

MILITARY SPECIFICATION

RECEPTACLES, RECEPTACLE PLUGS, SWITCH AND RECEPTACLES,
AND OUTLETS (ELECTRICAL), GENERAL SPECIFICATION FOR

This specification is approved for use within the Naval Sea Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the general requirements for power type electrical plugs, receptacles, switch and receptacle combinations, and outlets for use in direct current (dc) circuits up to 250 volts, or in alternating current (ac) circuits up to 600 volts at frequencies up to and including 400 hertz (Hz).

2. APPLICABLE DOCUMENTS

2.1 Government documents.

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

SPECIFICATIONS

FEDERAL

- L-P-393 - Plastic Molding Material, Polycarbonate, Injection and Extrusion.
- W-C-596 - Connector, Electrical, Power, General Specification for.
- QQ-N-290 - Nickel Plating (Electrodeposited).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 55Z3, Department of the Navy, Washington, DC 20362-5101, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

MIL-R-2726B(SH)

FEDERAL (Continued)

- QQ-S-365 - Silver Plating, Electrodeposited, General Requirements for.
- TT-P-645 - Primer, Paint, Zinc Chromate, Alkyd Type.
- LLL-R-626 - Rosins: Gum, Wood, and Tall Oil.

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- MIL-M-14 - Molding Plastics and Molded Plastic Parts, Thermo-setting.
- MIL-P-79 - Plastic Rods and Tubes, Thermosetting, Laminated.
- MIL-V-173 - Varnish, Moisture-and-Fungus Resistant (For Treatment of Communications, Electronic, and Associated Equipment).
- MIL-R-900 - Rubber Gasket Material, 45 Durometer Hardness.
- 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-B-5423 - Boots, Dust and Water Seal (For Toggle and Push-Button Switches, Circuit Breakers, and Rotary-Actuated Parts), General Specification for.
- MIL-B-5423/2 - Boot, Dust and Water Seal, Type A (For Toggle Switches), Style 3 (One-Hole Mounting, Through).
- MIL-P-15024 - Plates, Tags and Bands for Identification of Equipment.
- MIL-P-15024/5 - Plate, Identification.
- MIL-P-15037 - Plastic Sheet, Laminated, Thermosetting, Glass-Cloth, Melamine-Resin.
- MIL-F-16377 - Fixtures, Lighting; and Associated Parts; Shipboard Use, General Specification for.
- MIL-I-17214 - Indicator, Permeability; Low-Mu (Go-No Go).
- MIL-E-17555 - Electronic and Electrical Equipment, Accessories, and Provisioned Items (Repair Parts): Packaging of.
- MIL-S-19622 - Stuffing Tubes, Nylon: General Specification.
- MIL-C-21567 - Compound, Silicone, Soft Film.
- MIL-E-24142 - Enclosures for Electrical Fittings and Fixtures, General Specification for.
- MIL-C-24643 - Cable and Cord, Electrical, Low Smoke, for Shipboard Use, General Specification for.
- MIL-C-24643/3 - Cable, Electrical, 600 Volts, Types LSSHOF, LSDHOF, LSTHOF, and LSFHOF.

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

STANDARDS

FEDERAL

- 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.

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- 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-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.
- MIL-STD-454 - Standard General Requirements for Electronic Equipment.
- MIL-STD-1344 - Test Methods for Electrical Connectors.
- MS17339 - Cable, Safety (Wire Rope).
- MS28775 - Packing, Preformed, Hydraulic, +275°F ("O" Ring).

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

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted shall be those listed in the issue of the DoDISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS shall be the issue of the nongovernment documents which is current on the date of the solicitation.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- B 3 - Standard Specification for Soft or Annealed Copper Wire. (DoD adopted)
- B 26 - Standard Specification for Aluminum-Alloy Sand Castings. (DoD adopted)
- B 49 - Standard Specification for Hot-Rolled Copper Redraw Rod for Electrical Purposes. (DoD adopted)
- B 133 - Standard Specification for Copper Rod, Bar, and Shapes. (DoD adopted)
- B 187 - Standard Specification for Copper Bus Bar, Rod, and Shapes.
- B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate. (DoD adopted)
- B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube (Metric). (DoD adopted)
- B 633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel. (DoD adopted)
- D 2000 - Standard Classification System for Rubber Products in Automotive Applications. (DoD adopted)
- D 4066 - Standard Specification for Nylon Injection and Extrusion Materials (PA). (DoD adopted)
- E 18 - Standard Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials. (DoD adopted)

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
ANSI/AWS D1.1 - Structural Welding Code Steel.

(Application for copies should be addressed to the American National Standards Institute, 1430 Broadway, New York, NY 10018.)

UNDERWRITERS LABORATORIES, INC. (UL)
UL 498 - Attachment Plugs and Receptacles.

(Application for copies should be addressed to Underwriters Laboratories, Inc., 333 Pfingsten Road, Northbrook, IL 60062.)

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

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 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 in the contract or purchase order, a sample shall be subjected to first article inspection (see 4.4 and 6.3).

3.3 Materials. Materials shall be as specified (see 3.1). When not specified, the contractor may select any material that will satisfactorily perform the intended function in the equipment and will otherwise comply with the requirements of this specification.

3.3.1 Prohibited materials. Materials of the following types shall not be used:

- (a) Toxic pyrolytic materials which emit toxic gases or other harmful products when exposed to high temperatures.
- (b) Flammable materials in a form which will explode or ignite from any electric spark, flame or from heating, and which, if so ignited will independently support combustion in air.
- (c) Fragile or brittle materials.
- (d) Magnesium or magnesium base alloys.

- (e) Radioactive materials.
- (f) Mercury; however, it may be used in manufacturing, or test processes for materials and parts provided that, in such use, no contamination of the delivered materials or parts can result.
- (g) Asbestos.
- (h) Cadmium.

3.3.2 Fungus-inert materials. Fungus-inert materials shall be in accordance with requirement 4 of MIL-STD-454.

3.3.3 Arc-resistant materials. Arc-resistant materials shall be in accordance with requirement 26 of MIL-STD-454.

3.3.4 Metals. Metals shall be selected or processed and applied in a manner that provides corrosion resistance. Metals that are not inherently corrosion resistant (see 3.3.4.2) shall be processed (treated, plated or painted) to provide corrosion resistance.

