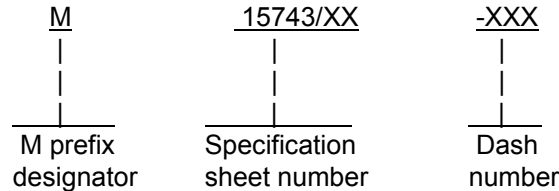


SWITCHES, ROTARY, ENCLOSED

1. SCOPE

1.2 Classification.

1.2.2 Part or Identifying Number (PIN). PINs to be used for (product) acquired to this specification are created as follows:



2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

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FEDERAL SPECIFICATIONS

- [L-P-504](#) - Plastic Sheet and Film, Cellulose Acetate.
- [L-P-535](#) - Plastic Sheet (Sheeting), Plastic Strip, Poly (Vinyl Chloride) and Poly (Vinyl Chloride-Vinyl Acetate), Rigid.
- [QQ-N-281](#) - Nickel-Copper Alloy Bar, Rod, Plate, Sheet, Strip, Wire, Forging and Structural and Special Shaped Sections.

FEDERAL STANDARDS

- [FED-STD-H28](#) - Screw Thread Standards for Federal Services.
- [FED-STD-H28/2](#) - Screw-Thread Standards for Federal Services, Section 2, Unified Inch Screw Threads - UN and UNR Thread Forms.

DEPARTMENT OF DEFENSE SPECIFICATIONS

- [MIL-S-901](#) - Shock Tests, H.I. (High Impact), Shipboard Machinery, Equipment and Systems, Requirements for.
- [MIL-E-917](#) - Electric Power Equipment, Basic Requirements (Naval Shipboard Use).
- [MIL-E-2036](#) - Enclosures for Electric and Electronic Equipment, Naval Shipboard.
- [MIL-L-3661](#) - Lampholder, Indicator Lights, Indicator Light Housing & Indicator Light Lenses, General Specification for.
- [MIL-DTL-15024](#) - Plates, Tags and Bands for Identification of Equipment, General Specification for.
- [MIL-P-15024/5](#) - Plates, Identification.
- [MIL-PRF-15160](#) - Fuse, Instrument, Power, and Telephone, General Specification for.
- [MIL-DTL-15291](#) - Switches, Rotary, Snap Action and Detent/Spring Return Action, General Specification for.
- [MIL-T-16366](#) - Terminal, Electrical Lug and Conductor Splices, Crimp Style.
- [MIL-DTL-16878](#) - Wire, Electrical, Insulated General Specification for.
- [MIL-PRF-19207](#) - Fuseholder, Extractor Post type, Blown Fuse, Indicating and Nonindicating, General Specification for
- [MIL-S-19622](#) - Stuffing Tube, Nylon, and Packing Assemblies, General Specification for.
- [MIL-DTL-21604](#) - Switches, Rotary, Multipole and Selector: General Specification for.

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- [MIL-E-24142](#) - Enclosures for Electrical Fittings and Fixtures, General Specification for.
- [MIL-I-24768](#) - Insulation, Plastics, Laminated, Thermosetting, General Specification for
- [MIL-I-24768/1](#) - Insulation, Plastics, Laminated, Thermosetting, Glass-Cloth, Melamine-Resin

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

DEPARTMENT OF DEFENSE STANDARDS

- [MIL-STD-108](#) - Definitions of and Basic Requirements for Enclosures for Electrical and Electronic Equipment.
- [MIL-STD-167-1](#) - Mechanical Vibrations of Shipboard Equipment (Type I - Environmental and Type II - Internally Excited).
- [MIL-STD-202](#) - Test Methods for Electronic and Electrical Component Parts.

(Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch/> or <http://www.assist.daps.dla.mil/> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D Philadelphia, PA 19111-5094.)

2.2.2 Other Government drawings. The following other Government drawings form a part of this specification to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

DRAWING

NAVAL SEA SYSTEMS COMMAND

- NAVSHIP - 9000-S6202-73055 - Fabricated Terminals (Closed end) and Branch Buses for Electrical Fittings.

