MILITARY SPECIFICATION

TERMINALS, STUD, BLIND PLATE, FOR ELECTRICAL BONDING AND GROUNDING (NONINSULATED) GENERAL SPECIFICATION FOR

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

1. SCOPE

1.1 Scope. This specification covers blind plate stud terminals used for electrical bonding and grounding.

1.2 Classification.

1.2.1 Military part number. The military part number shall consist of the letter "M", the basic document number, and an assigned dash number (see 3.1) as shown in the following:

M	83454/01-	A	A	2	08
Military designator (see 1.2.1)	Document sheet number (see 1.2.1)	Sleeve material and finish (see 1.2.1.1)	Stud material and finish (see 1.2.1.2)	Grip (see 1.2.1.3)	Stud thread length (see 1.2.1.4)

1.2.1.1 Sleeve material finish. The sleeve material and finish shall be identified by a single letter in accordance with the following:

A 6061-T6 aluminum alloy per QQ-A-225/8, #600 alodine per MIL-C-5541, type 1, grade C, class III.
B Naval brass per QQ-B-639, half hard, tin plate per MIL-T-10727.

1.2.1.2 Stud material and finish. The stud material and finish shall be identified by a single letter in accordance with the following:

A 4140 per MIL-S-5626, 8740 per MIL-S-6049, or 4340 per MIL-S-5000 alloy steel, heat treated 160/180 ksi tensile (Rc36 to 40) cadmium plated per QQ-P-416, type II, class 2.

1.2.1.3 Grip. The nominal thickness (grip) of the structure to which the stud is to be attached shall be indicated by a single digit representing the thickness in sixteenth's of an inch.

1.2.1.4 Stud thread length. The stud thread length shall be indicated by two digits representing the length in sixteenth's of an inch.

2. APPLICABLE DOCUMENTS

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

SPECIFICATIONS

FEDERAL

QQ-A-225/8	-	Aluminum Bar and Rod 6061-T6.
QQ-A-250/4	-	Aluminum Alloy 2024, Plate and Sheet.
QQ-B-639	-	Brass, Naval, Flat Products (Plate, Bar, Sheet, And Strip).
QQ-P-416	-	Plating, Cadmium (Electrodeposited).
PPP-B-566	-	Boxes, Folding, Paperboard.
PPP-B-636	-	Box, Fiberboard.
PPP-B-676	-	Boxes, Setup.
PPP-T-60	-	Tape, Pressure-Sensitive Adhesive, Waterproof, For Packaging.
PPP-T-76	-	Tape, Pressure-Sensitive Adhesive Paper, (For Carton Sealing).

MILITARY

MIL-P-116	-	Preservation, Methods of.
MIL-S-5000	-	Steel, Chrome-Nickel-Molybdenum (E4340) Bars And Reforging Stock.
MIL-C-5541	-	Chemical Conversion Coatings On Aluminum And Aluminum Alloys
MIL-S-5626	-	Steel, Chrome-Molybdenum (4140) Bars, Rods, And Forging Stock (For Aircraft Application).
MIL-S-6049	-	Steel, CHROME-NICKEL-MOLYBDENUM (8740) Bars, Rods, And Forging Stock (For Aircraft Application).
MIL-S-8879	-	Screw Threads, Controlled Radius Root With Increased Minor Diameter; General Specification For.
MIL-R-9917	-	Riveter, Pneumatic, Pin Swaged Fastener, Blind Rivets And Blind Bolts.
MIL-T-10727	-	Tin Plating; Electrodeposited or Hot-Dipped, For Ferrous And Nonferrous Metals.
MIL-B-43014	-	Boxes, Water Resistant Paperboard, Folding, Set-up And Metal-Stayed.
MIL-C-45662	-	Calibration System Requirements.

STANDARDS

MILITARY

MIL-STD-105	-	Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129	-	Marking for Shipment and Storage.
MIL-STD-202	-	Test Methods for Electronic and Electrical Component Parts.
MIL-STD-454	-	Standard General Requirements for Electronic Equipment.

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

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

NATIONAL BUREAU OF STANDARDS

Handbook H28 - Screw-Thread Standards For Federal Services.

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

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 requirements of this specification and the specification sheet, the latter shall govern.

3.2 Material. The material shall be as specified herein. However, when a definite material is not specified, a material shall be used which will enable the terminals 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. Materials used in the construction of terminals shall be fungus inert (see Requirement 4 of MIL-STD-454).

3.2.1 Sleeve material and finish. The sleeve material and finish shall be in accordance with 1.2.1.1 for the specified identification letter (see 3.1).

3.2.2 Stud material and finish. The stud material and finish shall be in accordance with 1.2.1.2 for the specified identification letter (see 3.1).