3.3.4.1 Selection of metals in direct contact. To minimize corrosion attack due to electrolytic action between dissimilar metals in contact with each other, metal-to-metal contacts shall be limited to those metals which, when coupled, are in accordance with MIL-E-917.

3.3.4.2 Corrosion-resisting metals. The following commonly used metals when properly applied are considered to be inherently corrosion resistant without further processing:

- (a) Brass
- (b) Bronze
- (c) Copper
- (d) Copper-nickel alloy
- (e) Copper-beryllium alloy
- (f) Copper-nickel-zinc alloy
- (g) Nickel-copper alloy
- (h) Nickel-copper silicon alloy
- (i) Nickel-copper-aluminum alloy
- (j) Austenitic steels, AISI types 202, 302, 303, 304, 304L, 309, 310, 316, 316L, 321, 324A, 347.

3.3.4.3 Aluminum. Aluminum alloys, including castings, shall be in accordance with ASTM B 26, ASTM B 209 and ASTM B 221, as applicable.

3.3.4.4 Copper and copper alloys. Unless otherwise specified (see 3.1), all current-carrying parts and wire binding screws and lugs shall be copper or copper alloy in accordance with ASTM B 3, ASTM B 49, ASTM B 133, ASTM B 187 (as applicable).

3.3.4.5 Nonferrous material (except aluminum). Unless otherwise specified (see 3.1), nonferrous materials, except aluminum, shall be in accordance with commercial standards.

3.3.5 Laminated insulating material. Laminated plastic insulating material shall be a glass cloth bonding with melamine resin, in accordance with type GME of MIL-P-15037 or type GMG of MIL-P-79.

3.3.6 Thermosetting insulating material. Thermosetting, molded insulating parts shall be in accordance with type MAI-30 or type MMI-30 of MIL-M-14.

3.3.7 Thermoplastics. Thermoplastic materials for molding noninsulating parts (such as shells, caps handles, and similar items) shall be polyamide (nylon) in accordance with ASTM D 4066 or polycarbonate in accordance with L-P-393.

3.3.8 Nonmagnetic materials. When specified (see 3.1), enclosures and installed parts shall be of a nonferrous material or a material generally considered nonmagnetic.

3.3.9 Rubber compounds. Rubber compounds and compositions shall be in accordance with ASTM D 2000 or MIL-R-900. The compound grade shall be as specified in the applicable specification sheet.

3.3.10 Recovered materials. Unless otherwise specified herein, all material and articles incorporated in the products covered by this specification shall be new and may be fabricated using materials produced from recovered materials to the maximum extent practicable without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specifically specified.

3.4 Design and construction. Plugs, receptacles, switch and receptacle combinations, and outlets shall conform to the design, construction, and physical dimensions specified herein and in the applicable specification sheets. The dimensions shown are after all plating and finish is applied.

3.4.1 Castings. Castings shall be free from cold shuts, blow holes or any imperfections that may affect strength. Surfaces of castings shall have burrs and fins removed.

3.4.2 Molded parts. Molded parts shall be free of sinks or bubbles, streaking, charred areas, flow lines and incomplete fill. Flash shall be removed from molded parts and the width of the flash edges made thereby shall be not greater than 1/32 inch. Flash edges shall be buffed smooth. For parts of thermosetting material, buffed or cut areas shall be given two coats of varnish in accordance with MIL-V-173. For parts of thermoplastic material, no treatment is necessary unless a filled thermoplastic material is used; then the treatment is the same as for thermosetting material.

3.4.2.1 Polyamide (nylon) parts. Molded polyamide (nylon) parts shall be in accordance with ASTM D 4066, group 1, class 8, grade 1.

3.4.2.2 Polycarbonate parts. Moisture content of the polycarbonate material prior to molding shall be controlled as specified by the manufacturer of the material. Processing and molding techniques of the material manufacturer shall be followed.

3.4.2.3 Stress relief. Measures shall be taken in molding or processing plastic to ensure that stress build-up does not occur or is satisfactorily treated to relieve these stresses to prevent deterioration or failure of a part or assembly. The stress-relieving process shall be as recommended by the contractor of the raw material.

3.4.2.4 Molded assemblies. Molded assemblies shall have the manufacturer's name or identification and part number molded in a visible location. Phase, polarity or pin number markings shall be molded on both sides as indicated in the applicable specification sheet. Molded assemblies and parts may be marked with the applicable superseded drawing where the molds have been built with identification markings of the superseded drawing, except that the marking of this specification shall be used when the molds require reworking or replacing. In addition, when complete assemblies have a molded superseded assembly identification, the assembly identification as specified in the applicable specification sheet shall be indelibly marked on the assembly.

3.4.3 Contacts. Unless otherwise specified (see 3.1), material for contacts (male and female) shall be copper or copper alloy, having the Rockwell hardness specified in the applicable specification sheet. Contacts shall incorporate an anti-rotational device to prevent turning of the contact in its respective plug or receptacle assembly. Contact terminals shall be of the solder or pressure grip type. Binding head screws may be used on bladed contacts. Female contacts shall be designed to ensure a good electrical connection throughout their length by crimping the contact end or by the use of a spring clip. Contacts shall be designed for ease of insertion, with a minimum of wear to the contact surfaces. This may be accomplished on male contacts (other than bladed contacts) by incorporating a spherical tip or adequate radius, and on female contacts by chamfering or other means.

3.4.3.1 Silver plating. When required by the applicable specification sheet, silver plating shall be not less than 0.0002-inch thick and shall be in accordance with type III, bright, grade A of QQ-S-365.

3.4.3.2 Nickel plating. When required by the applicable specification sheet, contacts shall be nickel-plated in accordance with class 1, grade G of QQ-N-290.

3.4.3.3 Ground contact finish. Ground contacts shall have a green finish at the wire connection point, or at the option of the contractor, the entire contact may be finished green. The finish at the wire connection point may be on binding screws only if they cannot be completely removed, otherwise the finish shall be on the contact or on the insulation adjacent to the contact.

3.4.4 Insulating barriers. Insulating barriers shall be used whenever practical at contact terminals of plugs and receptacles.

3.4.5 Gaskets. Rubber gaskets shall be provided, as required, to maintain the degree of enclosure specified in the specification sheets.

