

MIL-M-13231C(ER)  
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SUPERSEDING  
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## MILITARY SPECIFICATION

### MARKING OF ELECTRONIC ITEMS

This specification is approved for use within Laboratory Command, Department of the Army, 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 marking of electronic items, except marking for shipment and except as otherwise specified by an applicable Government document covering the item on which the marking appears. These requirements cover both the information to be shown by the marking and the materials and processes used therefor.

#### 2. APPLICABLE DOCUMENTS

##### 2.1 Government Documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks 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.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: LABCOM, ATTN: SLCET-RS, Fort Monmouth NJ 07703 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC-MISC

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## FEDERAL

- CID-A-A-208 - Ink, Marking, Stencil, Opaque  
(Porous and Non Porous Surfaces)
- L-P-387 - Plastic Sheet, Laminated,  
Thermosetting (for Designation Plates)
- TT-E-529 - Enamel, Alkyd, Semi-gloss
- L-P-535 - Plastic Sheet (Sheeting):  
Plastic Strip Poly (Vinyl Chloride)  
and Poly (Vinyl Chloride-Vinyl  
Acetate), Rigid
- TT-I-542 - Ink, Marking, Laundry Black

## MILITARY

- MIL-V-173 - Varnish, Moisture and Fungus  
Resistant (for Treatment of Communications,  
Electronic, And Associated Equipment)
- MIL-P-8793 - Paint (Gloss and Nonspecular), for use on  
Elastomeric pigmented film
- MIL-F-14072 - Finishes for Ground Electronic Equipment
- MIL-P-15024/7 - Plate, Tags and Bands, Band Identification,  
Cable Assembly, Type K1, Aluminum
- MIL-P-15024/8 - Plate, Tags and Bands, Band Identification,  
Cable Assembly, Type K2 Heat Shrinkage  
Tubing
- MIL-P-15024/9 - Aircraft Loading Dataplate
- MIL-P-19834 - Plates, Identification, Metal Foil, Adhesive  
Backed
- MIL-I-24092 - Insulating Varnish, Electrical Impregnating,  
Solvent Containing
- MIL-I-43553 - Ink, Marking, Epoxy Base
- MIL-M-43719 - Marking Materials and Markers, Adhesive,  
Elastomeric, Pigmented, General  
Specification For
- MIL-P-55110 - Printed Wiring Boards

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## STANDARDS

## MILITARY

- MIL-STD-105 - Sampling Procedures and Tables For Inspection by Attributes
- MIL-STD-129 - Marking for Shipment and Storage
- MIL-STD-130 - Identification Marking of U.S. Military Property
- MIL-STD-196 - Joint Electronics Type Designation System (JETDS)
- MIL-STD-202 - Test Methods For Electronic And Electrical Component Parts
- MIL-STD-280 - Definitions of Item Levels, Item Exchangability, Models, and Related Terms
- MIL-STD-810 - Environmental Test Methods and Engineering Guidelines
- MIL-STD-1464 - Army Nomenclature System

2.1.2 Other Government documents, drawings, and publications.

The following other Government documents, drawings, and publications form a part of this specification to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

## PUBLICATION

H4/H8 - Commercial and Government Entity Cataloging Handbook.

(Copies of specifications, standards, handbooks, drawings, publications, and other Government documents 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 document(s) form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of 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 document which is current on the date of the solicitation.

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American National Standards Institute (ANSI)  
ANSI Y32.16-1975 - Reference Designation for Electrical and  
Electronics Parts and Equipments.

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

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 Nomenclature. Nomenclature, as defined in MIL-STD-130, is  
further understood as follows:

(a) Commercial parts and assemblies that are normally marked  
by the manufacturer with nomenclature which deviates from the  
approved item name may be marked with the manufacturer's  
nomenclature if substitution of the approved item name would be  
impracticable.

(b) Government name and type number, which is described in  
3.1.1 and 3.1.2, shall be used exactly as designated by the  
contracting officer and regardless of other considerations.

#### 3.1.1 Government names and type numbers

3.1.1.1 Joint Electronics Type Designation Systems. DOD names  
and type numbers in accordance with MIL-STD-196, are in the  
following form: Radio Set AN/GRC-9B, Receiver-Transmitter RT-  
77/GRC-9, Vibrator Power Unit PE-237-GG, Generator GN-38.  
Tentative type numbers, which incorporate blank parentheses, are  
used in government procurement data when the exact design is  
likely to vary from one procurement to another; for example:  
Vibrator Power Unit PE-237(), Radio Set AN/GRC-9(), Receiver-  
Transmitter ART-77()/GRC-9. The contractor shall replace  
tentative type numbers with final type numbers assigned by the  
contracting officer.

3.1.1.2 Army Nomenclature Systems. Examples of Army nomenclature  
systems in accordance with MIL-STD-1464 are: Power Unit M7A1;  
Cartridge, Delay: XM280; Tank, Combat, Full Tracked:M1.

3.1.2 Identifying number. The identifying number shall be in  
accordance with MIL-STD-130.

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3.1.3 Procurement identification number. The procurement instrument identification number (PIIN) (see 6.5) is the contract number.

