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 the standards which control the accuracy of the inspection equipment shall comply with the requirements of MIL-C-45662.

4.2 Classification of inspection. The examination and testing of switches shall be classified as follows:

- (a) Component-materials inspection (see 4.3).
- (b) Qualification inspection (see 4.5).
- (c) Preproduction inspection (see 4.6).
- (d) Quality conformance inspection (see 4.7).
 - (1) Inspection of product for delivery (see 4.7.1).
 - (2) Inspection of preparation for delivery (see 4.7.2).

4.3 Component-materials inspection. Component-materials inspection shall consist of verification that the component materials listed in table IV, used in fabricating the switches, are in accordance with the applicable referenced specifications or requirements prior to such fabrication.

TABLE IV. Component-materials inspection.

Component material	Requirement paragraph	Applicable specification or requirement
Plastic material:		
Thermosetting - - - - -	3.3.2.1	MIL-M-14
Thermoplastics - - - - -	3.3.2.2	MIL-P-20693, L-P-410, FED-STD-406
Rubber - - - - -	3.3.3	ZZ-R-765
Finish:		
Anodized aluminum - - - - -	3.3.4	MIL-A-8625
Chemical treatment for aluminum - - - - -	3.3.4	MIL-C-5541

4.4 Inspection conditions. Unless otherwise specified herein, all inspections shall be made in accordance with the general requirements of MIL-STD-202.

4.5 Qualification inspection.^{1/} Qualification inspection shall be performed at a laboratory approved by the Government (see 6.3).

4.5.1 Sample. Unless otherwise specified (see 3.1), the number of sample units comprising a sample of switches to be submitted for qualification inspection shall be in accordance with table V. The sample shall be produced with equipment and procedures normally used in production. The sample shall consist of switches, of one basic style (complete with barriers, panel seals, and color filters, if applicable), and at least one lens of each style, color, and transmittance (see 3.1).

4.5.2 Test routine. Unless otherwise specified (see 3.1), sample units shall be subjected to the qualification inspection specified in table V, in the order shown. Sample units shall be subjected to the inspection of group I, as indicated. The sample units shall then be divided as specified in table V and subjected to the inspection for their particular group.

4.5.3 Defectives. One or more defectives shall be cause for refusal to grant qualification.

4.5.4 Extent of qualification.

4.5.4.1 Single submission. Qualification shall be restricted to the style submitted.

4.5.4.2 Group submission. The extent of qualification shall be in accordance with the applicable specification sheet (see 3.1).

4.5.5 Retention of qualification. To retain qualification, the supplier shall forward at 24-month intervals, or when 50,000 units of one style have been produced whichever is more frequent to the qualifying activity, a summary of the results of groups A and B tests, indicating as a minimum the number of lots which passed and the number which failed, and the complete results of group C tests. If test results indicate nonconformance with specification requirements, action shall be taken to remove the failing product from the qualified products list. Failure to submit the test results shall 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 when inspection data indicates failure of the qualified product to meet the requirements of this specification.

4.6 Preproduction inspection. Preproduction inspection shall be performed by the supplier, after award of contract and prior to production, at a laboratory satisfactory to the Government (see 6.2.2). Unless otherwise specified (see 6.2.2), the samples and test routine shall be as specified in table V.

^{1/} Application for qualification tests shall be made in accordance with Provisions Governing Qualification SD-6 (see 6.4).

TABLE V. Qualification inspection.

Examination or test	Requirement paragraph	Method paragraph
<u>Group I (18 sample units)^{1/}</u>		
Visual and mechanical examination - - - - -	3.1, 3.3, 3.4, 3.25 and 3.26	4.8.1
Solderability ^{2/} - - - - -	3.5	4.8.2
Switch actuation and circuit configuration - -	3.6	4.8.3
Contact resistance - - - - -	3.7	4.8.4
Simultaneity - - - - -	3.8	4.8.5
<u>Group II (4 sample units from group I)</u>		
Thermal shock - - - - -	3.9	4.8.6
Vibration, high frequency - - - - -	3.10	4.8.7
Shock (specified pulse) method I - - - - -	3.11	4.8.8.1
Shock (high impact) method II (when applicable) - - - - -	3.11	4.8.8.2
Terminal strength - - - - -	3.12	4.8.9
Lamp retention (when applicable) - - - - -	3.13	4.8.10
Torque strength of plunger - - - - -	3.14	4.8.11
Strength of actuator and actuator stop - - -	3.15	4.8.12
Dielectric withstanding voltage - - - - -	3.16	4.8.13
<u>Group III (2 sample units from group II)</u>		
Salt spray (corrosion) - - - - -	3.17	4.8.14
Dielectric withstanding voltage - - - - -	3.16	4.8.13
Switch actuation and circuit configuration -	3.6	4.8.3
<u>Group IV (2 sample units from group II)</u>		
Insulation resistance - - - - -	3.18	4.8.15
Moisture resistance - - - - -	3.19	4.8.16
Switch actuation and circuit configuration -	3.6	4.8.3
<u>Group V (2 sample units from group I)</u>		
Mechanical endurance - - - - -	3.20	4.8.17
Sand and dust (when applicable) - - - - -	3.21	4.8.18
Seal (when applicable) - - - - -	3.22	4.8.19
Dielectric withstanding voltage - - - - -	3.16	4.8.13
Switch actuation and circuit configuration -	3.6	4.8.3
<u>Group VI (12 sample units from group I)</u>		
Overload - - - - -	3.23	4.8.20
Electrical endurance (2 switches each)		
Resistive circuit (ac and dc) - - - - -		
Inductive circuit (ac and dc) - - - - -	3.24	4.8.21
Lamp load (ac and dc) - - - - -		
Dielectric withstanding voltage - - - - -	3.16	4.8.13