(Copies may be obtained from Commander, Naval Sea Systems Command, SEA 03R42, 2531 Jefferson Davis Highway, Arlington, VA 22242-5160.

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

- [ASME-B46.1](#) - Surface Texture (Surface Roughness, Waviness, and Lay).

(Application for copies can be found online at <http://www.ansi.org/> or 25 West 43rd Street, New York, NY 10036-8002, telephone 212-642-4900, fax 212-302-1286)

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AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- [ASTM-B36/B 36M](#) - Standard Specification for Brass Plate, Sheet, Strip and Rolled Bar.
- [ASTM-B121/B121M](#) - Standard Specification for Leaded Brass Plate, Sheet, Strip, and Rolled Bar.
- [ASTM-B633](#) - Standard Specification for Zinc on Iron and Steel, Electrodeposited Coatings of.

(Application for copies can be found online at <http://www.astm.org/> or should be addressed to the American Society for Testing and Materials, 100 Barr Harbor Drive, P.O.Box C700, West Conshohocken, PA, 19428-2959).

IPC - ASSOCIATION CONNECTING ELECTRONICS INDUSTRIES

- [J-STD-004](#) - Soldering Fluxes Requirements for.
- [J-STD-006](#) - Electronic Grade Solder Alloys and Fluxed and Non-fluxed Solid Solders for Electronic Soldering Applications Requirements for.

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

- [SAE-AS8660](#) - Silicone Compound, NATO Code Number S-736
- [SAE-AS28775](#) - Packing, Performed, Hydraulic, +275 DEG. F. ("O"-Ring)

(Application for copies can be found online at <http://www.sae.org> or should be addressed to the Society Of Automotive Engineers (SAE) World Headquarters, 400 Commonwealth Drive, Warrendale, PA 15096-0001)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein except for related specification sheets, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheet. In the event of any conflict between the requirements of this specification and the specification sheet, the latter shall govern.

3.2 First article. When specified (see [6.2](#)), a sample shall be subjected to first article inspection (see [6.4](#)) in accordance with [4.3](#).

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.

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3.3.1 Metals. Metals shall be of a corrosion-resistant type or shall be treated to resist corrosion as specified in [MIL-E-917](#). Dissimilar metals, in contact with each other shall be selected to comply with the requirements of [MIL-E-917](#). The selection of metals in contact shall also be such as to prevent galling.

3.3.2 Nonmetallic materials. As specified in [MIL-E-917](#), nonmetallic materials shall be nonflammable, nontoxic, and fungus-inert.

3.3.3. Prohibited materials. Asbestos, cadmium and mercury shall not be used in the manufacture of the enclosed switches. In addition, no parts shall have come in direct contact with metallic mercury, mercury compounds or mercury bearing instruments or devices, employing only a single boundary of containment, during manufacture or inspection. (A single boundary of containment is one that is not backed up by a second seal or barrier to prevent escape and consequent mercury contamination in the event of rupture of the primary seal or barrier.)

3.3.4 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.4 Parts.

3.4.1 Switches. Unless otherwise specified (see [3.1](#)), switches shall conform to [MIL-DTL-15291](#) or [MIL-DTL-21604](#).

3.4.2 Switch handles. Switch handles shall be of the materials and dimensions specified (see [3.1](#)). Screws used to secure the handle to the shaft extension shall be corrosion resistant steel (CRES) commercial grade.

3.4.3 Switch shaft extensions and couplings. Switch shaft extensions and couplings shall be of the materials and dimensions specified (see [3.1](#)). Pins used to secure the coupling to the switch shaft shall be nickel copper alloy in accordance with [QQ-N-281](#). Type 302 stainless steel may be used as an alternate to meet the performance requirements of this specification.