3.1.4 Inspector's stamp. Space for the inspector's stamp is not desired.

3.1.5 Special characteristics. The following special characteristics are listed as a guide:

VOLTAGE: \_\_\_\_\_ VOLTS AC; \_\_\_\_\_ VOLTS DC; \_\_\_\_\_ VAC; \_\_\_\_\_ VDC.

CURRENT: \_\_\_\_\_ AMP; \_\_\_\_\_ A; \_\_\_\_\_ MA.

FREQUENCY OF POWER: \_\_\_\_\_ HZ; \_\_\_\_\_ HERTZ; \_\_\_\_\_  $\sim$ .

PHASE OF POWER (if more than one phase): 2-PHASE; 3-PHASE.

POWER: \_\_\_\_\_ WATTS; \_\_\_\_\_ W; \_\_\_\_\_ MW; \_\_\_\_\_ HP.

SPEED (rotating machinery): \_\_\_\_\_ RPM; \_\_\_\_\_ RPS.

FREQUENCY, RADIO (frequency generators, tuning units):

\_\_\_\_\_ HZ; \_\_\_\_\_ KHZ; \_\_\_\_\_ MHZ.

IMPEDANCE, CHARACTERISTIC (transmission lines, wires):

\_\_\_\_\_ ohms; \_\_\_\_\_  $\Omega$ .

3.1.6 Contractor and Government Entity (CAGE) Code. The CAGE Code (previously known as "Federal Supply Code for Manufacturers") used for identification of sources shall conform to H4/H8 - Commercial and Government Entity Cataloging Handbook.

3.2 Identification to be marked on equipment. All items of equipment subject to the requirements of this specification, including parts, assemblies, subassemblies, modules, units, groups, sets, systems, etc., shall be marked for identification. The primary purpose of such identification is to assist field personnel in logistic supply and maintenance functions rather than to provide technical, manufacturing or assembly data. Such identification marking shall be in accordance with MIL-STD-130, except as modified herein. Marking shall include the information in Table I on a space available basis. Omission of any of this information shall be in accordance with the priority sequence shown in Table I.

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3.2.1 Exceptions to Table I. There are certain usage or caution markings which pre-empt the priorities of Table I, e.g., high voltage, radioactive, electrostatic or electromagnetic sensitivity, polarity markings, etc. These markings have unique priority and take precedence above all others.

3.2.2 Uniquely small items. It is understood that certain items are physically too small for identification marking, e.g. glass diodes, composition resistors, etc. Table I would allow for such reasonable exceptions as the polarity dot on the diode and color code banding on a resistor.

3.2.3 Limited use/multiple use. Table I, priority sequence 3, for assemblies, "End Item Application (part of)" is intended for limited use items (1 or 2 end item applications only). Where a part or assembly has application in multiple use situations, "end item application" marking requirement does not apply. Where a question arises, obtain clarification from the procuring activity.

3.2.4 Specific Item Identification. On a "where applicable" and space available basis, identity of contract number and a lot number or date code or serial number shall be marked on the part. If a serial number is required elsewhere by the contract for the item in question, apply the same; if not, unless precluded by space availability, apply either date code or lot number, not all three.

3.2.5 Use of unit pack/bag and tag. When verified by the procuring activity that physical space is not available on the item to be identified, the unit pack identification marking of MIL-STD-129 shall be used.

3.3 Reference designations, Government type numbers, and designators for parts assemblies.

3.3.1 Reference designations. Reference designations marking and marking processes shall conform to ANSI Y32.16-1975 and shall be marked on items as specified therein.

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TABLE I  
Priority of Identification Information on Parts and Assemblies

PARTS	
TYPE OF PART/NOMENCLATURE STATUS	MARKING & PRIORITY
Standard Parts, QPL Parts, Mil Spec Parts, Parts in 59XX Federal Stock class and similar parts for which there are established standard marking requirements.	Marking in accordance with specific specification for the part at hand which identifies that part.
Non Standard Parts; Identified by Source control drawings, Selected items, and Altered items.	<ol style="list-style-type: none"> <li>1. Design activity CAGE Code &amp; Dwg No./Part No.</li> <li>2. Actual Manufacturer's CAGE Code. (include Part No. if applicable)</li> <li>3. NSN</li> <li>4. Contract No. &amp; Lot No./Serial No./Date Code</li> <li>5. Special Characteristics (see 3.1.5)</li> </ol>
Specification Control Drawings	<ol style="list-style-type: none"> <li>1. Manufacturer's/Vendors marking.</li> <li>2. Special Characteristics (see 3.1.5)</li> </ol>
Commercial Off-the-Shelf Parts (not specified by source or specification control drawings)	Manufacturer's/vendor's marking acceptable for parts.
ASSEMBLIES, SUB-ASSEMBLIES, MODULES	
All assemblies, sub-assemblies, modules, printed wiring board assemblies, line replaceable units etc.	<ol style="list-style-type: none"> <li>1. Design Activity CAGE Code/ "Assy" &amp; Dwg. No. or Part No</li> <li>2. NSN</li> <li>3. End Item Application ("Part of") see 3.2.3</li> <li>4. Actual Manufacturer's CAGE Code (Incl. Part No., if applicable)</li> <li>5. Contract No. &amp; Lot No./Serial No./Date Code</li> <li>6. Reference designation</li> <li>7. Special Characteristics (see 3.1.5)</li> </ol>
Commercial, off-the-Shelf	Manufacturer's/vendor's marking acceptable for assemblies.