3.4.6 Preformed packing (O-rings). O-rings shall be in accordance with MS28775 and shall be lubricated with silicon compound in accordance with MIL-C-21567 at the time of assembly.

3.4.7 Stuffing tubes. Unless otherwise specified (see 3.1), stuffing tubes shall be in accordance with MIL-S-19622. Unless otherwise specified in the specification sheet, the tubes shall not be furnished with either plugs or receptacles.

3.4.8 Cables. Unless otherwise specified (see 3.1), cables shall not be furnished with plugs or receptacles.

3.4.9 Hardware. Unless otherwise specified in the applicable specification sheet, all hardware (bolts, nuts, screws, washers, and miscellaneous hardware) shall be of a good commercial grade material compatible with that of the basic fixture. Steel (corrosion-resisting steel (CRS) excepted) hardware shall be zinc plated in accordance with ASTM B 633.

3.4.10 Screw threads for fastening devices. Screw threads for threaded fastening devices shall be in accordance with FED-STD-H28. Unless otherwise specified (see 3.1), the threads shall be right hand, coarse-thread series, unified form, class 2A or 2B, or the American National form, class 2, of FED-STD-H28/2.

3.4.10.1 Engagement of threaded parts. Threaded parts shall engage by at least four full threads in soft metals like aluminum and aluminum alloys. A minimum of three full threads shall be used in harder materials such as brass or steel. Unless otherwise specified (see 3.1), when a screw mates with a plastic part, a threaded metal insert, bushing type or helical type, shall be molded therein. The bushing type is the preferred type.

3.4.10.2 Thread locking. Nuts, bolts, studs and screws used for electrical connections shall be secured by lockwashers, except that lockwashers need not be provided with lug type terminals used on conductors smaller than 5000 circular mil, terminal boards or switches, if the switches are furnished without lockwashers. Bolts, nuts and screws used for mechanical connections shall be secured by locking devices, as required, to ensure compliance with the requirements specified (see 3.1).

3.4.11 Creepage and clearance distances. Creepage and clearance distances shall be in accordance with MIL-E-917.

3.4.12 Live parts. When a plug is fully engaged with its respective mating receptacle, there shall be no live parts exposed or accessible.

3.4.13 Soldering. Soldering shall be in accordance with MIL-STD-454.

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

3.4.15 Sharp edges. Sharp edges and corners that are accessible shall be given a slight radius.

3.4.16 Stress-corrosion cracking of metals. Stress-corrosion cracking occurs under tensile stresses which are induced into metal parts that are formed by bending or drawing or that are fabricated by welding. Susceptible metal parts under tensile stress shall be stress relieved to prevent deterioration or failure. Method of stress relieving shall be contractor's choice as recommended by the contractor of the raw material.

3.4.17 Plugs.

3.4.17.1 Single pole plugs. A single pole plug shall have its contact securely fastened to the plug body by a method that will permit disassembly of these parts. The use of two set screws will be permitted for making solderless connections to the contact terminal.

3.4.17.1.1 Plug body. The plug body shall be molded to provide a positive finger grip that will permit removal of the plug from its receptacle without applying strain to the cable. When a female contact is involved, the plug body shall totally enclose all exterior surfaces of the contact. The color of the plug body shall be black or red as specified in the applicable specification sheet.

3.4.17.2 Multipole plugs.

3.4.17.2.1 Strain relief. Plugs shall incorporate a means for providing strain relief for the cable.

3.4.17.2.2 Ground contacts. In addition to providing for the normal contact terminal connection, when the housing is metal, ground contacts shall be connected to the plug housing with an adequate size bus or conductor.

3.4.17.2.3 Plug housing. The plug housing shall contain a cavity of sufficient size to permit assembly of the plug without damage to the cable or its conductors. If the plug is such that conductor slack is necessary for wiring purposes, the size of the cavity shall be increased accordingly.

3.4.17.2.4 Watertight and submersible housings. Watertight and submersible plug housings may be fabricated and designed to accept a standard stuffing tube or may be a one-piece molded or cast design that will accept the stuffing tube cap and packing assembly in accordance with MIL-S-19622.

3.4.17.2.5 Plug retainer cap. The plug retainer cap shall be a captive part of the plug assembly and shall provide for rapid coupling and uncoupling of the plug, without the use of a spanner wrench or other tool.

3.4.17.2.6 Gasket. Watertight and submersible plugs shall be furnished with a captive gasket, except where the gasket is an integral part of the mating receptacle.

3.4.17.2.7 Instruction sheets. When specified in the applicable specification sheet, instruction sheets providing pertinent design and installation procedures shall be furnished with the plug.

3.4.18 Receptacles.

3.4.18.1 Single pole, panel-mounted receptacles. The receptacle body shall incorporate a means (such as ribs or a hexagonal shape) to facilitate panel installation. Key and keyways shall not be used. The hole in the face of the cap shall be no larger than necessary to admit the mating plug. The color of the receptacle body and cap shall be black or red as specified in the applicable specification sheet.

3.4.18.1.1 Contact. The contact stud shall accept standard terminal lugs in accordance with UL 498.

3.4.18.1.2 Terminal hardware. The hardware for securing terminal lugs to the receptacle terminal shall be furnished with the receptacle.

3.4.18.2 Multipole receptacles.

3.4.18.2.1 Bladed receptacles. Unless otherwise specified (see 3.1), bladed receptacles shall be in accordance with W-C-596, and of the type specified in the applicable specification sheet.

3.4.18.2.2 Receptacle insulation. Receptacle insulation may be a fabricated or molded multipiece design, or the contacts and insulation may be molded as an integral unit. Molded, one-piece designs shall be free of insulation compound on all interior contact surfaces, and there shall be no entrance of compound into the contact slots.

3.4.18.2.3 Keyway. When a keyway is specified but not dimensioned, it shall be dimensioned to receive the mating plug and maintain polarity.

3.4.18.2.4 Gaskets. Gaskets furnished with receptacles shall be integral to the receptacle.

3.4.19 Enclosed receptacles, switch and receptacles, and outlets.

3.4.19.1 Enclosure. Watertight and submersible enclosures shall be in accordance with MIL-E-24142 except the cover shall be modified as required. After modification the enclosure shall be returned to the level of effectiveness specified (see 3.1) with replaceable seals. Nonwatertight enclosures shall be of a commercial design, consistent with the requirements of this specification and the applicable specification sheet.