3.4.4 Commercial (hardware) parts. Commercial utility hardware items such as screws, bolts, and nuts may be used, provided they possess properties equivalent to and are replaceable by MS or AN part numbers. Unless otherwise indicated (see [3.1](#)), attaching hardware shall be as follows:

- a. Screws, nuts and bolts shall be brass commercial grade except they shall be CRES commercial grade, in aluminum enclosures.
- b. Lockwashers shall be phosphor bronze, commercial grade, for brass hardware and CRES, commercial grade for CRES hardware.
- c. Washers for switch handles shall be laminated plastic, type FBS in accordance with [MIL-I-24768](#).

3.4.5 Fuses. Fuses shall conform to [MIL-PRF-15160](#). The type shall be as specified (see [3.1](#)). Unless otherwise specified (see [6.2](#)), fuses shall not be furnished.

3.4.6 Fuse clips. Fuse clip retainers shall not be used with fuse clips for fuses rated 0-60 amperes. The type shall be as specified (see [3.1](#)).

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3.4.7 Fuseholders. Fuseholders shall conform to [MIL-PRF-19207](#). The type shall be as specified (see [3.1](#)).

3.4.8 Fuse base. The fuse base shall be of glass melamine conforming to type GME of [MIL-I-24768/1](#) or shall be a material selected from laminates specified in [MIL-E-917](#) provided they meet the electrical and mechanical requirements (see [3.1](#)). The laminates shall be furnished in natural color.

3.4.9 Terminal assemblies. Where specified (see [3.1](#)), terminal assemblies and buses shall be in accordance with Drawing 9000-S6202-73055.

3.4.10 Glands and bushings. Glands and bushings shall be of the same material as the basic enclosure.

3.4.11 Lamps. Lamps shall be of the incandescent type conforming to industry number 1769. Unless otherwise specified (see [6.2](#)), lamps shall not be furnished.

3.4.12 Light indicators and target cap assemblies. Light indicators and cap assemblies shall conform to [MIL-L-3661](#). The style shall be as specified (see [3.1](#)).

3.4.13 Cable clamps. When specified (see [3.1](#)) commercial nylon cable clamps shall be furnished.

3.4.14 Wire terminals. When specified (see [3.1](#)), wire terminals shall conform to [MIL-T-16366](#).

3.4.15 Wire. When specified (see [3.1](#)), wire shall conform to [MIL-DTL-16878](#).

3.4.16 Preformed packing (O-rings). O-rings shall be in accordance with [SAE-AS28775](#), of the sizes as specified (see [3.1](#)), and shall be lubricated with silicon compound conforming to [SAE-AS8660](#) at time of assembly.

3.4.17 Mounting parts. Unless otherwise specified (see [3.1](#)), mounting parts such as angles, pads, brackets, straps and studs shall be of the same material as the basic enclosure.

3.5 Design and construction. Enclosed rotary switches shall be of the design, construction, and physical dimensions specified (see [3.1](#)).

3.5.1 Enclosures. Enclosures shall be in accordance with [MIL-E-24142](#) or shall be modified versions of [MIL-E-24142](#) enclosures (see [3.1](#)). After drilling holes in the enclosure, the openings shall be returned to the level of effectiveness of enclosure with replaceable seals. When not specified (see [3.1](#)), seals may be manufacturer's choice, provided the completed enclosure meets the applicable effectiveness of enclosure requirement.

3.5.1.1 Cable entrance. When specified (see [3.1](#)), cable entrance into unit enclosures shall be by means of stuffing tubes conforming to [MIL-S-19622](#). Unless otherwise specified (see [3.1](#) and [6.2](#)), stuffing tubes, packing, and holes for stuffing tubes shall not be provided.

3.5.2 Switch orientation and mounting. Switch orientation within the enclosure shall be as specified (see [3.1](#)). Switch mounting shall be such as to prevent switch movement on or lateral to the mounting centerline. For base mounted switches, balance pads secured to the enclosure may be used as required. Switches may be mounted on pads brazed directly to the enclosure or on angles, straps, plates or a combination thereof. The actual method of mounting the switch within the enclosure shall be manufacturer's choice except switches shall not be modified to suit mounting.