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TABLE I (Cont'd)

UNITS, GROUPS, SETS, SYSTEMS	
JETDS Nomenclature assigned	<ol style="list-style-type: none"> <li>1. NSN</li> <li>2. Nomenclature (Item Name and type designation)</li> <li>3. Prime Manufacturer's Name &amp; CAGE Code</li> <li>4. Design Activity CAGE Code, Part No. &amp; Serial Number</li> <li>5. Contract Number</li> <li>6. "US Army"</li> <li>7. Special Characteristics (see 3.1.5)</li> </ol>
Commercial, Off-the-Shelf Equipment, No Army Nomenclature assigned	<ol style="list-style-type: none"> <li>1. Prime Manufacturer's Name, LOGO or Trademark--CAGE Code desirable</li> <li>2. Manufacturer's Noun Name for device</li> <li>3. Model No. and Serial No.</li> <li>4. Special Characteristics/Specifications Data</li> <li>5. Contract Number</li> </ol>

NOTE: Identification requirements cited on the applicable Product Drawing takes precedence over all marking priorities specified. For lack of specific drawing requirements items shall be marked in accordance with Table I.

3.3.1.1 Reprocurements. When the item on contract has been procured previously in quantity (not on a development contract), the reference designations used on the previous procurement shall be used on the current contract. Corresponding items shall be assigned the same reference designations as those used on the previous procurement (see 6.7). In case of doubt as to whether the current contract is a reprocurement, the contracting officer shall be consulted. When deviation is made from a previous procurement, new or substitute items shall be assigned reference designations conforming in general to the previous system.

3.3.2 Type numbers and type designation.



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**3.3.2.1 Cord and cable assemblies.** Cord and cable assemblies shall be identified in accordance with MIL-P-15024/8. Aluminum bands in accordance with MIL-P-15024/7 may be used only in special applications as approved by the procuring activity. Assemblies less than six feet in overall length shall have an identification band around the cable (or cord) jacket in the middle of the assembly. Assemblies six feet and longer in overall length shall have a band near each end.

**3.3.2.2 Electron tubes, crystal rectifiers, and crystal units.** The type designation or type number of these parts shall be marked adjacent to their sockets. The type designation or type number of parts so marked, other than crystal units, shall be the same as that on the part except the letters 'JAN' or 'USA' shall be omitted. When space is not available for marking the required type designation or type number, a suitable label showing location of these parts shall be mounted inside the unit where it will be readily visible when viewing the tubes, crystal rectifiers, and crystal units.

**3.3.2.3 Printed wiring boards.** Printed wiring boards shall be marked in accordance with MIL-P-55110. The marking material shall be compatible with all materials on the printed wiring board and assembly, including conformal coatings. Such marking material shall be non-nutritive to fungus. The markings shall not affect the performance of the printed wiring board and assembly, and shall be readily visible to maintenance personnel.

**3.4 Fuse ratings.** When space is available, the current rating of each fuse shall be marked on or adjacent to the fuse holder. Where slow-blowing type fuses are employed, the words 'SLO-BLO' shall be marked in addition to the current rating.

**3.5 Functional marking.** Connectors, keys, circuit breakers, jacks, switches, other controls, and similar items shall be suitably designated by marking, adjacent to the item, on the surface upon which they are mounted. The marking shall be such that the function of the item can be readily identified by the equipment operator.

**3.6 Nameplate data for articles of equipment.** Articles of equipment shall be marked with nameplate data conforming to MIL-STD-130, figure 1, except as otherwise specified herein, regardless of whether the data is applied directly to a surface of the article or by means of an attached label. Marking of 'additional information' as described in MIL-STD-130, shall not be included unless specifically called for.

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**3.7 Special requirements for marking of containers.** For the purposes of this paragraph and its subparagraphs, a container shall be understood as a case or bag conforming to either of the following descriptions:

a. The container is furnished as one item of an article of equipment, for the purpose of holding and transporting the remaining parts and assemblies thereof. Example: Case forming part of and containing a set of tools or crystal units.

b. The container is furnished as a separate article of equipment, and is used to hold and transport one or more other articles of equipment. All of the articles, including the container, are units of a set.

The requirements of 3.7.1 and 3.7.2 shall be in addition to other requirements of this specification.

**3.7.1 Identification of set, article of equipment, or contents.** The legend shall be the Government type number and, where space permits, the Government name of the item; or, when Government name and type number have not been assigned, the legend shall be the nomenclature and, where space permits, the part number. The legend shall identify one of the following, as applicable:

a. The set, when the container is part of and contains all other units, assemblies, and parts of the set.

b. The unit, when such consists of the container and its contents (see 3.7a).

c. The major units inside the container (see 3.7b).

The legend shall be located on the exterior of the container, as follows: For cases, on the top and front, in the most prominent spaces available; for bags, in prominent locations that will be visible when the bag (with contents) is stored (see 3.11.1).

**3.7.2 Identification of container only.** Identification marking of the container shall be as specified by other paragraphs of this specification. However, location of the marking shall be as follows:

a. For cases, the marking shall be placed on an interior surface of the lid or cover. When the lid or cover is detachable, the marking shall in addition be placed on an interior surface of the case itself.