^{1/} At the time of submission four additional sample units shall be required for qualification for shock (high-impact) method II and shall be subjected to groups I and II only.

^{2/} Two sample units only.

4.7 Quality conformance inspection.

4.7.1 Inspection of product for delivery. Inspection of product for delivery shall consist of groups A, B, and most recent C.

4.7.1.1 Inspection lot. An inspection lot, as far as practicable, shall consist of all switches, barriers, color filters, lenses, and panel seals covered by the same military specification sheet produced under essentially the same conditions, and offered for inspection at one time.

4.7.1.2 Group A inspection. Group A inspection shall consist of the examinations and tests specified in table VI, and shall be made on the same set of sample units in the order shown.

4.7.1.2.1 Sampling plan. Statistical sampling and inspection shall be in accordance with MIL-STD-105 for general inspection level II. The acceptable quality levels (AQL) shall be as specified in table VI. Major and minor defects shall be as defined in MIL-STD-105.

4.7.1.2.2 Rejected lots. If an inspection lot is rejected, the supplier may withdraw the lot, rework it to correct the defects, or screen out the defective units, as applicable, and reinspect. Such lots shall be separate from new lots, and shall be clearly identified as reinspected lots. Rejected lots shall be inspected using tightened inspection.

TABLE VI. Group A inspection.

Examination or test	Requirement paragraph	Method paragraph	Quality level AQL (percent defective)	
			Major	Minor
Visual and mechanical examination - - - - -	3.1, 3.3, 3.4, 3.25 and 3.26	4.8.1	1.0	4.0
Switch actuation and circuit configuration - - - - -	3.6	4.8.3		

4.7.1.3 Group B inspection. Group B inspection shall consist of the examinations and tests specified in table VII, in the order shown, and shall be made on sample units which have been subjected to and have passed the group A inspection.

4.7.1.3.1 Sampling plan. The sampling plan shall be in accordance with MIL-STD-105 for special inspection level S-3. The AQL shall be 4.0 percent defective.

4.7.1.3.2 Rejected lots. If an inspection lot is rejected, the supplier may withdraw the lot, rework it to correct the defects, or screen out the defective units, as applicable, and reinspect. Such lots shall be kept separate from new lots, and shall be clearly identified as reinspected lots. Rejected lots shall be inspected using tightened inspection.

4.7.1.3.3 Disposition of sample units. Sample units which have passed group B inspection may be delivered on the contract or order, if the lot is accepted.

TABLE VII. Group B inspection.

Examination or test	Requirement paragraph	Method paragraph
Dielectric withstanding voltage-	3.16	4.8.13
Contact resistance - - - - -	3.7	4.8.4
Seal (when applicable) - - - - -	3.22	4.8.19

4.7.1.4 Group C inspection. Group C inspection shall consist of the examinations and tests specified in table V, in the order shown. Shipment shall not be held up pending results of the inspection.

4.7.1.4.1 Sampling plan. Sample units as specified in table V shall be selected from each 50,000 units of all switches, barriers, color filters, lenses, and panel seals covered by the same military specification sheet produced or within each two year period after the date of notification of qualification whichever comes first. If one or more sample units fail to pass group C inspection, the sample shall be considered to have failed. A manufacturer's normal quality control tests, production tests, environmental tests, and so forth, may be used to fulfill all or part of group C inspection; however, all of group C inspection shall be completed as specified.

4.7.1.4.1.1 Lens, color filters, barriers, and panel seals. The lenses, color filters, panel seals and barriers, when applicable shall be tested as a part of the basic switch.