3.3 Design and construction. Terminals shall be of the design, construction, finish, and physical dimensions specified (see 3.1, 1.2.1.1, and 1.2.1.2).

3.3.1 Nuts, lock washers, and flat washers. Nuts, lockwashers, and flat washers shall be plated with the same finish used for the stud or be manufactured from a metal that is electrolytically compatible with the stud materials. Nuts, lockwashers, and flat washers shall be supplied with the terminals, and shall be as specified (see 3.1).

3.3.2 Threaded parts. Threaded parts shall be in accordance with Handbook H28 and MIL-S-8879 and shall be as specified (see 3.1).

3.4 Installation tool. Terminals shall be installed using a tool which meets the requirements of MIL-R-9917.

3.5 Voltage drop. When terminals are tested as specified in 4.6.3, the voltage drop between the terminal lug and the aluminum surface where terminal is installed shall not exceed the required value.

3.6 Thermal shock. When terminals are tested as specified in 4.6.4, there shall be no evidence of cracking, loosening of parts, or other physical damage.

3.7 Vibration, high frequency. When terminals are tested as specified in 4.6.5, there shall be no evidence of cracking, breaking, or loosening of parts.

3.8 Torque. When terminals are tested as specified in 4.6.6, the studs shall not turn within the sleeves, the terminals shall not turn within the mounting, and there shall be no mechanical damage.

3.9 Salt spray (corrosion). When terminals are tested as specified in 4.6.7, there shall be no exposure of base metal or blistering of plated surfaces.

3.10 Current cycling. When terminals are tested as specified in 4.6.8, the voltage drop shall not exceed the value specified in 4.6.3.

3.11 Humidity. When terminals are tested as specified in 4.6.9, there shall be no evidence of deterioration or other physical damage between electrical ground stud sleeve and mounting surface or terminal lug. The voltage drop shall not exceed the value specified in 4.6.3.

3.12 Bend. When terminals are tested as specified in 4.6.10, there shall be no evidence of loosening and the voltage drop shall not exceed the value specified in 4.6.3.

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

4. QUALITY ASSURANCE PROVISIONS

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

4.1.1 Test equipment and inspection facilities. Test and measuring equipment and inspection facilities of sufficient accuracy, quality and quantity to permit performance of the required inspection shall be established and maintained by the supplier. The establishment and maintenance of a calibration system to control the accuracy of the measuring and test equipment shall be in accordance with MIL-C-45662.

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

(a) Materials inspection (see 4.3).
(b) Quality conformance inspection (see 4.5).

4.3 Materials inspection. Materials inspection shall consist of certification supported by verifying data that the materials listed in table I, used in fabricating the terminals, are in accordance with the applicable referenced specifications prior to such fabrication.

TABLE I. Materials inspection.

Material	Requirement paragraph	Applicable specification
Steel - - - - - - - - - -	3.2.1 and 3.2.2	MIL-S-5626, MIL-S-5000, and MIL-S-6049
Tin plate - - - - - - - -	3.2.1	MIL-T-10727
Brass - - - - - - - - - -	3.2.1	QQ-B-639
Aluminum- - - - - - - - -	3.2.1	QQ-A-250/4, QQ-A-225/8
Alodine - - - - - - - - -	3.2.1	MIL-C-5541
Passivation - - - - - - -	3.2.1	MIL-S-5002
Cadmium plate - - - - - -	3.2.2	QQ-P-416

4.4 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.

4.5 Quality conformance inspection.

4.5.1 Inspection of product for delivery. Inspection of product for delivery shall consist of group A inspection.

4.5.2 Inspection lot. An inspection lot shall consist of all terminals of the same part number, produced under essentially the same conditions, and offered for inspection at one time.

4.5.2.1 Group A inspection. Group A inspection shall consist of the examination and test specified in table II, in the order shown.

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

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

TABLE II. Group A inspection.

Examination	Requirement paragraph	Method paragraph	AQL (percent defective)	
			Major	Minor
Visual and mechanical examination - - - - - - - -	3.2 to 3.3.2 incl. 3.13	4.6.1	1.0	4.0

4.5.2.2 Periodic inspection. Periodic inspection shall consist of group B inspection. Except where the results of this inspection show noncompliance with the applicable requirements (see 4.5.2.2.1.4), delivery of products which have passed group A inspection shall not be delayed pending the results of the periodic inspection.

4.5.2.2.1 Group B inspection. Group B inspection shall consist of the tests specified in table III, in the order shown. Group B inspection shall be made on sample units selected from inspection lots which have passed group A inspection.

4.5.2.2.1.1 Sampling plan. Ten sample units of each part number shall be selected from the first lot, and thereafter, once each month.

4.5.2.2.1.2 Failures. If one or more sample units fail to pass group B inspection, the sample shall be considered to have failed.