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b. For bags, the marking shall be placed on an interior surface that is readily visible when the bag is opened; however, if such location is not available, the marking shall be placed on the exterior of the bag but shall be smaller and in a less prominent place than the legend specified in 3.7.1.

3.8 Special markings on articles of equipment. Units shall be marked with the following information, as applicable:

3.8.1 Aircraft-loading dataplate. An Aircraft-loading dataplate shall be marked as specified in MIL-P-15024/9.

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3.8.2 Marking battery circuits. Units designed to operate from internal batteries shall be marked with the following, in a convenient form for use by operating and maintenance personnel:

- a. Battery type numbers.
- b. Battery location and position.
- c. Polarity.
- d. Nominal voltage.
- e. Interconnection between batteries, if two or more are used.
- f. Minimum acceptable voltage for equipment operation.

The markings shall be applied on or adjacent to the battery compartment or holder, and on or adjacent to terminals, connectors, contacts, removable leads, etc., that are part of the battery circuit but not of the battery itself. When necessary to provide such information in convenient form, a block or pictorial wiring diagram of the battery circuit and batteries shall be provided instead of, or in addition to the markings, and shall be located on or as close as practicable to the battery compartment.

3.8.2.1 Warning label. Battery-powered equipment, with the exception of equipment requiring permanent battery installation, shall be labeled externally as follows:

WARNING  
REMOVE BATTERIES BEFORE  
SHIPMENT OR INACTIVE STORAGE  
OF 30 DAYS OR MORE

Examples of equipment requiring permanent battery installation are sonobuoys, missiles, and fuses.

3.8.3 High voltage notice. When an AC or DC voltage of 500 volts or more (nominal value) is exposed, including exposure by opening or removal of an access door or cover, the following notice shall be marked on the article of equipment:

DANGER-HIGH VOLTAGE \_\_\_\_\_ VOLTS

The notice shall be prominently located on, or adjacent to, the exposed circuits, or on the access door or cover. The legend shall be marked in white or aluminum letters not less than 0.375 inch (9.52mm) high, on a red background.

3.8.4 Radioactive material. Items containing radioactive material shall be marked in accordance with MIL-STD-129.

3.8.5 Non-ionizing radiation. Items producing radiofrequency or microwave radiation shall be marked in accordance with MIL-STD-129.

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3.8.6 Technical literature caution notice. Each unit that has operating controls shall be provided with a technical literature caution notice. The notice shall be provided on the operating panel, or in a prominent place when there is no operating panel. The notice may be combined with the nameplate data, as shown in Figure 1; or may be separate as shown in Figure 2.

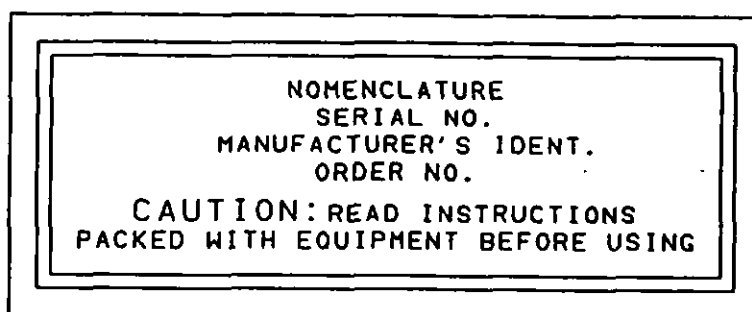


FIGURE 1. NAME AND CAUTION PLATE (EXAMPLE OF LEGEND).

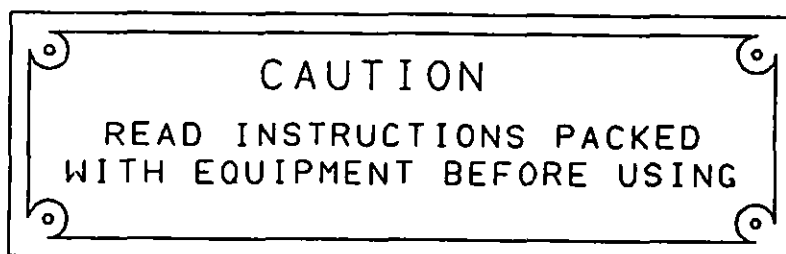


FIGURE 2. CAUTION PLATE.

3.8.7 Schematic, wiring, and cable diagram. When these are provided they shall be in the form of labels or direct marking on a suitable surface of the item.

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**3.8.8 Chassis identification.** The chassis of each unit shall be marked with the order number and the manufacturer's name, trademark, or code symbol, using a group I process listed in table II. The marking shall be located where it will be readily visible when the chassis is removed for maintenance. The serial number, when used, shall be marked next to the above marking. This may be done after manufacture of the unit is completed, by means of a group I table II process or by use of an electric etching tool. (Chassis identification shall be in addition to nameplate data specified by 3.6).

