

MILITARY SPECIFICATION
TERMINALS, CASUALTY POWER SYSTEMS,
GENERAL SPECIFICATION FOR

1. SCOPE

1.1 This specification covers the general requirements for alternating current (a.c.) and direct current (d.c.) casualty power system terminals and associated guards, enclosure assemblies, switches, terminal blocks and canvas covers.

2. APPLICABLE DOCUMENTS

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

SPECIFICATIONS

FEDERAL

QQ-Z-325 - Zinc Coating, Electrodeposited, Requirements for.

MILITARY

MIL-M-14 - Molding Plastics and Molded Plastic Parts, Thermosetting.
MIL-V-173 - Varnish, Moisture and Fungus Resistant (For Treatment of Communications Electronic, and Associated Equipment).
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-D-1000 - Drawings, Engineering and Associated Lists.
MIL-D-1000/2 - Drawings, Engineering and Associated Lists.
MIL-P-15024 - Plates, Tags and Bands for Identification of Equipment.
MIL-P-15024/5 - Plates, Identification.
MIL-P-15037 - Plastic Sheet, Laminated, Thermosetting, Glass-Cloth, Melamine-Resin.
MIL-T-24381/1 - Terminal, Casualty Power, Bulkhead 200-Ampere, 500-Volt, Three-Phase, Alternating Current, Symbol Number 1025.
MIL-I-45208 - Inspection System Requirements.

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

STANDARDS

MILITARY

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 - Mechanical Vibration of Shipboard Equipment.
MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts.

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

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

NATIONAL BUREAU OF STANDARDS

Handbook H-28 - Screw Thread Standard for Federal Services.

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.)

UNIFORM CLASSIFICATION COMMITTEE
Uniform Freight Classification Rules

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, Illinois 60606.)

AMERICAN NATIONAL STANDARD INSTITUTE, INC.
B46.1 1962 - Surface Texture.

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

3. REQUIREMENTS

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

3.2 Sample for first article inspection. Prior to beginning production, a sample shall be examined and tested as specified in 4.2 (see 6.2).

3.3 Material. The material for each part shall be as specified on the specification sheet.

3.3.1 Dissimilar metals. Dissimilar metals shall not be used in intimate contact unless adequately protected against electrolytic corrosion. Where it is necessary that any combination of dissimilar metals be assembled, an interposing material shall be used which will be compatible with each metal. Dissimilar metals are defined in MIL-E-917.

3.3.2 Plastic.

3.3.2.1 Molded plastic. Molded plastic shall be MMI-30 or MAI-60 of MIL-M-14, as specified on the specification sheets. Flash shall be removed from molded pieces and the width of the flash edges made thereby shall be not greater than 1/32 inch.

3.3.2.2 Laminated plastic. Laminated plastic shall be phenolic type GME of MIL-P-15037. All cut surfaces of laminated plastic shall be coated with two coats of varnish in accordance with MIL-V-173 to prevent absorption of moisture.

3.4 Design and construction. Design and construction shall be as specified herein and as specified on the specification sheets.

3.4.1 Threads. Unless otherwise specified on the individual specification sheet, threads shall be right hand class 2, conforming to unified or American National screw threads as specified in Handbook H28.

3.4.2 Terminal screws. Terminal screws shall fit the tool bit specified for the tool handle assembly of MIL-T-24381/1.

3.4.3 Castings. Castings shall be free from cold shuts, blow holes, and other imperfections.

3.4.4 Dimensions and tolerances.

3.4.4.1 Dimensions shall be as specified on the applicable specification sheet.

3.4.4.2 Dimensional tolerances. Unless otherwise specified on the specification sheet, dimensional tolerances shall be as follows:

- (a) Fractional - plus or minus 1/64 inch. A tolerance of plus or minus 1/32 inch is acceptable on fractional dimensions which are controlled by welding or brazing, provided the wider tolerance does not interfere with the interchangeability of assemblies or parts.
- (b) Decimal - plus or minus 0.005 inch.