4.7.1.4.2 Disposition of sample units. Sample units which have been subjected to group C inspection shall not be delivered on the contract or order.

4.7.1.4.3 Noncompliance. If a sample fails to pass group C inspection, the supplier shall take corrective action on the materials or processes, or both, as warranted, and on all units of product which can be corrected and which were manufactured under essentially the same conditions, with essentially the same materials, and processes, 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 C inspection shall be repeated on additional sample units (all inspection, or the inspection which the original sample failed, at the option of the Government). Groups A and B inspection may be reinstated; however, final acceptance shall be withheld until the group C inspection has shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure and corrective action taken shall be furnished to the contracting officer, and to the qualifying activity.

4.7.2 Inspection of preparation for delivery. Sample packages and packs shall be selected and inspected in accordance with the schedule of acceptance tests and visual inspection aids of MIL-P-116, to verify conformance with the requirements in section 5 of this specification.

4.8 Methods of examination and test.

4.8.1 Visual and mechanical examination. Switches, lenses, color filters, panel seals and barriers shall be examined to determine that the material, design, construction, physical dimensions, marking, and workmanship are in accordance with the applicable requirements. (See 3.1, 3.3, 3.4, 3.25, and 3.26.)

4.8.2 Solderability (see 3.5). Switches shall be tested in accordance with method 208 of MIL-STD-202. The following details and exception shall apply:

- (a) Number of terminations of each switch to be tested - Five.
- (b) Dipping machine - Need not be used.
- (c) Solder dip - Not applicable.
- (d) Examination of terminations - Method for evaluation of lugs and tabs shall apply.

4.8.3 Switch actuation and circuit configuration (see 3.6). The actuation and circuit configuration of the switch shall be tested by use of test circuits for compliance with the specified functions.

4.8.4 Contact resistance (see 3.7). Switches shall be tested in accordance with the following:

4.8.4.1 Switch terminals (see 3.7.1). Switch terminals shall be tested in accordance with method 307 of MIL-STD-202. The following details and exception shall apply:

- (a) Method of connection - Connections shall be made by clamps or shall be soldered.
- (b) Test current - 100 milliamperes (ma).
- (c) Maximum open-circuit test voltage - 6 ± 1 volts, direct current (vdc).
- (d) Number of activations prior to measurement - Not applicable.
- (e) Number of test activations - Three activations per pole.
- (f) Number of measurements per activation - One measurement. (The average of the 3 readings shall be considered the contact resistance.)
- (g) Points of measurement - Measurements shall be made across the terminals of each switching circuit with the switch contacts closed. Measurements

4.8.4.2 Lamp terminals (when applicable, see 3.7.2). Lamp terminals shall be tested in accordance with method 307 of MIL-STD-202. The following details and exceptions shall apply:

- (a) Method of connection - Connections shall be made by clamps or shall be soldered.
- (b) Preparation for test - An applicable lamp retention adapter (see figure 1) shall be used.
- (c) Test current - 100 milliamperes (ma).
- (d) Number of adapter insertions - Three.
- (e) Number of measurements per insertion - One measurement between the lamp terminals. (The average of the three readings shall be considered the contact resistance.)

4.8.5 Simultaneity (see 3.8). Using suitable measuring equipment, simultaneity of switch contacts in any station shall be measured at an actuation rate of 2.0 inch per second. Only one of each five stations in a multistation switch shall be tested.