**3.8.9 Modification work-order number.** A modification work-order (MWO) plate shall be mounted on the exterior of each unit. The plate shall be one of the types specified in 3.13.2a through 3.13.2d, and shall be 3.5 inches (88.9mm) long by 3 inches (76.2mm) high. When suitable space is not available, however, for a plate of this size, the contracting officer shall be consulted regarding use of a smaller plate or, in extreme cases, omission of the plate entirely. The plate shall have a matte finish suitable for mounting an adhesive-backed, aluminum foil label thereon. The legend "MODIFICATION WORK ORDER" shall be marked across the top of the plate, in letters approximately 0.125 inch (3.17mm) high. The MWO plate may be combined with a plate used for marking of nameplate data.

**3.8.10 Sensitive Electronic Devices** - Sensitive electronic devices (ie. those devices sensitive to Electrostatic discharge (ESD)) shall be marked as specified in MIL-STD-130.

**3.9 Location of marking.**

**3.9.1 General.** Reference designations shall be located as specified in ANSI Y32.16-1975. Other marking shall be located as specified in MIL-STD-130 and this specification. If physical or other limitations are evident making it impracticable to locate marking as specified, the contracting officer shall authorize deviation.

**3.9.2 Type number and type designations.** Marking of the type numbers and type designations specified in 3.3.2 shall be so located that they are readily visible with a minimum removal of cabinets, covers, shields, adjacent parts and assemblies.

**3.10 Marking processes.** Marking of required information shall be applied directly to the surface of the item or by a label or wrap-around tag using one of the processes specified in table II. Marking processes used for reference designations shall be as specified in ANSI Y32.16-1975.

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**3.10.1 Marking Processes for electronic parts and/or components.** Electronic parts and/or components shall be marked with epoxy-based ink conforming to MIL-I-43553 using one of the methods specified in group II or group III of table II. Heat sensitivity of electronic parts should be considered when epoxy ink is applied. See MIL-I-43553 for ambient or elevated temperature curing options. Marking inks other than MIL-I-43553 may be used provided they are permanent (see table II note 3/) and fungus-inert. Inks that are not known to be fungus inert must be subjected to the fungus test specified in MIL-STD-810, Method 508, for a period of 28 days. Certification by a qualified laboratory or by the material producer based on test data on record that the treated material meets Grade 0 or Grade 1 requirements of table 508-I, Method 508, MIL-STD-810, is sufficient evidence of acceptability.

**3.11 Marking on wood surfaces.**

**3.11.1 Exterior of wood containers.** The legend specified in 3.7.1 shall be applied by branding prior to painting of the surface concerned.

**3.11.2 Other wood surfaces.** Marking on other wood surfaces shall be applied by branding prior to painting of the surface concerned, or by plastic or metal labels, except that aluminum foil labels shall not be used.

**3.11.3 Branding.** Depth of branding in solid wood shall be .0625 inch (1.59mm) and in plywood shall be two-thirds of the nominal thickness of the surface ply; in either instance, the tolerance shall be  $\pm$  .0156 inch (0.40mm). Minimum height of characters (letters, figures, etc.) for the legend specified in 3.7.1 shall be .75 inch, (19.0mm) and for other branding shall be .375 inch (9.52mm).

**3.12 Size and form of characters.** Characters used for reference designations shall be as specified in ANSI Y32.16-1975. Letters, numbers, and other characters used for other marking shall be as specified in MIL-STD-130. They shall be of such size as to promote maximum legibility under adverse conditions and in any case shall be at least .047 inch (1.19mm) high.

**3.13 Labels.** Labels shall conform to the following:

**3.13.1 Border.** Borders are not required on labels used for reference designations. Where space permits, labels used for other marking shall have a border on each edge of not less than .125 inch (3.17mm).

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3.13.2 Material and process. Material and process for labels shall conform to categories (a) through (g) below. Only categories (a), (b), and (c) shall be employed for surfaces exposed to abrasion or the weather during use, maintenance, installation, or operational adjustment of units; however, categories (d) and (e) may be so employed when permitted by note 2 of table II. In no case shall categories (d) through (g) be used for nameplate data.

a. Plated steel, corrosion resistant steel, aluminum, brass, or copper, finished in accordance with MIL-F-14072.

b. Laminated thermosetting plastic conforming to L-P-387. Markings on external surfaces of such labels shall be confined to direct etching, die stamping, or engraving, and, except for type NDP material, the surface marking shall be filled with white enamel.

c. Photographically printed or photo etched aluminum plate with a thickness of not less .020 inch (0.51mm) (see table II, group I).

d. Aluminum foil, adhesive-backed label conforming to MIL-P-19834 except that color of the plate need not conform to the specification.

e. Decalcomanias when used on exterior surfaces shall be fabricated with a hard-surface varnish coating and added fungicide and shall not be given any additional varnish treatment. When used on interior surfaces, they shall be protected by clear varnish, type II, conforming to MIL-V-173. Either varnish or solvent-applied type of decalcomania may be used on baked painted surfaces but only the varnish-applied type may be used on other surfaces. When the decalcomania is MIL-M-43719, Class 1 material with lines and characters silkscreened with MIL-P-8793 material, it shall be protected by clear vinyl paint per MIL-P-8793. Water-applied decalcomanias shall not be used under any circumstances.

f. Printed on white book paper, laminated between two sheets of not less than .015-inch thickness (0.38mm) composition B, type I, grade B, clear plastic material conforming to L-P-535. The two sheets shall be bonded together to seal against moisture.

g. Printed on minimum .020-inch thickness (0.51mm) composition B, type II, grade C, white plastic material and covered with a minimum .010-inch thickness (0.25mm) composition B, type I, grade B, clear plastic material, both conforming to L-P-535. The two sheets shall be bonded together to seal against moisture.