- (c) Unless otherwise specified on the specification sheet, mounting bolt holes shall be not greater than plus or minus 1/32 inch larger than the bolt diameter for mounting bolts 3/4 inch and smaller; and not greater than 1/16 inch larger than the bolt diameter for mounting bolts larger than 3/4 inch.
- (d) Angles - As specified on the specification sheet.

3.4.5 Sharp corners and edges. Sharp corners and edges shall be rounded and buffed smooth.

3.4.6 Drilled and tapped holes shall be slightly countersunk. Drilling, countersinking and tapping of metal parts shall be done before any finish is applied.

3.4.7 Enclosures. The degree of enclosure, when applicable, shall be as specified in the individual specification sheet. Definitions for degree of enclosure shall be in accordance with MIL-STD-108.

3.5 Performance requirements.

3.5.1 Shock. Casualty power terminals, terminal blocks, switches, and enclosure assemblies shall withstand without damage or loosening of parts, the HI Shock test specified in 4.5.4.

3.5.2 Vibration. Casualty power terminals, terminal blocks, switches, guards, and enclosure assemblies shall withstand, without damage or the loosening of parts, the vibration test of 4.5.3.

3.5.3 Salt spray. After terminals, terminal blocks, enclosure assemblies, guards and switches are tested in accordance with 4.5.5, there shall be no evidence of base metal corrosion of parts, no impairment of the legibility of marking or no interference with the electrical or mechanical performance of the parts.

3.5.4 Dielectric withstanding voltage. There shall be no damage, arcing, or breakdown of insulating material when terminals, terminal blocks or switches are tested as specified in 4.5.1.

3.5.5 Insulation resistance. The insulation resistance between current carrying parts and between current carrying parts and non-current carrying parts shall be not less than 200 megohms, when terminals, terminal blocks or switches are tested as specified in 4.5.6.

3.5.6 Temperature cycling. When terminals, terminal blocks or switches are tested as specified in 4.5.2, there shall be no evidence of mechanical damage. After the test, the dielectric withstanding voltage shall be as specified in 3.5.4 and the insulation resistance shall conform to 3.5.5.

3.5.7 Impact. When specified on the applicable specification sheet, welded or brazed parts of terminals and associated parts shall withstand the impact test specified in 4.5.7.

3.5.8 Watertight bond. When specified on the applicable specification sheet, the terminal or associated part shall withstand the test of 4.5.8 with no signs of leakage through the molded assembly.

3.6 Surface textures. Surface textures specified on the applicable specification sheet shall be in accordance with ANSI B46.1 - 1962.

3.7 Finish. All terminal parts shall have surfaces which are not warped, cracked, chipped, or blistered either initially or as a result of the tests specified herein. The type of finish shall be as specified on the applicable specification sheet.

3.8 Plating or painting.

3.8.1 Plating. All machining or manufacturing procedures shall be complete before plating or finish is applied. Zinc plating when required on the applicable specification sheet shall conform to QQ-Z-325.

3.8.2 Painting. Enclosures shall be painted in accordance with MIL-E-917.

3.9 Marking.

3.9.1 Marking shall appear on the terminals and associated parts as indicated on the specification sheets. Military part number (for example M24381/1-01) and symbol number shall be shown. Manufacturer's identification shall be the prime manufacturer. Marking shall be stamped, molded, depressed or embossed as specified on the specification sheet.

3.9.1.1 Molded parts may be marked in accordance 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. When marked with these superseded drawing numbers, the applicable military part numbers shall be rubber stamped on the parts. Other information as indicated on the applicable specification sheet and not contained by the mold for the superseding drawing, shall also be rubber stamped on the parts.

3.9.2 Identification plate. An identification plate in accordance with MIL-P-15024 shall be prepared for the bulkhead terminal for mounting on the bulkhead. The identification plate shall be as shown on the applicable specification sheet. The plate shall be for severe service as defined in MIL-P-15024/5.