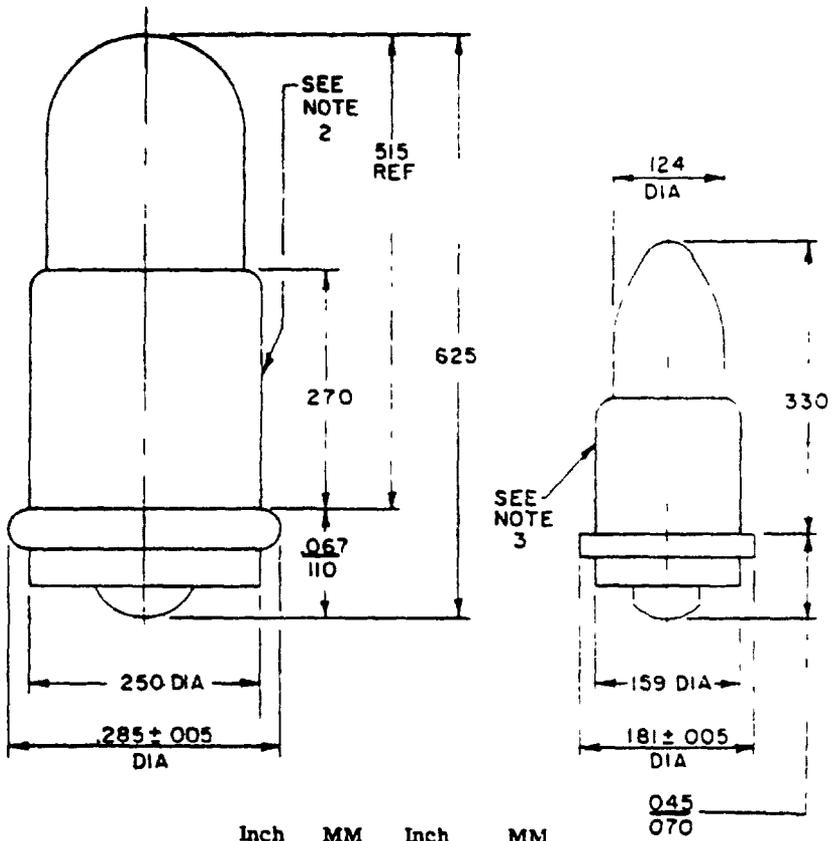
4.8.6 Thermal shock (see 3.9). Switches shall be tested in accordance with method 107 of MIL-STD-202. Unless otherwise specified (see 3.1), the following details and exception shall apply:

- (a) Test-condition letter - A, except the upper temperature for lenses shall be $71^{\circ}\text{C} \begin{matrix} +3^{\circ} \\ -0^{\circ} \end{matrix}$ unless otherwise specified (see 3.1).
- (b) Measurements after cycling - Switches shall be examined for mechanical or electrical damage. When applicable, lenses shall be examined for discoloration or deformation.

4.8.7 Vibration, high frequency (see 3.10). Switches shall be tested in accordance with method 204 of MIL-STD-202. The following details and exceptions shall apply:

- (a) Mounting of specimens - Normal mounting means.
- (b) Test-condition letter - A.
- (c) Test and measurement during vibration - Contact chatter shall be continuously monitored during vibration in accordance with method 310 of MIL-STD-202.
- (d) Examination after test - Switches shall be examined for mechanical damage or impairment of operation.

4.8.8 Shock (see 3.11). Switches shall be tested in accordance with 4.8.8.1, and when specified (see 3.1) with 4.8.8.2.



Inch	MM	Inch	MM
.005	.13	.181	4.60
.045	1.14	.250	6.35
.067	1.70	.270	6.86
.070	1.78	.285	7.24
.110	2.79	.330	8.38
.124	3.15	.515	13.08
.159	4.04	.625	15.88

NOTES:

1. Dimensions are in inches.
2. Reference MS25237 and MS18209 (T-1 3/4 midget-flanged-base lamp).
3. Reference MS24515 (T-1 subminiature-flanged-base lamp).
4. Unless otherwise specified, tolerance is .XXX ± .001 (.03 mm).
5. Metric equivalents (to the nearest .01 mm) are given for general information only and are based upon 1 inch = 25.4 mm.
6. Lamp retention adapters shall be of metal and shall weigh 5gm ⁺¹/₋₀ and may be counterbored to achieve weight.

FIGURE 1. Lamp retention adapters.

4.8.8.1 Method I (shock (specified pulse)). Switches shall be tested in accordance with method 213 of MIL-STD-202. The following details and exception shall apply:

- (a) Mounting method and accessories - Switches shall be secured to a sufficient mass in each of its three principal axes, in turn.
- (b) Test-condition letter - I.
- (c) Measurement before test - Not applicable.
- (d) Measurement during test - Switch contact stability shall be continuously monitored during shock in accordance with method 310 of MIL-STD-202.
- (e) Measurement after test - When applicable, the lamp circuits of the switch housing shall be energized.
- (f) Examinations after test - Switches shall be examined for any change in operation, mechanical damage, broken, loose, deformed and displaced parts, and impairment of normal operation.

4.8.8.2 Method II (high-impact shock) (when specified, see 3.1). Switches shall be tested in accordance with method 207 of MIL-STD-202. The following details and exception shall apply:

- (a) Mounting fixture - Same as 4.8.8.1(a).
- (b) Monitoring during test - Switch contact stability shall be monitored for each blow in accordance with method 310 of MIL-STD-202.
- (c) Measurements after test - Same as 4.8.8.1(e).
- (d) Examination after test - Same as 4.8.8.1(f).

4.8.9 Terminal strength (see 3.12). Switches shall be tested in accordance with one of the following methods, as applicable. Only 5 terminals need to be tested.