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h. Adhesive-Backed thermosetting plastic labels with over laminated copy (the thickness shall not be less than .006 inch and shall not be greater than .025 inch). The nameplate marking is subsurface printed beneath a protective polyester film.

3.13.3 Radius of corners. Decalcomanias and aluminum foil labels shall have corners rounded to a minimum radius of .03 inch (0.76mm) and preferably to a radius of .0625 inch (1.59mm) to

3.13.4 Mounting. Labels, except decalcomanias and adhesive-mounted aluminum foil, shall be securely and permanently mounted by screws or rivets that will not stain the labels under specified service and test conditions. Adhesives and mounting processes used for decalcomanias shall be as recommended by the manufacturer thereof. Clearance between mounting holes in labels, and the mounting screws or rivets, shall be provided where necessary to prevent buckling of the labels caused by expansion or contraction at specified temperature extremes.

3.14 Spectral gloss. Spectral gloss of exterior markings shall not exceed the maximum gloss permitted for the finish on the surface of the article of equipment to which the marking is applied, unless a higher gloss is inherent in use of specified material and process for the marking.

3.15 Opacity. The opacity of decalcomanias, paint, and ink used for marking shall be sufficient to hide completely the background on which they are applied.

3.16 Permanency and durability. Direct marking, including background, and labels shall be capable of withstanding the tests listed in table III without evidencing any of the following defects:

Blistering	Fading	Separation
Chipping	Flaking	Softening
Corrosion	Illegibility	Splitting
Cracking	Loosening from the	Warping
Delamination	mounting surface	
Dissolving	Peeling	
Discoloration		

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TABLE II. MARKING PROCESSES

Group	Process	Restrictions on applications
I	<p>Die stamping, engraving, photo-etching, molding, steel stamping, photosensitive printing on reverse surface of polyester film or photographically printed on sensitized aluminum (or photo-etched) as furnished by the Metalphoto Corp., Cleveland Ohio or the Fotofoil Division of Miller Dial Corp., El Monte, Calif or equal, and processed as recommended by the manufacturer of the Material and 3.13.2 (see 1/).</p>	NONE
II	<p>STENCILING OR SCREEN PRINTING WITH:</p> <ul style="list-style-type: none"> <li>a. Semi-gloss enamel conforming to TT-E-529 (see 5/).</li> <li>b. Quick drying ink (for non-porous surfaces only) conforming to Commercial Item description drawing A-A-208</li> <li>c. Epoxy-based ink conforming to MIL-I-43553</li> </ul> <p>SILK SCREENING OR OFFSET PRINTING</p> <ul style="list-style-type: none"> <li>a. Use ink conforming to the performance requirements of MIL-I-43553.</li> </ul>	<p>(1) Shall not be used for nameplate data; use group I instead</p> <p>(2) Shall not be used on surfaces subject to abrasion or the weather during use or storage of equipment, nor for surfaces subject to abrasion during installation, maintenance, or operational adjustment of equipment, except as allowed by 2//; use group I instead.</p>

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Group	Process	Restrictions on applications
III	Lithography or lettering or rubber stamping with permanent ink. 3/ Stamping ink for textiles shall conform to TT-I-542.	Same as group II, except that stamping of textiles with the specified ink may be used for any application.
IV	Branding on wood surfaces	As specified in 3.11

1/ Pigment-filled group I markings shall be protected by clear varnish conforming to MIL-I-24092 except where such varnish is incompatible with a luminescent pigment, in which case the protective coating shall be as recommended by the manufacturer of the luminescent material.

2/ Where use of group I marking on these surfaces (surfaces subject to abrasion or the weather, as described under group II) is impracticable because of size, shape, or other characteristics of the available surface, decalcomanias, or pressure-sensitive-backed aluminum-foil labels or adhesive backed thermosetting plastic labels may be used; however, their use shall be subject to prior approval by the contracting officer and in no case shall they be used for nameplate data.

3/ Permanent ink is fade-resistant, does not "bleed" when coated with varnish conforming to MIL-V-173 and will not rub off when in an uncoated condition and exposed to moisture. Permanent ink shall be capable of satisfying the permanency and durability requirements of this specification when tested as required by paragraph 4.3. Since tropicalization treatment of equipment often involves an overall coating with MIL-V-173 varnish, the contractor shall certify that the permanent ink used can withstand a coating with MIL-V-173 without evidencing "bleeding".

4/ For parts used in electrical applications NOT subject to weather or abrasion as specified in group II (2), the abrasion testing as defined in paragraph 4.4 shall be performed using a 1kg load and CS-10 calibrase wheel for a minimum of 300 cycles in the Taber Abraser Machine or equal.

5/ Nonepoxy ink markings shall be protected by a clear transparent epoxy coating.

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3.17 Facsimiles. Facsimiles (or scale drawings) of each different marking shall be submitted to the contracting officer for approval of the legend and its location on the article of equipment, assembly, or part. Facsimiles of legends inscribed on labels shall show the entire label. All facsimiles shall include a scale showing the size of the marking, and shall include or be accompanied by information as to location. Copies of each facsimile shall be furnished as follows:

- a. 3 copies of nameplate data
- b. 4 copies of electrical diagrams.
- c. 2 copies of other markings.