3.10 Installation and servicing instructions. Installation and servicing instructions shall be furnished. Sketches necessary to clarify assembly, servicing, or installation shall also be furnished.

3.11 Drawings. Drawings shall be in accordance with type II of MIL-D-1000/2 and category E of MIL-D-1000.

3.11.1 Additional drawing data. In addition to the data required by MIL-D-1000/2 drawings shall include the following:

- (a) Descriptive data of the equipment.
- (b) Center of gravity, and mounting dimensions.
- (c) A list of notes pertinent to the tests conducted in accordance with Section 4.
- (d) A list of notes pertinent to the basic design of the equipment.

3.11.2 Distribution. The manufacturer, upon being notified that the sample has passed first article inspection, shall place on record a set of prints of the drawings used for manufacturing casualty power terminals with the following activities:

- (a) DECAS
- (b) NAVSEC
- (c) Contracting officer

3.12 Workmanship. Casualty power terminals shall be manufactured and processed in a careful and workmanlike manner in accordance with good design and sound practice.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Inspection system. The supplier shall provide and maintain an inspection system acceptable to the Government for supplies and services covered by this specification. The inspection system shall be in accordance with MIL-I-45208 (see 6.4).

4.1.2 Test reporting. Test results shall be recorded by the supplier on test forms prepared by the supplier. Provision shall be made for recording of all required data. Each test report form shall be identified by the number of this specification and by the particular test paragraph number and title of the paragraph.

4.1.3 Test reports - After acceptance of the first lot (see 4.3.2 and 4.3.3) one file copy of all test data shall be forwarded to the Naval Ship Engineering Center and to any other activity specified (see 6.1). The data shall be bound into a 9 by 11-1/2 inch binder.

The cover and title page shall give sufficient information to identify the equipment. A table of contents shall be included and shall list each test required by 4.4.1 and 4.4.2. No special test format will be required. However, each test shall be prefaced by the name of the test and applicable test paragraph. The data submitted shall be copies of the actual data taken on the test floor and not retyped data. The forms used shall allow sufficient columns to make instrument corrections and necessary calculations.

4.2 First article inspection. The sample for first article inspection shall be subjected to the examination and applicable tests shown in table I.

Table I - First article inspection.

| Title | Requirement paragraph | Test paragraph |
|---------------------------------|----------------------------------|----------------|
| Examination | 3.3, 3.4, 3.7, 3.8, 3.9, 3.12 | 4.4.1 |
| Dielectric withstanding voltage | 3.5.4 | 4.5.1 |
| Temperature cycling | 3.5.6 | 4.5.2 |
| Dielectric withstanding voltage | 3.5.4 | 4.5.1 |
| Insulation resistance | 3.5.5 | 4.5.6 |
| Vibration | 3.5.2 | 4.5.3 |
| Shock | 3.5.1 | 4.5.4 |
| Salt spray | 3.5.3 | 4.5.5 |
| Insulation resistance | 3.5.5 | 4.5.6 |
| Impact | 3.5.7 | 4.5.7 |
| Watertight bond | 3.5.8 | 4.5.8 |
| Enclosure (submersible) | | 4.5.8.1 |

4.3 Sampling for quality conformance inspection.

4.3.1 Lot. For purposes of sampling, a lot shall consist of not more than 5,000 casualty power terminals, terminal blocks, enclosure assemblies, guards, switches or canvas covers of the same part number manufactured under essentially the same conditions.

4.3.2 Sampling for examination. Sample terminals and associated parts shall be selected at random from each lot in accordance with MIL-STD-105 at inspection level I for the examination specified in 4.4.1. The A.Q.L. shall be 2.5 percent defective. Any terminal or associated part in the sample containing one or more defects shall be rejected. If the number of defective terminals or associated parts in any sample exceeds the acceptance number for that sample, the lot represented by the sample shall be rejected.