4.8.9.1 Solder terminals. Switches with solder terminals shall be tested in accordance with method 211 of MIL-STD-202. The following details and exceptions shall apply:

- (a) Test-condition letter - A.
- (b) Applied force - 4-1/2 pounds.
- (c) Direction of applied force - Parallel to the long axis of the terminal, perpendicular to the long axis of the terminal, and in any direction most likely to cause failure. No one terminal shall be tested in more than one direction.
- (d) Duration of applied force - One minute.

After the test, the switches shall be examined for breakage, loosening and rotation of terminals, and any damage to the switch.

4.8.9.2 Screw terminals. Switches with screw terminals shall be tested in accordance with 4.8.9.2.1 and 4.8.9.2.2.

4.8.9.2.1 Pull. Screw terminals shall be subjected to a pull of the applicable static force specified in table VIII in a direction along the axis of the terminal screw, in a direction perpendicular to the axis of the terminal screw, and in the direction most likely to cause failure. No one terminal shall be tested in more than one direction. The force shall be applied for one minute. After the test, switches shall be examined for any damage and breakage, loosening, and rotation of terminals.

TABLE VIII. Static force values.

Thread size	Force in pounds
4-40	5
6-32	30
8-32	35
10-32	40
10-24	40
1/4-28	50

4.8.9.2.2 Torque. Screw terminals shall be tested in accordance with method 211 of MIL-STD-202. The following detail and exception shall apply:

- (a) Test-condition letter - E, except that for thread sizes 10-24, the torque shall be 24.0 pound-inches.
- (b) Direction of torque - In the direction of the screw threads.

After the test, switches shall be examined for any damage and breakage, loosening and rotation of terminals.

4.8.9.3 Wire-lead terminals. Switches with wire-lead terminals shall be tested in accordance with method 211 of MIL-STD-202. The following details and exceptions shall apply:

- (a) Test-condition letter - A.
- (b) Applied force - 15 pounds.
- (c) Direction of applied force - In any direction, including the one most likely to cause failure.
- (d) Duration of applied force - One minute.

After the test, the switches shall be examined for any damage and breakage, loosening, and rotation of terminals.

4.8.10 Lamp retention (when applicable, see 3.13). A lamp retention adapter in accordance with figure 1 shall be inserted (to complete lens engagement) and withdrawn five times. With the adapter installed in the applicable lens, and the lens held so that the base on the adapter points directly downward, the unit shall remain captive to the lens.

4.8.10.1 Insertion, withdrawal and removal force (snap-in lenses). Snap-in lenses shall be subjected to an insertion, withdrawal and removal test to determine conformance with 3.4.7.1.

4.8.11 Torque strength of plunger (see 3.14). With the switches mounted by normal means, a torque of 5 inch-pounds shall be applied to the plunger in a plane perpendicular to the centerline of the plunger for a period of 1 minute.

4.8.12 Strength of actuator and actuator stop (see 3.15). With the switch mounted by normal means, a static load of 25 pounds, unless otherwise specified (see 3.1), shall gradually be applied in line with the actuator for a period of 1 minute.

4.8.13 Dielectric withstanding voltage (see 3.16). Switches shall be tested in accordance with 4.8.13.1 and, when specified (see 3.1), in accordance with 4.8.13.2.

4.8.13.1 At atmospheric pressure. Switches shall be tested in accordance with method 301 of MIL-STD-202. The following details and exception shall apply:

- (a) Special preparations or conditions - The tests shall be conducted with the unit in its normal position and shall be repeated for all other operating positions. Lamps, if applicable, shall be removed from the switch before these tests.
- (b) Magnitude of test voltage - 1,000 volts, rms.
- (c) Nature of potential - ac.
- (d) Duration of application of test voltage - One minute for qualification and group C inspection; five seconds for other tests.
- (e) Points of application -
 - (1) Between all terminals and ground.
 - (2) Between all adjacent contact terminals of different poles.
 - (3) Between all unconnected terminals of the same pole.
 - (4) When applicable, between lamp circuit terminals and unconnected switch contact terminals.
- (f) Examination after test - Switches shall be examined for arcing, flashover, and breakdown, and current flow in excess of 10 microamperes.

4.8.13.2 At reduced barometric pressure. Switches designed for operation above 10,000 feet shall be tested as specified in 4.8.13.1, and in accordance with method 105 of MIL-STD-202. The following details and exception shall apply:

- (a) Method of mounting - Normal mounting means.
- (b) Test-condition letter - C, unless otherwise specified (see 3.1).
- (c) Test voltage - 400 volts rms.