TABLE III. Group B inspection.

Test	Requirement paragraph	Method paragraph
Mounting examination - - - - - - - - - -	3.1	4.6.2.1
Voltage drop - - - - - - - - - - - - - - -	3.5	4.6.3
Thermal shock- - - - - - - - - - - - - - -	3.6	4.6.4
Vibration, high frequency- - - - - - - -	3.7	4.6.5
Torque- - - - - - - - - - - - - - - - - -	3.8	4.6.6
Salt spray (corrosion) - - - - - - - - -	3.9	4.6.7
Current cycling- - - - - - - - - - - - -	3.10	4.6.8
Humidity- - - - - - - - - - - - - - - - -	3.11	4.6.9
Bend- - - - - - - - - - - - - - - - - - -	3.12	4.6.10
Voltage drop - - - - - - - - - - - - - - -	3.5	4.6.3

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

4.5.2.2.1.4 Noncompliance. If a sample fails to pass group B inspection, the supplier shall take corrective action on the materials or processes, or both, as warranted, and on all units of product which can be corrected and which were manufactured under essentially the same conditions, with essentially the same materials, processes, etc., and which are considered subject to the same failure. Acceptance of the product shall be discontinued until corrective action, acceptable to the Government, has been taken. After the corrective action has been taken, group B inspection shall be repeated on additional sample units (all inspection, or the inspection which the original sample failed, at the option of the Government). Group A inspection may be reinstituted; however, final acceptance shall be withheld until the full group B reinspection has shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure and corrective action taken shall be furnished to the cognizant inspection activity.

4.5.3 Inspection of preparation for delivery. The sampling and inspection of the preservation-packaging and interior package marking shall be in accordance with the group A and B quality conformance inspection requirements of MIL-P-116. The sampling and inspection of the packing and marking for shipment and storage shall be in accordance with the quality assurance provisions of the applicable container specification and the marking requirements of MIL-STD-129.

4.6 Methods of examination and test.

4.6.1 Visual and mechanical examination. Terminals shall be examined to verify that the design, construction, physical dimensions, and workmanship are in accordance with the applicable requirements (see 3.2 to 3.3.2 inclusive, and 3.13).

4.6.2 Specified mounting (see 3.5). Unless otherwise specified herein, terminals shall be mounted in a 2024-T3 Aluminum mounting panel per QQ-A-250/4 of specified grip (see 3.1), drilled to the specified installation hole diameter (see 3.1) during group B inspection. The installation tool shall meet the requirements of 3.4. Terminals shall not be mounted during group A inspection.

4.6.2.1 Mounting examination. After mounting, terminals shall be visually examined to verify that they have been installed properly and meet the specified dimensional requirements for an installed terminal (see 3.1).

4.6.3 Voltage drop (see 3.5). The voltage drop shall be measured from the intersection of the tongue and barrel of the terminal, to a point on the mounting surface the same distance from the stud axis as probe point on terminal. The following conditions shall apply:

(a) Mounting - As specified in 4.6.2.
(b) Voltage drop - Voltage drop shall be as follows:

Wire size	20	18	16	14	12	10
Voltage drop (millivolts)(min)	25	25	17.5	15	10	7.5

(c) Test current - 25 amps, minimum, through terminal.

4.6.4 Thermal shock (see 3.6). Terminals shall be tested in accordance with method 107 of MIL-STD-202. The following details shall apply:

(a) Mounting - As specified in 4.6.2.
(b) Measurements before cycling - Not applicable.
(c) Test-condition letter - C, unless otherwise specified (see 3.1).
(d) Examinations after cycling - Terminals shall be visually examined for evidence of cracking, loosening, or other physical damage.

4.6.5 Vibration, high frequency (see 3.7). Terminals shall be tested in accordance with method 204 of MIL-STD-202. The following details and exceptions shall apply:

(a) Mounting of specimens - As specified in 4.6.2.
(b) Test condition letter - D.
(c) Motion - In each of two mutually perpendicular directions, one perpendicular and the other parallel to the longitudinal axis of the terminal.
(d) Examination and measurements - Terminals shall be visually examined for evidence of cracking, breaking, and loosening of parts.

4.6.6 Torque (see 3.9). When terminals are mounted as specified in 4.6.2, the torque specified in table IV shall be applied between the studs and the mounting. The studs shall then be examined for turning within the sleeves, and the terminals shall be examined for turning within the mounting and for mechanical damage.

TABLE IV. Torque.