3.4.19.2 Receptacles. Receptacles covered by separate specification sheets of this specification shall undergo first article test (if not already tested) prior to installing them in an enclosure.

3.4.19.3 Interior wiring. Interior wiring shall be furnished and installed by the contractor. The conductors shall be of ample length to permit removal of the cover to connect the power source. Connections at screw terminals shall be made with terminal lug connectors in accordance with UL 498. Interior wiring shall be sized to the receptacle rating and shall be connected as shown on the wiring diagram in the applicable specification sheet.

3.4.19.4 Enclosure cover ground connections. Where live parts are installed on the cover, a ground connection pad shall be furnished on both the box and cover, and the cover shall be connected to the box by an adequate size conductor. The cover ground connection shall be in addition to and separate from that provided by the receptacle mounting strap or housing. Reliance on the cover mounting screws or hinges, if any, to complete the ground connection between cover and box shall not be permitted. If the enclosure is of an insulating material and no metallic parts are exposed or accessible, the ground connection between cover and box will not be required.

3.4.19.5 Wiring diagram. A wiring diagram, on a type III label in accordance with MIL-F-16377, shall be furnished with enclosed receptacles, switch and receptacles, and outlets, and attached to the interior of the enclosure.

3.4.19.6 Toggle switches. Toggle switches shall be in accordance with MIL-S-3950, and of the type specified in the applicable specification sheet. A switch position indicator plate shall be installed on the switch.

3.4.19.7 Toggle switch boots. Toggle switches used in watertight or submersible applications shall be furnished with watertight boots in accordance with MIL-B-5423 and MIL-B-5423/2.

3.4.19.8 Rotary switches. Rotary switches shall be in accordance with MIL-S-15291, and of the type specified in the applicable specification sheet. A switch position indicator plate shall be installed on the switch, or switch positions may be engraved on the enclosure cover in lieu of a plate.

3.4.19.9 Interlocking switch and receptacle combinations. Interlocking switch and receptacle combinations shall incorporate a positive, nondefeatable interlock that will prohibit removal of the plug or cap when the switch is in the ON position.

3.4.19.10 Terminal board. When a terminal board is specified in the applicable specification sheet, it shall be furnished and installed by the contractor. The terminal board may be a commercial type.

3.4.19.11 Caps. Caps used for maintaining watertight or submersible integrity on enclosed receptacles, when the plug is removed, shall be metal or molded plastic, and shall be provided with a captive gasket, unless the gasket is a part of the receptacle. The cap shall have a finger grip, or other means to facilitate installation and removal without the use of tools. A wire cable assembly, in accordance with MS17339, shall be securely attached to the cap by a method that will allow swivel movement of the cap. The other end of the cable assembly shall be fastened to the enclosure cover. In some instances this cable assembly may be inadequate for securing purposes (particularly large metal caps), and in such cases a chain or larger cable may be used.

3.4.19.12 Welding. Welding and allied processes used in the modification of enclosures and installation of parts shall be in accordance with the best commercial practice. ANSI/AWS D1.1 shall be used as a guide.

3.4.19.13 Sealing counterbored holes. Counterbored holes in insulating bases installed in enclosures shall be fitted with grade D rosen in accordance with LLL-R-626, after screws are in place.

3.4.19.14 Painting. Unless otherwise specified (see 3.1 and 6.2.1), steel and aluminum enclosures shall be painted and brass enclosures shall be neither primed nor painted. Parts such as angles, brackets, straps, and pads installed in the steel and aluminum enclosures shall be pretreated in accordance with MIL-E-917 and shall be given one coat of primer in accordance with TT-P-645. The entire enclosure, less base, switches (where applicable), and attaching hardware, shall then have topcoat applied in accordance with MIL-E-917.

3.5 Performance.

3.5.1 Insulation resistance. The insulation resistance between electrical conductors and between electrical conductors and ground shall be not less than 100 megohms when tested as specified in 4.7.1.

3.5.2 Dielectric withstanding voltage. When plugs, receptacles, switch and receptacles, and outlets are tested as specified in 4.7.2, there shall be no arcing, breakdown, corona (audible or visible) or punctured insulation.

3.5.3 Contact resistance. Contact resistance requirements shall be the following:

3.5.3.1 Plug and receptacles. When plugs and receptacles are tested as specified in 4.7.3.1, the resistance of each pair of mated male and female contacts shall not exceed 0.05 ohm. The potential drop measured at a dc value equal to the maximum specified current rating (see 3.1) shall not exceed 0.5 volts.

3.5.3.2 Portable receptacles with cable assembly integral. When portable receptacles with cable assembly integral are tested as specified in 4.7.3.2, the total resistance of the ground circuit shall not exceed 0.1 ohm.

3.5.3.3 Ground contact resistance. When bladed receptacles and plugs are tested as specified in 4.7.3.3, the resistance of the ground contact shall not exceed 0.01 ohm.

3.5.4 Effectiveness of enclosure. When plugs, receptacles, and switch and receptacles are tested as specified in 4.7.4, they shall meet the design requirements in accordance with MIL-STD-108 for the specific degree of enclosure specified in the applicable specification sheet.

3.5.5 Endurance (durability). The plugs, receptacles, switch and receptacles, and outlets shall be serviceable and shall perform their function as evidenced by successfully passing the current load test as specified in 4.7.12 after completion of the endurance test (see 4.7.5).

3.5.6 Uncoupling force. When plugs and receptacles are tested as specified in 4.7.6, the force required to pull the plug out of the receptacle shall be within the limits specified in the applicable specification sheet.

3.5.7 Strain relief. When plugs and specified receptacles are tested as specified in 4.7.7, the strain exerted on the attached cable shall not reach the terminals to which the cable conductors are connected.

3.5.8 Mechanical abuse (impact). When plugs and receptacles are tested as specified in 4.7.8, there shall be no evidence of mechanical damage or electrical failure.

3.5.9 Vibration. When plugs, receptacles, switch and receptacles, and outlets are tested as specified in 4.7.9, there shall be no evidence of cracking, loosening of parts, or other damage. The test plug shall be retained in the receptacle throughout the test and, where switches are present, there shall be no momentary opening or transfer of switch contacts.