4.8.14 Salt spray (corrosion) (see 3.17). Switches shall be tested in accordance with method 101 of MIL-STD-202. The following detail and exception shall apply:

- (a) Test-condition letter - B.
- (b) Examination after exposure - Switches shall be subjected to 10 cycles of operation of making and breaking the rated resistive current at the lowest dc voltage specified (see 3.1), after a 6 hour drying period in a forced draft oven, at a temperature of approximately 57°C.

After the test, switches shall be examined for evidence of excessive corrosion, warping, cracking, any other damage, and when applicable, color fading of the lenses.

4.8.15 Insulation resistance (see 3.18). Switches shall be tested in accordance with method 302 of MIL-STD-202. The following details shall apply:

- (a) Test-condition letter - B.
- (b) Special conditions - As specified in 4.8.13.1(a).
- (c) Points of measurement - As specified in 4.8.13.1(e).

4.8.16 Moisture resistance (see 3.19). Switches shall be tested in accordance with method 106 of MIL-STD-202. The following details and exceptions shall apply:

- (a) Mounting - By normal means, on corrosion-resistant metal panel positioned 15 degrees from the vertical, with the switch actuator up.
- (b) Initial measurements - Not applicable.
- (c) Polarization voltage - During steps 1 to 6 inclusive, 100 volts dc shall be applied between all terminals tied together and the metal panel. The negative polarity shall be applied to the metal panel.
- (d) Loading voltage - Not applicable.
- (e) Steps 7a and 7b - Not applicable.
- (f) Final measurements - Unless otherwise specified (see 3.1), immediately after the conclusion of the test and while the switches are still in the humidity chamber, and also at the end of the drying period, insulation resistance shall be measured as specified in 4.8.15.

After the test, switches shall be examined for breaking, cracking, spalling, and loosening of terminals, pitting of plated metal, and color fading of lenses, when applicable.

4.8.17 Mechanical endurance (see 3.20). Switches shall be subjected to 50,000 cycles of operation at room temperature. The cycling rate shall not exceed 100 cycles of operation per minute. A cycle of operation shall be the movement of the actuating means through the entire range of its travel causing the switch contacts to change from one position to another.

4.8.18 Sand and dust (when applicable, see 3.21). Switches shall be tested in accordance with method 110, test-condition letter B, of MIL-STD-202. During the test, the switches shall be mechanically operated for 2,500 cycles. The cycling rate shall not exceed 60 cycles of operation per minute.

4.8.19 Seal (when applicable, see 3.22). When specified (see 3.1), switches shall be tested in accordance with 4.8.19.1 or 4.8.19.2. Before conducting the test, all gaskets which normally can be replaced in service without disassembly shall be disassembled and then reassembled to the switch.

4.8.19.1 Watertight. The switch, mounted on a test enclosure by normal mounting means, shall be 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 (psig) every 2 minutes until a pressure of 15 psig is reached, and maintained at that pressure for 30 minutes. During the period of maximum pressure, the switch shall be operated for 25 cycles of operation.

4.8.19.2 Dripproof. The switch, mounted by normal means, shall be subjected to the dripproof test of MIL-STD-108. The following details and exceptions shall apply:

- (a) Quantity of water - 1 gallon per station, with a minimum of 5 gallons. Water shall be evenly distributed.
- (b) Duration - 5 minutes.
- (c) Variation from vertical - 15 degrees.
- (d) Stream position - 12 inches maximum above the switch.

4.8.20 Overload (see 3.23). Switches shall be subjected to 50 make-and-break cycles of operation at a rate of 5 to 6 cycles per minute while carrying 150 percent rated resistive current at the lowest dc voltage specified (see 3.1). The duty cycle shall be approximately 50 percent on and 50 percent off. The switches shall be electrically and mechanically operated at the conclusion of the test.

4.8.21 Electrical endurance (see 3.24).

4.8.21.1 Conditions.

- (a) Unless otherwise specified (see 3.1), test loads shall be arranged so that an independent load shall be provided for each pole, and the life cycle for each electrical load shall be 25,000 cycles.
- (b) Switches shall be continuously monitored and recorded to determine whether any contact has failed to open or close its individual circuit in the proper sequence. The monitoring circuit shall not shunt inductive components of inductive loads or switch contacts.

- (c) The duty cycle shall be approximately 50 percent on and 50 percent off for resistive and inductive loads. The duty cycle shall be approximately 30 percent on and 70 percent off for lamp loads.
- (d) The cycling rate shall be 10 to 12 cycles per minute.
- (e) When testing switch styles having normally open and normally closed contact arrangement, samples shall be equally divided between the two arrangements. All samples shall be tested in their normal positions.
- (f) In any of the specified load tests, each conductor shall be of an applicable size for single use in free air as listed in MIL-W-5088. If the rating of the switch under test does not coincide with a wire size, the next larger diameter wire shall be used.
- (g) One side of the power supply, one side of the test load, the switch mounting plate, metal housing (if applicable), and the actuating member, if metal, shall be connected to a common ground.