3.18 Workmanship. Marking shall be legible and shall not exhibit any defects that will affect its intended purpose.

TABLE III. Permanency and durability of markings

Type of marking	Applicable tests				
	Abrasion (see 4.4)	Corrosion (see 4.5)	Moisture Resis- tance (see 4.6)	Solvents (see 4.7)	Thermal Shock (see 4.8)
Metal labels (3.13.2a, c, d) (see 1/)	Required	Required	Required	Required	Required
Thermosetting plastic labels (3.13.2b, h) (see 2/)	Required	-----	Required	Required	Required
Decalcomanias (see 3.13.2e)	Required	-----	Required	Required	Required
Direct, except for branding on wood surfaces	Required	-----	Required	Required	Required
Thermoplastic labels (see 3.13.2f and 3.13.2g)	-----	-----	Required	-----	Required

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1/ For aluminum foil labels (3.13.2d), use the sampling procedures of section 4 herein but use the tests of MIL-P-19834.

2/ These tests apply only to surface markings and adhesives used on the base material, the base material is tested in accordance with L-P-387.

#### 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.

4.1.2 Visual inspection. Visual inspection of marking shall be performed during visual inspection of the item (part, assembly, article of equipment, or set) on which the marking appears. Any defect in the marking shall be considered a defect in the item. Defects in marking shall be classified as specified by the contract or document subsidiary thereto. If, however, classification of marking defects is not so specified, table IV shall apply.

4.2 Specimens for permanency and durability inspection.

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4.2.1 Specimens for test The specimens shall represent the following, as applicable:

a. Aluminum foil labels (see 3.13.2d): As called for by MIL-P-19834, except that the quantity of specimens shall be as required by the sampling procedures of 4.3.1 herein. When aluminum foil labels in accordance with MIL-P-19834 are supplied by nameplate manufacturers on the QPL for MIL-P-19834, there shall be no further testing required.

b. Other metal labels (see 3.13.2a and 3.13.2c): Each combination of material and process.

c. Thermosetting plastic labels (see 3.13.2b): Each combination of material and process.

d. Decalcomanias (see 3.13.2e): Each combination of material, process, and mounting surface.

e. Thermoplastic labels (see 3.13.2f and 3.13.2g): Each combination of material and process.

f. Direct marking, (ie. markings that are applied directly to the surface using processes listed in table II groups II and III), except branding on wood surfaces: Each combination of material, process, and surface on which the marking is applied.

At the contractor's option, the same specimens may be used successively for more than one test, or separate specimens may be used for individual tests.

4.2.2 Size and character of specimens. Specimens shall be such as to facilitate performance of the applicable tests listed in table III. In general this will require the largest size practicable, not more than 4 by 4 inches (101.6 by 101.6mm) in area, for the abrasion test. Also, for the abrasion test, a maximum amount of legend should be included between two concentric circles, respectively 1.5 (38.1mm) and 1.75 inches (44.4mm) in radius, having their center at the midpoint of the specimen.

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TABLE IV  
Classification of defects, if not specified by contract.1/

Wrong marking 2/	Illegible missing, or mislocated marking	Marking is dirty, smudged, etc.	Reference paragraph and kind of marking
1B1	2B1	3C1	3.2 Identification marking on assemblies and parts.
1C2	2C2		3.3.1 Reference designations.
1A3	2A3		3.3.2.1 Type number on cable assemblies
1A4	2A4	3C2	3.3.2.2 Type numbers of tubes and crystal units.
1A5	2A5	3C3	3.4 Fuse ratings.
1A6	2A6	3C4	3.5 Functional markings.
1A7	2A7	3C5	3.6 Nameplate data on articles of equipment
1A8	2A8	3C6	3.7.1 Identification on containers (identifies set, article of equipment or, contents of container)
1B9	2B9	3C7	3.7.2 Identification of container only.
1A10	2A10	3C8	3.8.1 Aircraft-loading dataplate.
1A11	2A11	3C9	3.8.2 Marking of battery circuits
1A12	2A12	3C10	3.8.3 High voltage notice.
1A13	2A13	3C11	3.8.4 Radioactive material markings
1A14	2A14	3C12	3.8.5 Non-ionizing radiation markings
1A15	2A15	3C13	3.8.6 Technical manual caution notice.
1B16	2B16	3C14	3.8.7 Electrical diagrams.
1A17	2A17	3C15	3.8.8 Chassis identification.
1B18	2B18	3C16	3.8.9 Modification work order plate.

1/ The symbols in this table (1B1, 2B1, etc.) are codes used by the government inspector for recording types of defects. The letters in the symbols shall be used to classify defects: "A" represents a major defect, "B" a minor defect, and "C" a control defect (for example, 1A5 is a major defect, 2B1 is a minor defect, and 3C1 is a control defect.)

2/ If location of marking deviates from specified location to an extent that wrong information could be derived, such mislocation shall be classified as wrong marking.



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4.2.3 Use of specimens after test. Specimens which have passed the permanency and durability tests may be used in items furnished on contract, except that specimens which have been subjected to the abrasion test shall not be used.