3.5.10 Shock. When plugs, receptacles, switch and receptacles, and outlets are tested as specified in 4.7.10, there shall be no evidence of cracking, breaking, excessive distortion, loosening of parts or other damage. Unless otherwise specified in the applicable specification sheet, the test plug shall be retained in the receptacle throughout the test and where switches are present, there shall be no momentary opening or transfer of switch contacts.

3.5.11 Salt spray (corrosion). When plugs, receptacles, switch and receptacles, and outlets are tested as specified in 4.7.11, there shall be no evidence of excessive corrosion. Excessive corrosion is defined as that which interferes with the electrical or mechanical performance, or in the case of plated metals, corrosion which has migrated through the plating and attacked the base metal.

3.5.12 Current load. When plugs and receptacles are tested as specified in 4.7.12, there shall be no shorting, or loss of electrical continuity, burning, rupture or other damage to the plug or receptacle. Slight evidence of smoke arising from the plug or receptacle is not to be considered cause for failure, provided performance is not impaired. The temperature rise during the test at rated load shall not exceed 104 degrees Fahrenheit ($^{\circ}$ F) (40 degrees Celsius ($^{\circ}$ C)) above an ambient of 122 $^{\circ}$ F (50 $^{\circ}$ C).

3.5.13 Operation. The switches on the switch and receptacles shall be mechanically operative and shall exhibit no sign of binding of the operating shaft during and after the test as specified in 4.7.13.

3.5.14 Rockwell hardness. When tested as specified in 4.7.14, contacts shall have the hardness specified in the applicable specification sheet.

3.5.15 Ball drop impact. When plastic plugs and specified receptacles are tested as specified in 4.7.15, the lip or rim of the shell shall not be cracked or permanently deformed.

3.5.16 Leakage current. When tested as specified in 4.7.16, the leakage current of the portable receptacle enclosures shall not exceed 5 milliamperes.

3.5.17 Magnetic permeability. The magnetic permeability of all surfaces of completed receptacle enclosures designated nonmagnetic (see 3.1) shall be 2.0 or less, after fabrication when tested as specified in 4.7.17.

3.5.18 Blade strength. When bladed plugs are tested as specified in 4.7.18, the contacts shall move not more than 1/32 inch in shape or position, or otherwise be damaged.

3.5.19 Knockout force. The bladed receptacle enclosure (box) cable entrance knockouts shall be conventional or reverse, and shall withstand a removal force of not less than 30 pounds (see 4.7.19).

3.6 Marking.

3.6.1 Identification plate. The identification plate shall contain, as a minimum, the following information:

- (a) Military part number (for example, M2726/1-001).
- (b) Symbol number (see 3.1).
- (c) Electrical rating (see 3.1).
- (d) Revision letter of the specification sheet, where applicable.
- (e) Prime manufacturer's name or trademark.

3.6.1.1 Enclosures. The identification plate for steel and brass enclosures shall be brass and the plate for aluminum shall be CRES or aluminum. The plate for plastic enclosures shall be any of the above. Unless otherwise specified (see 3.1), the plates shall be severe service in accordance with MIL-P-15024 and MIL-P-15024/5. Plate size shall be compatible with the amount of information required and shall be of a standard dimension in accordance with MIL-P-15024, where feasible.

3.6.1.2 Plugs, receptacles and receptacle outlets. The identification plates for plugs, receptacles and receptacle outlets shall be the same as for enclosures except molded or cast plugs, receptacles and receptacle outlets may have the information molded on the housing exterior. Additional markings shall be as specified in the applicable specification sheet.

3.6.2 Warning plate. Enclosures with a removable cover shall have a warning plate mounted externally on the cover. Unless otherwise specified (see 3.1), the plate shall be severe service in accordance with MIL-P-15024 and MIL-P-15024/5 and shall be of the materials specified in 3.6.1.1. The plate shall be marked in red letters as follows:

"WARNING
(Specify voltage)

De-energize power supply before removing cover.
Ground wire between cover and box shall be
connected at all times, (if applicable)."

Additional marking, if required, shall be as specified (see 6.2.1).

3.6.3 Phase, polarity and pin number markings. Phase, polarity and pin number marking shall be molded or engraved on all plugs and receptacles, both on the contact and terminal sides of the assembly.

3.7 Workmanship. Workmanship shall be in accordance with requirement 9 of MIL-STD-454.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform 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 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

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

- (a) First article inspection (see 4.4).
- (b) Quality conformance inspection (see 4.5).

4.3 Inspection conditions. Unless otherwise specified herein, all inspections shall be performed in accordance with the test conditions as specified in MIL-STD-1344.

4.4 First article inspection. First article inspection shall be performed on sample units which have been produced with equipment and procedures normally used in production.

4.4.1 First article inspection report. The contractor shall prepare a first article inspection report in accordance with the data ordering document specified in 6.2.2.

4.4.2 Sample size. One plug, receptacle, switch and receptacle, and outlet of each symbol number (covered by a single specification sheet (see 3.1)) shall be subjected to first article inspection.

4.4.3 Inspection routine. The sample shall be subjected to the inspections as specified in the applicable specification sheet.

4.5 Quality conformance inspection.

4.5.1 Inspection of product for delivery. Inspection of product for delivery shall consist of groups A and B inspection as specified in the applicable specification sheet.

4.5.1.1 Inspection lot. An inspection lot shall consist of plugs, receptacles, switch and receptacles or outlets of the same category (covered by a single specification sheet (see 3.1)), produced under essentially the same conditions, and offered for inspection at one time.

4.5.2 Group A inspection. Group A inspection shall consist of the inspections as specified in table I.

TABLE I. Group A inspection.

Inspection	Requirement	Test method	AQL percent
Visual and dimensional examination	3.1, 3.3, 3.4, 3.5 3.6 and 3.7	4.6.1	2.5
Operation (where applicable)	3.5.13	4.7.13	1.5

4.5.2.1 Sampling plan. Sample plugs, receptacles, switch and receptacles, or outlets shall be selected from each lot in accordance with MIL-STD-105 for general inspection level I. Acceptable quality levels (AQL) shall be as specified in table I.