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3.5.3 Wiring diagram. Where required (see [3.1](#)), the wiring diagram shall be in accordance with [MIL-E-2036](#), except the plastic protective material shall conform to [L-P-504](#) or [L-P-535](#), as applicable. Sufficient blank space shall be available for depicting the external switch connections after installation.

3.5.4 Local wiring. Where required (see [3.1](#)), local wiring shall be installed by the contractor.

3.5.5 Threaded parts and fastening devices. Unless otherwise specified (see [3.1](#)), threads for all threaded parts and fastening devices shall be in accordance with [MIL-E-917](#), except they shall conform to [FED-STD-H28](#) and shall be right hand, coarse-threaded series, unified form, class 2A or 2B conforming to [FED-STD-H28/2](#).

3.5.6 Welding and brazing. Welding and brazing of non-electrical parts shall be in accordance with commercial practices and shall otherwise meet all of the requirements specified herein.

3.5.6.1 Brazing. Parts or components shall be fastened by intermittent localized brazing in such a manner as to ensure that each enclosure assembly will not be completely soft-annealed and will not distort or leak when subjected to the shock tests (see [4.6.6](#)).

3.5.7 Solder and soldering flux. Solder, when used for electrical connections, shall be composition Sn60 in accordance with [J-STD-006](#), and soldering flux shall be in accordance with [J-STD-004](#).

3.5.8 Stress relief. All metals used in the switch enclosure assembly shall be treated or heat treated to prevent deterioration or failure due to stresses or other conditions resulting from working, forming, and similar processes during fabrication.

3.5.9 Drilling, countersinking, and tapping. Drilling, countersinking, and tapping shall be done before plating or finish is applied.

3.5.10 Electrical creepage and clearance distances. Electrical creepage and clearance distances shall be in accordance with [MIL-E-917](#).

3.6 Performance requirements.

3.6.1 Dielectric withstanding voltage. For enclosed switches having electrical circuits other than switches (see [3.1](#)), there shall be no evidence of disruptive discharge, arcing (other than at 6 test probes), flashover, corona (visible, audible, or smell), or breakdown when tested as specified in [4.6.2](#).

3.6.2 Insulation resistance. For enclosed switches having electrical circuits other than switches (see [3.1](#)), the insulation resistance of the electrical circuits shall be not less than 10 megohms when tested as specified in [4.6.3](#).

3.6.3 Mechanical operation. The enclosed rotary switches shall be mechanically operative and shall exhibit no sign of binding

3.6.4 Vibration. When enclosed rotary switches are tested as specified in [4.6.5](#). There shall be no loss of illumination of the lamp circuit. The monitoring of switch contacts shall be part of the qualification test requirements of [MIL-DTL-15291](#) and [MIL-DTL-21604](#).

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3.6.5 Shock. When enclosed rotary switches are tested as specified in [4.6.6](#), acceptance is based on no loss of illumination of the lamp circuit. Following the test, the enclosed rotary switches shall pass the dielectric withstanding voltage tests (if applicable) and the level of effectiveness of enclosure (see [4.6.2](#) and [4.6.7](#)). The monitoring of switch contacts shall be part of the qualification test requirements of [MIL-DTL-15291](#) and [MIL-DTL-21604](#).

3.6.6 Level of effectiveness of enclosure. The enclosed rotary switches shall meet the specific degree of enclosure requirements specified (see [3.1](#)) in accordance with [MIL-STD-108](#) when tested as specified in [4.6.7](#). Following the test, the enclosed rotary switches shall satisfactorily pass the dielectric withstanding voltage test (if applicable) (see [4.6.2](#)).

3.6.7 Salt spray. When enclosed switches are tested as specified in [4.6.8](#), there shall be no evidence of excessive corrosion. Excessive corrosion is defined as that which interferes with electrical or mechanical performance, or in the case of plated metals, corrosion which has migrated through the plating and attacked the base metal. Where corrosion-resisting treatments are used, it will be permissible to have limited superficial corrosion such as would result from scratches.

