

MIL-D-87157
 AMENDMENT 1
 10 February 1983

MILITARY SPECIFICATION

DISPLAYS, DIODE, LIGHT EMITTING, SOLID STATE, GENERAL SPECIFICATION FOR

This amendment forms a part of Military Specification MIL-D-87157, dated 26 August 1981, and is approved for use by all Departments and Agencies of the Department of Defense.

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1.2, 1.3, 1.3.1, 1.3.2, 1.3.3, delete and substitute the following:

"1.2 Military part number. Displays specified herein (see 3.1) shall be identified by a military part number which shall consist of the basic number of the specification sheet and a coded number. The part number shall be coded to provide information concerning device type, device quality level, lead finish, and luminous intensity. The military part number shall be in the following format:

M87157	/001	01	A	B	C
Military designator (see 1.2.1)	Detail specification (see 1.2.2)	Device type (see 1.2.3)	Device quality level (see 1.2.4)	Lead finish (see 1.2.5)	Luminous intensity code (see 1.2.6)

"1.2.1 Military designator. The M87157 military designator for displays means a Military Specification item produced in full compliance with MIL-D-87157 including qualification, and the referenced military detail specification (see 1.2.2). Any device which does not meet all the requirements of this specification and the applicable military detail specification shall not be marked M87157 and shall not make reference to MIL-D-87157, except when QPL listing for that device does not exist and qualification is waived by the preparing activity. When qualification has been waived, the devices shall not be marked 'JAN' or 'J' (see 3.7.5) and shall be subjected to and pass all the specified screening and quality conformance tests in accordance with the applicable military detail specification. Violation of requirements of this paragraph and the requirements of 3.1 and 3.7.5 may be cause for removal of the manufacturers' product from the Qualified Products List QPL-87157.

"1.2.2 Detail specification. The detail specification number shall consist of three digits from 001 to 999, as applicable.

"1.2.3 Device type. The device type number shall be specified in the detail specification. The numbers shall consist of two digits assigned sequentially, from 01 to 99, within each detail specification.

"1.2.4 Device quality level. Displays are classified by one of the following quality levels:

Quality level	Description
A	Hermetically sealed displays with 100% screening tests.
B	Hermetically sealed displays without 100% screening tests.
C	Nonhermetic sealed displays with 100% screening tests.
D	Nonhermetic sealed displays without 100% screening tests.

"1.2.5 Lead finish. The lead finish shall be as specified in 3.6. The lead finish shall be designated by a single letter as follows:

Finish letter	Lead finish
A	Hot solder dip
B	Tin plate
C	Gold plate
X	Finishes A, B, or C (see note)

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NOTE: Finish letter "X" shall not be marked on the display or its packaging. This designation is provided for use in drawings, part lists, purchase orders, or other documentation where lead finishes A, B, or C are all considered acceptable and interchangeable without preference.

"1.2.6 Luminous intensity code. The luminous intensity code shall be as specified in the detail specification."

3.6.3 Delete and substitute:

"3.6.3 Lead or terminal material and finish.

"3.6.3.1 Lead or terminal material. Lead or terminal material shall conform to one of the following chemical compositions:

a. Type A

Iron - - - - -	53 percent, nominal
Nickel - - - - -	29 ±1 percent
Cobalt - - - - -	17 ±1 percent
Manganese- - - - -	0.65 percent, maximum
Carbon - - - - -	0.06 percent, maximum
Silicon- - - - -	0.20 percent, maximum
Aluminum - - - - -	0.10 percent, maximum
Magnesium- - - - -	0.10 percent, maximum
Zirconium- - - - -	0.10 percent, maximum
Titanium - - - - -	0.10 percent, maximum

(Combined total of aluminum, magnesium, zirconium and titanium to be a maximum of 0.20 percent).

b. Type B

Nickel - - - - -	40 - 43 percent
Manganese- - - - -	0.80 percent, maximum
Silicon- - - - -	0.30 percent, maximum
Carbon - - - - -	0.10 percent, maximum
Chromium - - - - -	0.25 percent, maximum
Cobalt - - - - -	0.50 percent, maximum
Phosphorous- - - - -	0.025 percent, maximum
Sulfur - - - - -	0.025 percent, maximum
Aluminum - - - - -	0.10 percent, maximum
Iron - - - - -	Remainder