4.3.3 Sampling for quality conformance tests. Sample terminals or associated parts shall be selected at random from each lot in accordance with MIL-STD-105 at inspection level S2 for the tests specified in 4.4.2. The A.Q.L. shall be 1.5 percent defective. If any sample terminal or associated part fails to comply with any of these tests the sample shall be rejected, and if the number of nonconforming terminals or associated parts exceeds the acceptance number for that sample, the lot represented by the sample shall be rejected.

4.4 Quality conformance inspection.

4.4.1 Examination (terminals, terminal blocks, enclosure assemblies, guards and switches). Each of the sample terminals, terminal blocks, enclosure assemblies, guards and switches selected in accordance with 4.3.2 shall be examined to ascertain that shape, material dimensions, marking, finish, and workmanship are in conformance with the requirements of this specification. The fit of parts shall be observed with particular reference to the interchangeability of standard replacement parts.

4.4.1.1 Canvas covers. Each of the sample canvas covers selected in accordance with 4.3.2 shall be examined to ascertain that shape, material, dimensions, marking, and workmanship are in accordance with the requirements of this specification. A sample terminal or wooden model shall be used to determine correct fit of covers (see fitter block on applicable specification sheet).

4.4.2 Quality conformance tests. Sample terminals, terminal blocks, enclosure assemblies, guards and switches selected in accordance with 4.3.3 shall be subjected to the tests shown in table II, as applicable.

Table II - Quality conformance tests.

| | |
|---------------------------------|---------|
| Dielectric withstanding voltage | 4.5.1 |
| Insulation resistance | 4.5.6 |
| Enclosure (submersible) | 4.5.8.1 |

4.5 Test procedures.

4.5.1 Dielectric withstanding voltage. Casualty power terminals, terminal blocks or switches shall be tested as specified in method 301 of MIL-STD-202. The following details shall apply:

- (a) Test voltage - 60 Hertz, a.c. potential equal to 5000 volts, root mean square (rms).
- (b) Points of application - Between terminals and between terminals and ground.
- (c) Duration - 1 minute.
- (d) Examination - After the test, terminals shall be examined for evidence of damage, arcing, on breakdown of insulating material.

4.5.2 Temperature cycling. Casualty power terminals, terminal blocks or switches shall be tested in accordance with method 102 of MIL-STD-202. The following details shall apply:

- (a) Test condition - D.
- (b) Final measurement - Approximately 1 hour after the last cycle, the terminals shall be tested for dielectric withstanding voltage (see 4.5.1) and insulation resistance (see 4.5.6).

4.5.3 Vibration. Casualty power terminals, terminal blocks, switches, guards and enclosure assembly shall be subjected to the type I mechanical vibration test of MIL-STD-167, to determine conformance with 3.5.2.

4.5.4 Shock. Casualty power terminals, terminal blocks, switches, guards and enclosure assemblies shall be subjected to the type A, grade A, class 1 test of MIL-S-901.

4.5.5 Salt spray. Casualty power terminals, terminal blocks, enclosure assemblies, guards and switches shall be tested in accordance with method 101, test condition B of MIL-STD-202. The terminals, terminal blocks, enclosure assemblies, guards and switches shall then be examined for base-metal corrosion of parts, impairment of the legibility of marking of the parts, and interference with the electrical and mechanical functioning of terminals.

4.5.6 Insulation resistance. Insulation resistance shall be measured between all current-carrying parts of terminals and between current-carrying parts and noncurrent carrying parts in accordance with method 302, condition C, of MIL-STD-202 to determine conformance with 3.5.5.

4.5.7 Impact (when applicable, see 3.5.7). The adequate strength of welded or brazed parts shall be determined by subjecting sample terminals, terminal blocks or guards to direct impact blows of a hammer sufficient to completely bend, distort, or crush the brazed or welded pieces without failure of the braze or weld.