3.7 Finish.

3.7.1 Surface finish. Surface finishes specified (see [3.1](#)), shall be in accordance with [ASME-B46.1](#).

3.7.2 Zinc coating. Zinc coating, where required (see [3.1](#)), shall be in accordance with [ASTM-B633](#).

3.7.3 Painting. Unless otherwise specified (see [3.1](#)), brass enclosures shall be neither primed nor painted (see [6.2](#)).

3.7.4 Pure tin. The use of pure tin, as an underplate or final finish, is prohibited both internally and externally. Tin content of (product) and solder shall not exceed 97 percent, by mass. Tin shall be alloyed with a minimum of 3 percent lead, by mass (see [6.10](#)).

3.8 Marking.

3.8.1 Information and identification plates. Information and identification plates shall be attached to the box cover by means of screws in tapped holes or screws held by pads brazed to the back of the cover. Unless otherwise specified (see [3.1](#)), plates for steel and brass boxes shall be brass and plates for aluminum shall be CRES types A, B, and C in accordance with [MIL-DTL-15024](#) and severe service [MIL-P-15024/5](#).

3.8.1.1 Identification plates. Identification plates material shall be in accordance with [ASTM B36/B 36](#) and [ASTM B121/B121](#) as specified (see [3.1](#)). Marking information shall be as specified (see [3.1](#)). Plate size shall be as specified (see [3.1](#)). Where not specified rectangular plates shall be of the standard dimensions specified in [MIL-DTL-15024](#).

3.8.1.2 Information plates. Marking shall be as specified (see [3.1](#) and [6.2](#)). Where marking information is not specified, information plates shall be furnished blank. Plate size shall be as specified (see [3.1](#)).

3.8.1.3 Caution plate. Caution plates shall be as specified (see [3.1](#)).

3.9 Workmanship. Switches shall be processed in such a manner as to be uniform in quality and shall be free from cracked or displaced parts, sharp edges, burrs, and other defects, which will affect life, serviceability, or appearance.

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4. VERIFICATION

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

- a. First article inspection (see [4.3](#)).
- b. Conformance inspection (see [4.4](#)).

4.2 Inspection conditions. Unless otherwise specified herein, all inspections shall be performed in accordance with the test conditions specified in the "GENERAL REQUIREMENTS" of [MIL-STD-202](#).

4.3 First article inspection. First article inspection shall be performed on sample units which have been produced with equipment and procedures normally used in production (see [6.4](#)).

4.3.1 Sample size. One enclosed switch of each symbol number shall be subjected to first article inspection.

4.3.2 Inspection routine. The sample shall be subjected to the inspections specified in [table I](#).

TABLE I. First article inspection.

Inspection	Requirement paragraph	Test method paragraph
Visual and dimensional examination	3.1 , 3.3 , 3.4 , 3.5 , 3.7 , 3.8 , 3.9	4.6.1
Dielectric withstanding voltage	3.6.1	4.6.2
Insulation resistance (where applicable)	3.6.2	4.6.3
Mechanical operation	3.6.3	4.6.4
Vibration	3.6.4	4.6.5
Shock	3.6.5	4.6.6
Level of effectiveness of enclosure	3.6.6	4.6.7
Salt spray <u>1/</u>	3.6.7	4.6.8

1/ Salt spray testing shall be waived where the manufacturer certifies to the procuring activity that all of the assemblies covered by this specification are made of brass and other inherently corrosion resistant materials.

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4.3.3 Failures. One or more failures shall be cause for refusal to grant first article acceptance.

4.3.4 First article extension. First article acceptance for a given size enclosure with a single switch may be used as evidence of acceptance of smaller sizes (see [6.4.1](#)). The extension, however, in no way changes the conformance inspection in accordance with [4.4](#).