Stud thread size	Torque (inch-pounds) (min)
.086	10
.112	20
.138	30
.164	45
.190	60
.250	100
.3125	160
.3750	240
.4375	350

4.6.7 Salt spray (corrosion) (see 3.10). Terminals shall be tested in accordance with method 101 of MIL-STD-202. The following details shall apply:

(a) Applicable salt solution - 5 percent.
(b) Test-condition letter - B.
(c) Examinations after exposure - Terminals shall be visually examined for exposure of base metal and blistering of plated surfaces.

4.6.8 Current cycling (see 3.10). When mounted as specified in 4.6.2, terminals shall be placed in a gravity convection chamber with an internal temperature of 130° ±2°F. Following temperature stabilization, the specimens shall then be subjected to 50 current cycles. Each cycle shall consist of 30 minutes at 140 percent of the test current specified in 4.6.3, followed by 15 minutes at no load. Following the current cycling test, the test samples shall be allowed to cool to room temperature and the voltage drop test shall be performed in accordance with 4.6.3.

4.6.9 Humidity (see 3.11). Terminals shall be tested in accordance with method 103 of MIL-STD-202. The following details and exceptions shall apply:

(a) Mounting - As specified in 4.6.2.
(b) Measurements after conditioning - Not applicable.
(c) Test condition - A.
(d) Polarizing voltage - Not applicable.
(e) Exceptions - Steps 7a and 7b are not applicable.
(c) Examinations after exposure - Terminals shall be visually examined for evidence of deterioration, corrosion or other physical damage.

4.6.10 Bend (see 3.11). Force shall be applied at right angles to the terminals as close to the end as is practicable. The following conditions shall apply:

(a) Mounting - As specified in 4.6.2.
(b) Bend force - As specified (see 3.1).
(c) Examinations after test - Terminals shall be visually examined for evidence of physical damage.

5. PREPARATION FOR DELIVERY

5.1 Preservation-packaging. Preservation-packaging shall be level A or C, or as specified (see 6.1).

5.1.1 Level A.

5.1.1.1 Cleaning. Terminals shall be cleaned in accordance with MIL-P-116, process C-1.

5.1.1.2 Drying. Terminals shall be dried in accordance with MIL-P-116.

5.1.1.3 Preservative application. Preservatives shall not be used.

5.1.1.4 Unit packaging. Unless otherwise specified (see 6.1), terminals shall be unit packaged ten each in accordance with method III of MIL-P-116 insuring compliance with the applicable requirements of that specification.

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

5.1.2 Level C. Terminals shall be clean, dry and packaged in a manner that will afford adequate protection against corrosion, deterioration and physical damage during shipment from supply source to the first receiving activity. This level may conform to the supplier's commercial practice when such meets the requirements of this level.

5.2 Packing. Packing shall be level A, B, or C, or as specified (see 6.1).

5.2.1 Level A. The packaged terminals shall be packed in fiberboard containers conforming to PPP-B-636, class weather resistant, style optional, special requirements. In lieu of the closure and waterproofing requirement in the appendix of PPP-B-636, closure and waterproofing shall be accomplished by sealing all seams, corners and manufacturer's joint with tape, two inches minimum width, conforming to PPP-T-60, class 1 or PPP-T-76. Banding (reinforcement requirements) shall be applied in accordance with the appendix to PPP-B-636 using nonmetallic or tape banding only.

5.2.2 Level B. The packaged terminals shall be packed in fiberboard containers conforming to PPP-B-636, class domestic, style optional, special requirements. Closures shall be in accordance with the appendix thereto.

5.2.3 Level C. The packaged terminals shall be packed in shipping containers in a manner that will afford adequate protection against damage during direct shipment from the supply source to the first receiving activity. These packs shall conform to the applicable carrier rules and regulations and may be the supplier's commercial practice when such meets the requirements of this level.

5.3 Marking. In addition to any special marking required by the contract or purchase order (see 6.1), each unit package, intermediate and exterior container shall be marked in accordance with MIL-STD-129.

5.4 General.

5.4.1 Exterior containers. Exterior containers (see 5.2.1, 5.2.2, and 5.2.3) shall be of a minimum tare and cube consistent with the protection required and shall contain equal quantities of identical stock numbered items to the greatest extent practicable.

5.4.2 Packaging inspection. The inspection of these packaging requirements shall be in accordance with 4.5.3.

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 the applicable specification sheet, and the complete part number (see 1.2 and 3.1).
(c) Levels of preservation-packaging and packing required (see 5.1 and 5.2).
(d) Quantity per unit package (QUP), if other than ten each (see 5.1.1.4).
(e) Special marking, if required (see 5.3).

6.2 Material selection. Because of its high zinc content, brass should not be selected when long storage periods may be expected.

Preparing activity:
Air Force - 11

Agent:
DSA - ES

(Project 5940-F764)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

OMB 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 1 JAN 72 1426

REPLACES EDITION OF 1 JAN 66 WHICH MAY BE USED

C16061