4.5.3 Group B inspection. Group B inspection shall consist of the inspections as specified in table II with samples selected from inspection lots that have passed group A inspection.

TABLE II. Group B inspection.

Inspection	Requirement	Test method	AQL percent
Effectiveness of enclosure	3.5.4	4.7.4	1.5
Dielectric withstanding voltage	3.5.2	4.7.2	1.5
Insulation resistance	3.5.1	4.7.1	2.5
Contact resistance	3.5.3	4.7.3	1.5
Leakage current (where applicable)	3.5.16	4.7.16	1.5
Magnetic permeability (where applicable)	3.5.17	4.7.17	1.5

4.5.3.1 Sampling plan. The sampling plan shall be in accordance with MIL-STD-105 for special inspection level S-3. The AQL shall be as specified in table II.

4.6 Examination.

4.6.1 Visual and dimensional examination. Plugs, receptacles, switch and receptacles, and outlets shall be visually examined to verify that the materials, design, construction, physical dimensions, marking and workmanship are as specified in the applicable requirements (see 3.1, 3.3, 3.4, 3.5, 3.6 and 3.7). Threads shall be checked during production run with "Go and No-Go gauges to ensure conformance to FED-STD-H28.

4.7 Tests.

4.7.1 Insulation resistance. Insulation resistance shall be measured in accordance with method 3003.1 of MIL-STD-1344. The test voltage (500 volts dc) shall be applied between electrical conductors and between electrical conductors and ground. When switches are present, they shall be in the energized (closed) position. A resistance of less than 100 megohms shall be cause for rejection.

4.7.2 Dielectric withstanding voltage. Plugs, receptacles, switch and receptacles, and outlets shall be subjected to a dielectric withstanding voltage test in accordance with method 3001 of MIL-STD-1344. The following details shall apply:

- (a) Test voltage: Twice rated circuit voltage plus 1000 volts.
- (b) Nature of potential: Ac (root mean square).
- (c) Points of application: Between electrical conductors and between electrical conductors and ground (enclosure). Where switches are present, they shall be in the energized (closed) position.
- (d) Test sample: Plug mated to receptacle.
- (e) Barometric pressure: Sea level.
- (f) Rejection criteria: Failure to conform to 3.5.2.

4.7.3 Contact resistance. The contact resistance test shall be the following:

4.7.3.1 Plugs and receptacles. Mated plugs and receptacles shall be subjected to a contact resistance test in accordance with method 3004.1 of MIL-STD-1344. The following details and exceptions shall apply:

- (a) Test current: Rated load of plug and receptacle.
- (b) Voltage drop: Unless otherwise specified on the applicable specification sheet, 500 millivolts.
- (c) Test circuit: See figure 1.
- (d) Test sample preparation: Test shall be conducted on plugs and receptacles immediately following the endurance test as specified in 4.7.5 and salt spray test as specified in 4.7.11.
- (e) Rejection criteria: Failure to conform to 3.5.3.1.

4.7.3.2 Portable receptacles with cable assembly integral. The resistance of mated contacts shall be determined as specified in 4.7.3.1 and as shown on figure 1. The resistance of the ground circuit shall be determined as specified in 4.7.3.1 and as shown on figure 2. Failure to conform to 3.5.3.2 shall be cause for rejection.

4.7.3.3 Ground contact resistance. With the mating plug inserted in the receptacle, the resistance shall be measured with a milliohmmeter between the plug ground and the exterior of the enclosure. The resistance of the ground contact shall be as specified in 3.5.3.3.

4.7.4 Effectiveness of enclosure. Plugs and receptacles, and switch and receptacles shall be tested in accordance with MIL-STD-108, except they shall not be energized. Rejection or acceptance criteria shall be in accordance with MIL-STD-108 and as specified in 3.5.4.

4.7.5 Endurance (durability). Plugs and receptacles shall be subjected to the durability test in accordance with method 2016 of MIL-STD-1344. The following details shall apply:

- (a) Number of mating and unmating cycles: 1000.
- (b) Cycle rate: 10 + 5 cycles per minute.
- (c) Rejection criteria: Evidence of damage in accordance with method 2016 of MIL-STD-1344 or failure to conform to 3.5.5.

4.7.6 Uncoupling force. The receptacle shall be rigidly mounted to permit the coupling and uncoupling of the plug without impairing movement to the receptacle. The plug shall be coupled to and uncoupled from the receptacle 10 times prior to measurement. The gradually applied force required to withdraw the plug out of the receptacle, from the fully engaged position, shall be within the limits specified in the applicable specification sheet and shall be measured by a suitable method.

4.7.7 Strain relief. The conductors of the test cable shall be connected to the terminals of the plug or receptacle. The conductors shall have adequate slack within the plug or receptacle, and the cable shall be secured by normal means. With the plug rigidly held in place, a mechanical force shall be applied to the cable in a direction tending to withdraw the cable from the plug. The force shall be increased gradually to the magnitude specified in the applicable specification sheet, and held at that value for 1 minute. Reduction of slack of any conductor within the plug shall be considered as evidence of transmission of strain to the plug terminals and shall be cause for rejection.

4.7.8 Mechanical abuse (impact). The plug or receptacle shall be subjected to the test in accordance with method 2015 of MIL-STD-1344. The following details and exceptions shall apply:

- (a) Drop height: 8 feet.
- (b) Service class: Moderate.
- (c) Drop surface: 1-inch minimum steel plate.
- (d) Rejection criteria: Evidence of damage in accordance with method 2015 of MIL-STD-1344 or failure to conform to 3.5.8. Bending of blades on male plugs shall not be considered cause for failure, provided the blades can be returned to their original condition and mechanical and electrical operation is not impaired.

4.7.9 Vibration. The plugs, receptacles, switch and receptacles, and outlets shall be subjected to the type I vibration test as specified in MIL-STD-167-1. The following details and exceptions shall apply:

- (a) Frequency: The variable frequency tests shall be omitted.
- (b) Electrical test conditions: On switch and receptacles, the circuits shall be energized at rated voltage and oscillographs shall be taken during the last minute of the final tests along each principal axis to test switch contacts.
- (c) Rejection criteria: Failure to conform to 3.5.9.