4.4 Conformance inspection.

4.4.1 Inspection of product for delivery. Inspection of product for delivery shall consist of groups A and B inspection.

4.4.1.1 Lot. For the purpose of conformance inspection and test sampling, a lot is defined as all the enclosed switches of the same military part number (symbol number), produced in one facility, using the same production processes and materials, and being offered for delivery at one time.

4.4.1.2 Sampling for group A inspection. As a minimum, the contractor shall randomly select a sample quantity from each lot of completed enclosed switches in accordance with [table III](#) and inspect them in accordance with [table II](#) for the defects listed in [table IV](#). If one or more defects are found in any sample, the entire lot represented by the sample shall be rejected. If a lot is rejected, the contractor has the option of screening 100 percent of lot for the defective characteristic(s) or providing a new lot which shall be inspected in accordance with the sampling plan contained herein. The contractor shall maintain for a period of 3 years after contract completion all records of inspections, tests, and any resulting rejections.

TABLE II. Group A inspection.

Inspection	Requirement paragraph	Test method paragraph
Visual and dimensional examination	3.1 , 3.3 , 3.4 , 3.5 , 3.7 , 3.8 and 3.9	4.6.1
Mechanical operation	3.6.3	4.6.4

TABLE III. Sampling for group A inspection.

Lot size	Sample size	
	Major defects	Minor defects
2 to 8	All	3
9 to 25	8	3
26 to 50	8	5
51 to 90	8	6
91 to 150	12	7
151 to 280	19	10
281 to 500	21	11
501 to 1,200	27	15
1,201 to 3,200	35	18
3,201 to 10,000	38	22

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4.4 1.3 Sampling for group B inspection. As a minimum, the contractor shall randomly select a sample quantity from each lot of completed enclosed switches in accordance with [table VI](#) and inspect them in accordance with [table V](#) in the order shown. The sample quantity shall be selected from inspection lots that have passed group A inspection. If one or more defects are found in any sample, the entire lot represented by the sample shall be rejected. If a lot is rejected, the contractor has the option of screening 100 percent of the lot for the defective characteristic(s) or providing a new lot which shall be inspected in accordance with the sampling plan contained herein. The contractor shall maintain for a period of 3 years after contract completion all records of inspections, tests, and any resulting rejections.

4.5 Packaging inspection. Sample packages and packs and the inspection of the packaging, packing and marking for shipment and storage shall be in accordance with the requirements of section 5 and the documents specified therein.

TABLE IV. Classification of defects.

Categories	Defects
Critical:	None defined.
Major	
101	Symbol not as specified.
102	Parts missing, damaged, nonconforming, improperly fitted, or assembled.
103	Enclosure not as specified.
104	Light indicators/fuses not as specified; not mounted and oriented as specified; not marked as specified.
105	Switch not type specified; not mounted and oriented as specified; not marked as specified.
106	Dimensions not as specified.
107	Evidence of drilling, countersinking, and tapping after plating or application of finish.
108	Materials less than minimum requirements; evidence of unauthorized materials used; evidence of cracks, splits, seams, or pitting.
109	Threads nonconforming, form not as specified, not to size, missing, chipped, crossed, stripped, or damaged.
110	Terminal screws and lockwashers missing, damaged or nonconforming.
111	Sharp corners of components not rounded as required.
112	Plating, when specified nonconforming, missing, or incomplete; not smooth or uniform, evidence of peeling, nonadherent or uncoated areas; evidence of oxide scale or rust.
113	Wire, wiring methods not as specified.
114	Mounting characteristics not as specified.
115	O-rings missing; damaged; not lubricated as required.
116	Identification/information plates missing, damaged or nonconforming; not secured and positioned as required.
Minor	
201	Preservation, packaging, and packing not as specified.
202	Marking and manufacturer's identification, missing, incorrect, illegible, not permanent, or not located as specified.

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TABLE V. Group B inspection.