4.5.8 Watertight bond (when applicable, see 3.5.8). Terminals shall be tested to determine if there is watertight bond between terminal rod and body. One end of the molded assembly shall be subjected to water pressure of 6.65 pounds per square inch to determine conformance with 3.5.8.

4.5.8.1 Submersible test. When specified on the specification sheet, the terminal shall be subjected to the submersible enclosure test of MIL-STD-108.

4.6 Inspection of preparation for delivery. The packaging, packing, and marking of terminals and associated parts shall be inspected to determine conformance with section 5 herein.

5. PREPARATION FOR DELIVERY

(The preparation for delivery requirements specified herein apply only for direct Government procurement. For the extent of applicability of the preparation for delivery requirements listed in Section 2, see 6.3.)

5.1 Domestic shipment and early equipment installation.

5.1.1 Preservation and packaging. Preservation and packaging which may be the supplier's commercial practice, shall be sufficient to afford adequate protection against corrosion, deterioration and physical damage during shipment from the supply source to the using activity and until early installation.

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

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

5.2 Domestic shipment and storage or overseas shipment. The requirements and levels of preservation and packaging, packing, and marking shall be specified by the procuring activity (see 6.1).

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

5.2.1.1 Preservation and packaging, packing, and marking. Casualty power terminals, associated parts, repair parts, and technical publications shall be preserved and packaged level A or C, packed level A, B, or C, and marked in accordance with MIL-E-17555.)

6. NOTES

6.1 Ordering data. Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Title, number, and date of applicable specification sheet and Military part number.
- (c) Preservation and packaging, packing, and marking instructions if other than as specified in 5.1 (see 5.2).

6.2 First article inspection. Invitations for bid should provide that the Government reserves the right to waive the requirement for samples for first article inspection as to those bidders offering a product which has been previously procured 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 procurement.

6.3 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 procured by the supplier for incorporation into the equipment and lose their separate identity when the equipment is shipped.

6.4 Management control system documents. The following management control system document should be included on DD form 1660:

- (a) MIL-I-45208 (see 4.1.1).

Preparing activity:
Navy - SH
(Project 5940-N555)

FOLD

DEPARTMENT OF THE NAVY
Naval Ship Engineering Center
Center Building
Prince George's Center
Hyattsville, Maryland 20782

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE \$300

POSTAGE AND FEES PAID
Navy Department



Commander, Naval Ship Engineering Center
DOD Standardization Program & Documents Branch
Center Building - SEC 6124D
Prince George's Center
Hyattsville, Maryland 20782

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSALOMB Approval
No. 22-R255

INSTRUCTIONS: The purpose of this form is to solicit beneficial comments which will help achieve procurement of suitable products at reasonable cost and minimum delay, or will otherwise enhance use of the document. DoD contractors, government activities, or manufacturers/vendors who are prospective suppliers of the product are invited to submit comments to the government. Fold on lines on reverse side, staple in corner, and send to preparing activity. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements. Attach any pertinent data which may be of use in improving this document. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity.

DOCUMENT IDENTIFIER AND TITLE

NAME OF ORGANIZATION AND ADDRESS

CONTRACT NUMBER

MATERIAL PROCURED UNDER A

 DIRECT GOVERNMENT CONTRACT SUBCONTRACT**1. HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?****A. GIVE PARAGRAPH NUMBER AND WORDING.****B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES****2. COMMENTS ON ANY DOCUMENT REQUIREMENT CONSIDERED TOO RIGID****3. IS THE DOCUMENT RESTRICTIVE?** YES NO (If "Yes", in what way?)**4. REMARKS**

SUBMITTED BY (Printed or typed name and address - Optional)

TELEPHONE NO.

DATE

DD FORM 1426
1 JAN 72

REPLACES EDITION OF 1 JAN 68 WHICH MAY BE USED

S/N 0102-014-1802