4.8.21.2 Loads. Voltage, current, frequency, and altitude, shall be as specified (see 3.1), however, altitude electrical tests shall be conducted at room ambient condition only. Unless otherwise specified, the life cycle for each electrical load shall be 25,000 cycles. The loads are as follows:

- (a) Resistive load, dc. Only noninductive resistive components shall be used.
- (b) Inductive load, dc.
 - (1) Method I. Inductive dc loads shall use inductors in accordance with MIL-I-81023, so adjusted that the time constant L/R (time required for current to reach 63.2 percent of its steady-state value) shall be not less than 0.025 second.
 - (2) Method II (alternate). Inductive dc loads rated at 28 volts shall be computed in accordance with the formula: $W = (0.14)(I)^{1.18}$ in which "W" is the energy in joules which must be delivered to the electrical contacts under test, and "I" is the maximum dc inductive current rating of the contacts. The energy delivered to the contacts shall be measured as follows: A shunting capacitor shall be placed across the test contacts to absorb the arc energy. The voltage drop across this shunt capacitor shall be measured upon circuit interruption by means of an oscilloscope. The voltage drop across the capacitor during circuit interruption

shall be taken at the peak value of the first oscillation. This voltage drop and the value of the capacitance shall be substituted in the formula:

$$W = 1/2CE^2$$

Where: W = energy in joules.
 C = capacitance of shunt capacitor in farads.
 E = voltage drop across capacitor in volts (peak value during first oscillation).

This energy thus calculated is the energy which would be dissipated by the contacts if the capacitor were removed. This energy shall be within ± 10 percent of the energy calculated by the formula:

$$W = (0.14)(I)^{1.18}$$

This method of energy measurement requires the use of a capacitor having a working voltage of 1,000 volts. The size of the capacitor shall be such that the peak voltage measured shall be not less than 200, nor greater than 900 volts.

- (c) Lamp load, dc. Lamp loads, dc, shall use tungsten lamps which provide the rated, steady-state lamp current. Only tungsten lamps having a nominal wattage of 25 to 50 watts, of the voltage specified, shall be used to make up the load.
- (d) Resistive load, ac. Only noninductive resistive components shall be used.
- (e) Inductive load, ac. Inductive ac load test circuits shall consist of inductive and resistive load elements connected in series. The circuit parameters shall be rated inductive load current at 0.7 ± 0.05 lagging power factor at 115 volts.
- (f) Lamp load, ac. Similar to (c) above, except that the rated ac voltage shall be used. Only tungsten lamps having a nominal wattage not to exceed 200 watts, at the voltage specified, shall be used to make up the load.

5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging. Preservation and packaging shall be level A or C, as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Cleaning. Switch assemblies and component parts shall be cleaned in accordance with MIL-P-116, process C-1.

5.1.1.2 Drying. Switch assemblies and component parts shall be dried in accordance with MIL-P-116.

5.1.1.3 Preservative application. None required.

5.1.1.4 Unit packaging. Unless otherwise specified, switch assemblies and component parts shall be packaged in accordance with MIL-P-116, insuring compliance with the general requirements paragraph under methods of preservation (unit protection) and the physical protection requirements paragraph therein.

5.1.1.4.1 Switch assemblies. Each switch assembly shall be individually packaged as follows:

- Method IA-8 - up to and including 15 cubic inches
(for submarine on board repair parts use method IC-3, with transparent materials, of MIL-STD-758).
- Method IA-14 - 16 through 50 cubic inches.
- Method IIe (dessicant not required) - over 50 cubic inches.

5.1.1.4.2 Lenses. Lenses shall be packaged 5 per unit package by Method III.

5.1.1.4.3 Barriers. Barriers shall be packaged 5 per unit package by Method III.

5.1.1.4.4 Filters. Filters shall be packaged 5 per unit package by Method III.

5.1.1.5 Intermediate packaging. Switch assemblies and component parts, packaged as described in 5.1.1.4 and not already in a carton, shall be placed in intermediate containers conforming to PPP-B-566 or PPP-B-676. Intermediate containers shall be uniform in size, shape, and quantities, shall be of minimum cube and tare, and shall contain multiples of five unit packages, not to exceed 100 packages or ten pounds. No intermediate packaging is required when the total quantity shipped to a single destination is less than 50 units.

5.1.2 Level C. Each cleaned and dried switch assembly and component parts packaged in quantities as shown in 5.1.1.4, 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 6.2).