Inspection	Requirement paragraph	Test method paragraph
Level of effectiveness of enclosure	3.6.6	4.6.7
Insulation resistance (where applicable)	3.6.2	4.6.3
Dielectric withstanding voltage (where applicable)	3.6.1	4.6.2

TABLE VI. Sampling for group B inspection.

Lot size	Sample size
2 to 25	3
26 to 50	5
51 to 90	6
91 to 150	7
151 to 280	10
281 to 500	11
501 to 1,200	15
1,201 to 3,200	18
3,201 to 10,000	22

4.6 Methods of inspection.

4.6.1 Visual and dimensional examination. Enclosed switches shall be visually examined to verify that the materials, design, construction, physical dimensions, marking, and workmanship are in accordance with the applicable requirements (see [3.1](#), [3.3](#), [3.4](#), [3.5](#), [3.7](#), [3.8](#) and [3.9](#)).

4.6.2 Dielectric withstanding voltage. Enclosed switches shall be subjected to a dielectric withstanding voltage test in accordance with [method 301](#) of [MIL-STD-202](#). The following details shall apply:

- a. Test voltage: Twice rated voltage plus 1000 V.
- b. Nature of potential: AC (rms).
- c. Points of application: Between current carrying parts and enclosure (ground). Switches shall be in the energized (closed) position.
- d. Acceptance criteria: Conformance to the requirements of [3.6.1](#).

4.6.3 Insulation resistance. Insulation resistance shall be measured in accordance with [method 302](#), test condition B of [MIL-STD-202](#). The test voltage shall be applied between current carrying parts of opposite polarity and live parts and the enclosure (ground). Switches shall be in the energized (closed) position. The enclosed switch shall conform to the requirements of [3.6.2](#).

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4.6.4 Mechanical operation. Mechanical operation shall consist of the following cycle, repeated three times:

- a. The cover shall be completely removed and reassembled on the enclosure.
- b. The switch operating shaft shall be rotated through all positions three times. The enclosed switch shall conform to the requirements of [3.6.3](#).

4.6.5 Vibration. Enclosed switches shall be subjected to type I vibration tests of [MIL-STD-167-1](#). The following details and exceptions shall apply:

- a. Frequency :-The variable frequency tests shall be omitted.
- b. Electrical test conditions :- A light circuit shall be established and monitored to verify that no loss of continuity or discontinuity occurred.
- c. Examination after test :- Enclosed switches shall be checked for proper operation and examined for change in switch shaft position, and evidence of broken, loose, deformed, or displaced parts. Defective lamps or fuses shall not be cause for rejection.

4.6.6 Shock. Enclosed switches shall be subjected to the high-impact shock test for grade A, type A, class I equipment in accordance with [MIL-S-901](#). The conditions of [4.6.5\(b\)](#) and [\(c\)](#) shall apply. After completion of the test, where applicable (see [3.1](#)), electrical indicator circuits shall be fitted with lamps and fuses, as required, and energized at rated voltage. Failure of the lamps to illuminate shall be cause for rejection. Failure to satisfactorily pass the level of effectiveness or dielectric withstanding voltage tests (where applicable) shall be cause for rejection.

4.6.7 Level of effectiveness of enclosure. Enclosed switches shall be tested in accordance with [MIL-STD-108](#) except they shall not be energized. The degree of enclosure shall be as specified (see [3.1](#)). Acceptance/rejection criteria shall be as specified in [MIL-STD-108](#).

4.6.8 Salt spray. Enclosed switches shall be tested in accordance with [method 101](#), test condition A of [MIL-STD-202](#). Evidence of excessive corrosion as specified in [3.6.7](#) shall be cause for rejection.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see [6.2](#)). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

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6. NOTES

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

6.1 Intended use. Enclosed rotary switches covered by this specification are intended for use in electrical and electronic power and control circuits in exposed locations on Naval ships.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of the specification.
- b. ASSIST Online database at <http://assist.daps.dla.mil/> should be cited in the solicitation, and if required, the specific issue of individual documents referenced (see [2.1](#)).
- c. When first article testing is required (see [3.2](#)).
- d. If fuses are required (see [3.4.5](#)).
- e. If lamps are required (see [3.4.11](#)).
- f. If holes for stuffing tubes or cable entrance is required (see location [3.5.1.1](#)).
- g. If stuffing tubes, packing, and holes for stuffing tubes are required (see [3.5.1.1](#)).
- h. If painting is to be other than specified (see [3.7.3](#)).
- i. Data for information plates, if required (see [3.8.1.2](#)).
- j. Level of preservation, packaging and packing required (see [5.1](#)).
- k. If special marking is required (see [5.1](#)).