4.7.10 Shock. The plugs, receptacles, switch and receptacles, and outlets shall be subjected to the high-impact shock test for grade A, type A, class I equipment in accordance with MIL-S-901. The following details shall apply.

- (a) Electrical test conditions: On switch and receptacles, the circuits shall be energized at rated voltage and the coil of a relay calibrated for the rated voltage of the receptacle being tested and having a minimum drop-out time of 0.02 second, and shall be connected in series with the energized contacts of the switch.
- (b) Rejection criteria: Failure to conform to 3.5.10.

4.7.11 Salt spray (corrosion). The plugs, receptacles, switch and receptacles, and outlets shall be tested in accordance with method 101, test condition A of MIL-STD-202. Evidence of excessive corrosion shall be cause for rejection.

4.7.12 Current load. The mated plug and receptacle shall be tested, carrying the rated load continuously for 7 hours and 125 percent of the rated load for 1/2 hour. Temperature readings shall be taken midway and at the end of the 7 hours at rated load. Mechanical or electrical damage or excessive temperature rise shall be cause for rejection.

4.7.13 Operation. The operation test for switch with enclosures 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.

Following the test the switch with enclosure shall conform to 3.5.13.

4.7.14 Rockwell hardness. The Rockwell hardness test shall be conducted in accordance with ASTM E 18 on one contact of the sample. Readings shall be taken on an outside surface (not cross section). Failure to meet the hardness requirements specified in the applicable specification sheets shall be cause for rejection.

4.7.15 Ball drop impact. A 20-foot pound impact at each of three 120-degree radial positions around the plastic plug or receptacle shall be made by dropping a 3-pound steel ball from a height of 6.66 feet or a 5-pound steel ball from a height of 4 feet on the lip or rim of plugs and specified receptacles without deformation of or damage to the sample.

4.7.16 Leakage current (portable receptacle only). The leakage current test shall be conducted with the portable receptacle operating at approximately the normal operating temperature. The metal portion of the receptacle shall be ungrounded. Prior to the leakage current test, the resistance from the grounding conductor of the extension cable to the exposed metal portion of the receptacle shall be measured, and found to be less than 0.1 ohm. For measurement of leakage current, connections shall be made at the contacts of the plug connector. An adapter may be used to facilitate making connections to the power source and meter. To operate the portable receptacle, the power source shall be connected to the proper contacts of the plug connector. However, the grounding contact of the plug connector shall be left unconnected except as required for this test. For leakage current measurements, each line shall be connected successively to the grounding contact of the plug connector and the current flowing in the connecting wire measured. Leakage current shall conform to 3.5.16.

4.7.17 Magnetic permeability. The relative permeability of the enclosures designated as nonmagnetic (see 3.1), shall be checked using a low- μ indicator in accordance with MIL-I-17214 and shall have a permeability not greater than 2.0.

4.7.18 Blade strength. With the plug held rigidly in place, a force of 30 + 5 pounds shall be applied to each contact in a longitudinal direction away from the contact and shall be held for not less than 1 minute. At the end of the test, the plug shall conform to 3.5.18.

4.7.19 Knockout force. A 30-pound force (minimum) shall be applied externally to approximately a 1/4-inch diameter area on the opposite end of the knockout hinge and shall be held for not less than 10 seconds. Failure to resist this force shall be cause for rejection.

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

5. PACKAGING

(The packaging requirements specified herein apply only for direct Government acquisition. For the extent of applicability of the packaging requirements for referenced documents listed in section 2, see 6.4.)

5.1 Preservation, packing and marking. Receptacles, receptacle plugs, switch and receptacles and outlets shall be individually preserved level A, C or commercial, packed level A, B, C or commercial as specified (see 6.2.1) and marked in accordance with MIL-E-17555.

6. NOTES

6.1 Intended use. The plugs, receptacles, switch and receptacles, and outlets provide connections for the distribution of ac and dc power throughout Naval ships.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

- (a) Title, number, and date of this specification, the applicable specification sheet and part number.
- (b) If painting is to be other than specified (see 3.4.19.14).
- (c) Specify additional information for warning plate when required (see 3.6.2).
- (d) Levels of preservation and packing or commercial requirements (see 5.1).

6.2.2 Data requirements. When this specification is used in an acquisition and data are required to be delivered, the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (CDRL), incorporated into the contract. When the provisions of DoD FAR Supplement, Part 27, Sub-Part 27.410-6 (DD Form 1423) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification are cited in the following paragraph.

<u>Paragraph no.</u>	<u>Data requirement title</u>	<u>Applicable DID no.</u>	<u>Option</u>
4.4	First article inspection report	DI-T-4902	----

(Data item descriptions related to this specification, and identified in section 6 will be approved and listed as such in DoD 5010.12-L., Vol. I, AMSDL. Copies of data item descriptions required by the contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer.)

6.2.2.1 The data requirements of 6.2.2 and any task in sections 3, 4, or 5 of this specification required to be performed to meet a data requirement may be waived by the contracting/acquisition activity upon certification by the offeror that identical data were submitted by the offeror and accepted by the Government under a previous contract for identical item acquired to this specification. This does not apply to specific data which may be required for each contract regardless of whether an identical item has been supplied previously (for example, test reports).

6.3 First article. When a first article inspection is required, the item should be a first article sample. The first article should consist of one unit. The contracting officer should 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.

6.4 Sub-contracted material and parts. The packaging 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.

6.5 Supersession data. The following listed drawings and military standards have been superseded by this specification and the applicable specification sheets:

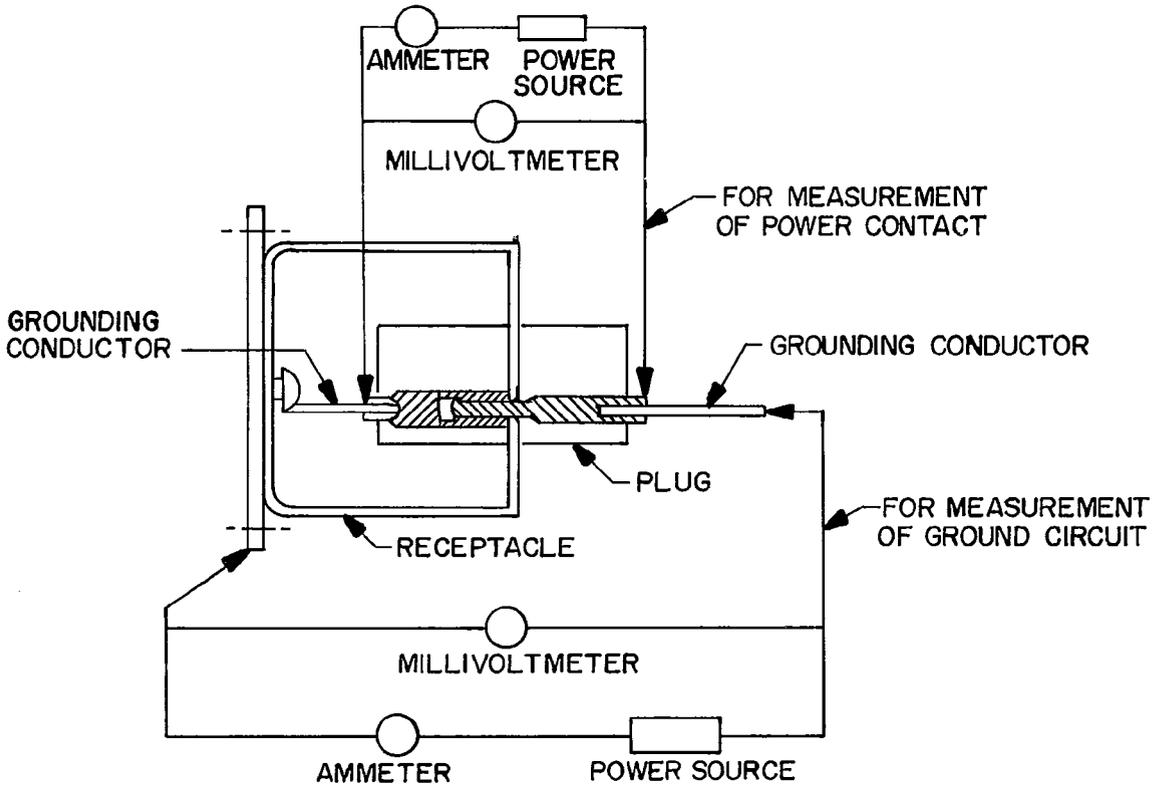
<u>Drawing</u>	<u>Specification sheet number</u>
9-S-4797-L	MIL-R-2726/68
9-S-4861-L	MIL-R-2726/24
9-S-5427-L	MIL-R-2726/42
9-S-5537-L	MIL-R-2726/25
9-S-5544-L	MIL-R-2726/44
9000-S6202-73316	MIL-R-2726/45
9000-S6202-73338	MIL-R-2726/35,/36
9000-S6202-73339	MIL-R-2726/33,/34
9000-S6202-73481	MIL-R-2726/30,/31
9000-S6202-73482	MIL-R-2726/32
9000-S6202-73882	MIL-R-2726/1, /2, /3, /4, /5, /6, /7, /8, /9, /10, /11, /12, /13
9000-S6202-73942	MIL-R-2726/26
9000-S6202-73944	MIL-R-2726/27
9000-S6202-73965	MIL-R-2726/46
9000-S6202-73966	MIL-R-2726/23
9000-S6202-74026	MIL-R-2726/47
9000-S6202-74068	MIL-R-2726/48
9000-S6202-74159	MIL-R-2726/67
9000-S6202-74204	MIL-R-2726/22
9000-S6202-74456	MIL-R-2726/37
815-74471	MIL-R-2726/18
815-74472	MIL-R-2726/49
815-1197066	MIL-R-2726/19, /20, /21
815-1197127	MIL-R-2726/41
815-1197213	MIL-R-2726/14, /15, /16, /17
815-1197230	MIL-R-2726/38
MS15484	MIL-R-2726/40
MS17177	MIL-R-2726/43
MS17791	MIL-R-2726/50
MS17792	MIL-R-2726/51

6.6 Subject term (key word) listing.

Outlets, electrical
Plugs
Switch and receptacles
Receptacles

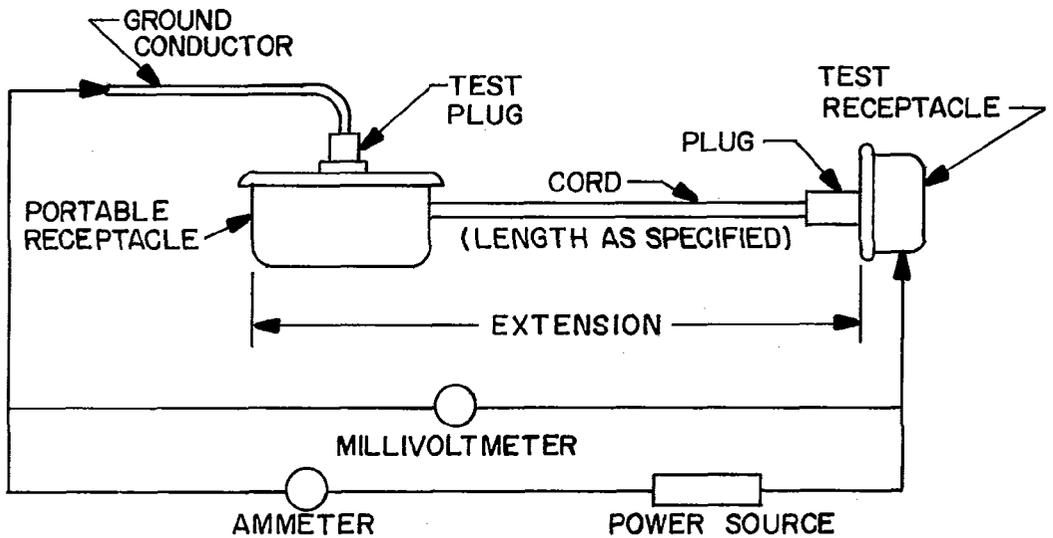
6.7 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Preparing activity:
Navy - SH
(Project 5935-N255-1)



SH 9070

FIGURE 1. Wiring diagram for measurement of resistance of power contacts and ground circuit of receptacles and plugs.



SH 9071

FIGURE 2. Wiring diagram for measurement of resistance of ground circuit of extension (includes portable receptacle, cord and plug).