5.2.1 Level A. The packaged switch assemblies and component parts shall be packed in fiberboard containers conforming to PPP-B-636, class weather resistant, style optional, special requirement. In lieu of the closure and waterproofing requirements in the appendix of PPP-B-636, closures and waterproofing shall be accomplished by sealing all seams, corners, and the manufacturer's joints with tape, 2 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 nonmetallic or tape banding only.

5.2.2 Level B. The packaged switch assemblies and component parts shall be packed in fiberboard containers conforming to PPP-B-636, class domestic, style optional, special requirement. Closures shall be in accordance with the appendix thereto. For Army, fiberboard container shall be class weather-resistant, as specified in Level A.

5.2.3 Level C. The packaged switch assemblies and component parts 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. This pack shall conform to the applicable carrier rules and regulations.

5.3 Marking (see 6.2). In addition to any special marking required by the contract or order, each unit package, intermediate, and exterior container shall be marked in accordance with MIL-STD-129.

5.4 General. Exterior containers 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 possible.

5.5 Inspection. Inspection of military packaging shall be in accordance with MIL-P-116 (see 4.7.2).

6. NOTES

6.1 Intended use. The switches covered by this specification are intended for use as panel displays and switching devices in alternating and direct current applications.

6.2 Ordering data.

6.2.1 For switches covered by specification sheets. Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Title, number, and date of the applicable specification sheet, the type designation, and all additional information to completely describe the switch, such as number of stations, applicable switch housing and lens, and station functions.
- (c) Lens marking, if required (see 3.4.7).
- (d) Levels of preservation, packaging, packing and marking (see section 5).

6.2.2 For switches not covered by specification sheets. Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Classification (see 1.2).
- (c) Manufacturer's part number.
- (d) Requirements (see 3.1), including the following:
 - (1) Applicable drawings, including all dimensions, actuation and circuit configuration.
 - (2) Identification of terminals, and schematic, if required (see 3.4.1.1).
 - (3) Switch functions (see 3.4.4).
 - (4) Circuit characteristic (see 3.4.5).
 - (5) Lamp type, if applicable (see 3.4.6).
 - (6) Lens design, material type, color, luminance, and required marking, if applicable (see 3.4.7).
 - (7) Color filters (type etc) when applicable (see 3.4.8).
 - (8) Mounting and spacer barriers, when applicable (see 3.4.9).
 - (9) Panel seals, when applicable (see 3.4.10).
 - (10) Shock test, method II, if applicable (see 4.8.8).
 - (11) Dielectric withstanding test at reduced barometric pressure, if applicable (see 4.8.13).
 - (12) Seal, when applicable (see 4.8.19).
- (e) Preproduction inspection requirements, if other than that specified in 3.2.2 and 4.6.
 - (1) The laboratory at which the inspection is to be performed, samples, and test routine, if other than that specified (see 4.6).
- (f) Levels of preservation, packaging, packing, and marking (see section 5).

6.2.3 Indirect shipments. The preservation, packaging, packing, and marking specified in section 5 is intended for direct purchases by or direct shipments to the Government and are not intended to apply to contracts or orders between the supplier and the prime contractor.

6.3 Qualification and preproduction.

6.3.1 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 for inclusion in the 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 Electronic Systems Command, Department of the Navy, Washington, D.C. 20360; however, information pertaining to qualification of products may be obtained from the Defense Electronics Supply Center (DESC-E), Dayton, Ohio 45401.

6.3.2 Preproduction. Preproduction approval is valid only on the contract or purchase order under which it is granted, unless extended by the Government to other contracts or purchase orders. Information pertaining to preproduction inspection of products covered by this specification shall be obtained from the procuring activity issuing the contract or purchase order.

6.4 Documents. Copies of military specifications and standards referenced in section 2 and "Provisions Governing Qualification SD-6" may be obtained upon application to the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120.

Custodians:

Army - EL
Navy - EC
Air Force - 85

Preparing activity:

Navy - EC

(Project 5930-0225)

Review activities:

Army - MU, MI, EL, CE, SM
Navy - EC, SH, AS, OS
Air Force - 11, 17, 85
DSA - ES

User activities:

Army - ME, AT, AV
Navy - MC
Air Force -

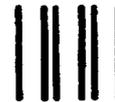
INSTRUCTIONS: In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the 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.

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DEPARTMENT OF THE NAVY



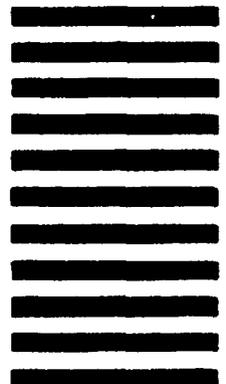
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