6.3 Consideration of data requirements. The following data requirements should be considered when this specification is applied on a contract. The applicable Data Item Descriptions (DIDs) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/provided and that the DID's are tailored to reflect the requirements of the specific acquisition. To ensure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DoD FAR Supplement 27.475-1 exempts the requirement for a DD Form 1423.

Reference paragraph	DID number	DID title	Suggested tailoring
4.3	DI-NDTI-80809	test, reports	----

The above DID's were those cleared as of the date of this specification. The current issue of DoD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DID's are cited on the DD Form 1423.

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6.4 First article. When first article inspection is required, the contracting officer should provide specific guidance to offerors, whether the item(s) should be a preproduction sample, a first article sample, a first production item, a sample selected from the first production items, a standard production item from the contractor's current inventory (see [3.2](#)), and the number of items to be tested as specified in [4.3](#). The contracting officer should also include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.4.1 First article extension. PIN listed in reverse order of acceptability. PINs not listed below are not included in extension coverage.

M15743/x	Current (amps)
1-001	10
2-001	10
3-001/2/4	10
16-001	10
17-001	10
18-001	10
19-001	10
20-001	10
3-003	10
4-002	10
6-001	10
4-001	10
5-001	10
5-002/3	10
8-001	30
8-003	
8-002	
9-001	
9-003	
9-002-11-001	

6.5 Sub-contracted material and parts. The preparation for delivery requirements of referenced documents listed in section 2 do not apply when material and parts are acquired by the contractor for incorporation into the equipment and lose their separate identity when the equipment is shipped.

6.6 Symbol number. The symbol number is a standard electrical equipment designation. Symbol numbers are listed in [MIL-HDBK-290](#).

6.7 Superseded drawings. The superseded drawings are listed on the applicable specification sheet (see [3.1](#)).

6.8 Subject term (key word) listing.

Enclosed
Submersible
Watertight
Snap action
Spring-return

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6.9. Environmentally preferable material. Environmentally preferable materials should be used to the maximum extent possible to meet the requirements of this specification. As of the dating of this document, the U.S. Environmentally Protection Agency (EPA) is focusing efforts on reducing 31 priority chemicals. The list of chemicals is available on their website at <http://www.epa.gov/epaoswer/hazwaste/minimize/chemlist.htm>. Further information is available at the following EPA site: <http://www.epa.gov/epaoswer/hazwaste/minimize/>. Included in the EPA list of 31 priority chemicals are cadmium, lead, and mercury. Use of the materials on the list should be minimized or eliminated unless needed to meet the requirements specified herein (see Section 3).

6.10 Tin whisker growth: The use of alloys with tin content greater than 97 percent, by mass, may exhibit tin whisker growth problems after manufactures. Tin whiskers may occur anytime from a day to years after manufacture and can develop under typical operating conditions, on products that use such materials. Conformal coatings applied over top of a whisker-prone surface will not prevent the formation of tin whiskers. Alloys of 3 percent lead, by mass, have shown to inhibit the growth of tin whiskers. For additional information on this matter, refer to [ASTM-B545](#) (Standard Specification for Electrodeposited Coatings of Tin).

6.11 Changes from previous issue. The margins of this specification are marked with vertical lines to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodians:
Navy - SH
DLA - CC

Preparing activity:
DLA - CC

(Project 5930-2007-024)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <http://assist.daps.dla.mil/>.