4.3 Permanency and durability inspection procedure. The specimens referenced in 4.2.1 shall be subjected to the applicable tests listed in table III, and then examined for the defects listed in 3.16.

4.3.1 Labels. Sample size for inspection of labels shall be in accordance with MIL-STD-105 (see 3.13). The acceptable quality level (AQL) shall be 10.0 percent defective and the inspection level shall be S-3 for normal and tightened inspection and S-2 for reduced inspection.

4.3.2 Direct marking.

4.3.2.1 Selection of specimens. The specimens described in 4.2 shall be selected during each month when the items (on which the markings appear) are being produced, and shall be representative of the markings used during the month concerned. Each test shall be performed on two specimens of each applicable combination listed in 4.2.1. Testing shall take place once every 6 months on the specimens that were collected during each month of the 6 month interval.

4.3.2.2 Noncompliance. If any specimen selected in accordance with 4.3.2.1 fails to pass the applicable tests, the manufacturer shall notify the qualifying activity and the cognizant inspection activity of such failure and take corrective action on the materials or processes, or both, as warranted, and on all units of product which can be corrected and which are manufactured under essentially the same material and processes, and which are considered subject to the same failure. After the corrective action has been taken inspection shall be repeated on additional sample units (all tests, or the test, which the original sample failed, at the option of the qualifying activity). In the event of failure after inspection, information concerning the failure shall be furnished to the cognizant inspection activity and the qualifying activity.

4.4 Abrasion test. The specimens shall be subjected to 200 cycles in a Taber Abraser Machine, or equal. The abraser wheels shall be properly dressed before each test. The wheels shall be CS17 Calibrase with 1 Kilogram load (see 3.16).

4.5 Corrosion Test. The specimens shall be immersed in a saturated solution of sodium chloride at 25°C(77°F) for 24 hours and then, without rinsing, shall be allowed to dry for 24 hours at room temperature. (see 3.16).



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4.6 Moisture-resistance test. The specimens shall be subjected to method 106, moisture-resistance test of MIL-STD-202, except that measurements and vibration shall be omitted. (see 3.16).

4.7 Solvents test. The specimens shall be subjected to method 215, resistance of solvents of MIL-STD-202; (See 3.16).

4.8 Thermal shock. The specimens shall be placed in hot deionized water at 79°C (174°F) for 3 hours, then immediately transferred to a cold chamber at a temperature of -55°C (-67°F) for 1 hour. The cycle shall be repeated immediately (see 3.16).

## 5. PACKAGING

5.1 Not applicable.

## 6. NOTES

6.1 Intended use. This specification is intended as a general subsidiary to end item specification.

6.2 Definitions and Marking Terms. For the purposes of this specification, definitions and marking terms shall be as given in MIL-STD-130 and the following:

6.2.1 Sets. A set shall be defined in accordance with MIL-STD-280.

6.2.2 Units A unit is the same as "equipment" as defined in MIL-STD-280.

6.2.3 Assemblies. An assembly shall be defined in accordance with MIL-STD-280.

6.3 Marking for shipment. Marking for shipment is covered by MIL-STD-129.

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6.4 Serial numbers In general, the manufacturer will be instructed as to which items require serial numbers. This requirement usually will appear in the contract or order, or in the specification covering the item. Also, the contract or order usually will require the manufacturer to maintain accurate records of serial numbers relative to date of manufacture, substitutions, shop changes, etc., and to furnish copies of such records at the completion of the contract. The records will be used by the Government in connection with maintenance, repair, and modification of the items. Serial numbers usually are required on (a) major units such as radio receivers, generators, switchboards, and oscilloscopes, (b) items which are selected, calibrated, machined, or adjusted for use together, and (c) items which require serial numbers for accountability purposes. Serial numbers usually are not required on (a) bags, chest, and other types of containers (b) hardware, (c) small parts produced by automatic machinery, and (d) minor units such as cable assemblies, groundrods and insulators.

6.5 Procurement instrument identification number. These numbers are in the form "DAAB05-69-C-0123" where the first six positions (DAAB05) identify the purchasing office, the next two positions (69) show the fiscal year in which the number was assigned, the next position (C) indicates the type of procurement instrument code, and the last four (0123) represent a serial number.

6.6 Air-transportable items. The contract or order, or the detailed specification covering the item will indicate which items are air-transportable.

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**6.7 Preprocurements.** Evidence of previous procurement in quantity as referenced in 3.3.1.1, may be found in technical literature furnished to the manufacturer for his information and guidance, and in nomenclature marked on a model of the equipment furnished to the manufacturer for conformance thereto. When "(X)" appears in the type-number portion of such nomenclature, it is evidence that the model was procured on a development contract and consequently the reference designations shall conform to ANSI Y32.16-1975 instead. Drawings, other data, or a model furnished to the manufacturer solely for his information and guidance and to which conformance is not specified shall not be considered sufficient evidence of previous quantity procurement of the item.

**6.8 Subject Term (Key Word) Listing**

Branding  
Reference designations  
Silkscreening  
Type numbers

Custodian:  
Army-ER

Preparing activity:  
Army-ER

Review Activities:  
Army-AR, AV, EA, MI, AV, CR, SM

(Project Misc A094)

User activity:  
Army-ME

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