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c. Type C

Co-fired metallization such as nominally pure tungsten. The composition and application processing of these materials shall be subject to qualifying activity approval and submitted with the application to test and as otherwise requested by the qualifying activity.

d. Type D - Copper alloy of the following composition:

Copper - - - - -	97.43 percent
Iron - - - - -	2.4 percent
Zinc - - - - -	0.13 percent
Phosphorous - - - - -	0.04 percent

3.6.3.2 Lead or terminal finish. The finish on all external leads shall conform to one of the following:

- a. Hot solder dip. The hot solder dip shall be homogeneous with a minimum thickness of 60 microinches for round leads and a minimum thickness of 200 microinches at the crest of the major flats for other shapes. In all cases, the solder dip shall extend up to and beyond the effective seating plane or to the glass seal for flush-mounted devices. When applied over the base metal, hot solder dip shall cover the entire lead to the glass seal or point of emergence of the lead or metallized contact through the package wall. Optional undercoat finishes shall apply as follows:
- (1) Tin plate thickness of 200 to 800 microinches which shall be dense, homogeneous and free of co-deposited organic material.
 - (2) Gold plate thickness of 50 to 225 microinches. Gold plating shall be a minimum of 99.7 percent gold and only cobalt shall be used as the hardener.
 - (3) Electroplated nickel or finishes from a sulfamate nickel bath are preferred and shall be 50 to 350 microinches thick. Electroless nickel finish shall be 50 to 100 microinches thick. The addition of 'wetting agents' is prohibited for either sulfamate or phosphorous nickel baths.
- b. Tin plate. Tin plate shall be 200 to 800 microinches thick and shall be dense, homogeneous, continuous, and free of co-deposited organic material. Bright tin plate is prohibited. Tin plate is acceptable over the base metal, or electroplated nickel, or electroless nickel phosphorous. Electroplated nickel or finishes from a sulfamate nickel bath are preferred and shall be 50 to 350 microinches thick. Electroless nickel finish shall be 50 to 100 microinches thick. The addition of 'wetting agents' is prohibited for either sulfamate or phosphorous nickel baths.
- c. Gold plate. Gold plating shall be a minimum of 99.7 percent gold and only cobalt shall be used as the hardener. The gold plate shall have a minimum thickness of 200 microinches deposited on the base metal or 60 microinches deposited over electrolytic nickel underplate."

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3.7.1, delete and substitute the following:

"3.7.1 Marking on each display. The following marking shall be placed on each display and shall be legible at time of shipment:

- a. JAN marking (see 3.7.5).
- b. Military part number (see 1.2).
- c. Index point, if applicable (see 3.7.2).
- d. Manufacturer's designating symbol.
- e. Lot identification code and code of assembly plant (see 3.7.6).
- f. Manufacturer's name, trademark or identification.
- g. Country of origin.

The maximum marking commensurate with display size and the above order of precedence shall apply."

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3.7.5 delete and substitute:

"3.7.5 JAN and J marking. The United States Government has adopted, and is exercising legitimate control over the certification marks 'JAN' and 'J', respectively, to indicate that items so marked or identified are manufactured to, and meet all the requirements of military specifications. Accordingly, items acquired to, and meeting all of the criteria specified herein and in applicable detail specifications shall bear the certification mark 'JAN' except that items too small to bear the certification mark 'JAN' shall bear the letter 'J'. The 'JAN' or 'J' shall be placed immediately before the part number except that if such location would place a hardship on the manufacturer in connection with such marking, the 'JAN' or 'J' may be located on the first line above or below the part number. Items furnished under contracts or orders which either permit or require deviation from the conditions or requirements specified herein or in applicable detail specifications shall not bear 'JAN' or 'J'. In the event an item fails to meet the requirements of this specification and the applicable specification sheets or detail specifications, the manufacturer shall remove the 'JAN' or the 'J' from the sample tested and also from all items represented by the sample. The 'JAN' or 'J' certification mark shall not be used on products acquired to contractor drawings or specifications. The United States Government has obtained Certificate of Registration No. 504,860 for the certification mark 'JAN'."

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Review activities, delete: "Navy - SH".

User activities, delete: "Navy - AS, CG, MC, OS".

Custodians:
Army - ER
Air Force - 11
NASA-MSFC-EG02Preparing activity:
Air Force - 11
(Project 5961-0854)Review activities:
Army - SM
Air Force - 17, 19, 85User activity:
Air Force - 13Agent:
DLA - ES