

Inch-Pound

MIL-PRF-23199/1 (SH)
25 July 1997

**PERFORMANCE SPECIFICATION
PACKAGING, PACKING AND MARKING (PP&M) REQUIREMENTS
FOR INSTRUMENTATION AND CONTROL EQUIPMENT**

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

1 SCOPE

1.1 **Scope.** This specification covers the requirements for packaging, packing, and marking of Instrumentation and Control components to safeguard cleanliness, prevent damage and corrosion, and preserve identification during shipment and storage.

1.2 **Definitions:**

DOT Department of Transportation
ESD Electro-Static Discharge
GBL Government Bill of Lading
GPA Government Procurement Agency
NSN National Stock Number
OBRP On-Board Repair Parts
PP&M Packaging, Packing and Marking
TCN Transportation Control Number

1.3 **Field Service.** Unless otherwise specified or requested by the Government Procurement Agency (GPA), the requirements contained herein do not apply to materials or equipment that is hand carried by vendor field service personnel. The seller field service personnel are responsible for protecting and handling the hand carried items. Materials and equipment that is shipped separately in support of field service is required to be packaged, packed and marked in accordance with this specification.

1.4 **PP&M Procedures:** Seller PP&M procedures written in accordance with the requirements contained herein shall be available for on-site GPA review. Deviations from this specification may be authorized by the GPA on a case basis (i.e., Alternate packaging methods may be authorized when the packaged equipment is intended for near term installation and long term preservation is not required).

1.5 **Applicability.** This specification supplements MIL-PRF-23199 and is specific to I&C equipment. Previous revisions to MIL-PRF-23199 (i.e., MIL-P-23199) referenced levels A, B and C of packaging and packing. This specification eliminates these level designations; thus, any reference to these levels in contractual documents is not applicable. The entire specification should be assumed applicable unless otherwise noted in contractual documents.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

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

STANDARDS

MILITARY

MIL-STD-129 - Marking for Shipment and Storage
MIL-STD-767 - Control of Hardware Cleanliness
MIL-STD-2041 - Control of Detrimental Materials
MIL-STD-2073-1 - Standard Practice for Military Packaging

SPECIFICATIONS

MILITARY

MIL-C-104 - Crates, Wood: Lumber and Plywood Sheathed, Nailed and Bolted
MIL-P-116 - Preservation, Methods of
MIL-C-17361 - Circuit Breakers, Air, Electric, Insulated Housing, (Shipboard Use), General Specification for
MIL-C-17587 - Circuit Breakers, Low Voltage, Electric Power, Air, Open Frame, Removable Construction
MIL-P-24466 - Polyethylene Bags, Sheet, and Tubing, Green
MIL-B-81705 - Barrier Materials Flexible, Electrostatic-Free, Heat Sealable

FEDERAL

L-P-378 - Plastic Sheet and Strip, Polyolefin

3. PACKAGING, PACKING AND MARKING REQUIREMENTS

3.1 General Requirements

3.1.1 Materials

3.1.1.1 "Loose fill" cushioning: Use of "loose fill" cushioning is prohibited.

3.1.1.2 Fiberboard Boxes: The gross weight of a fiberboard box, including contents, shall not exceed the manufacturer's maximum gross weight described on the box. In no case, shall the gross weight of a fiberboard box including contents exceed 200 pounds.

3.1.1.3 Wooden Boxes: Wooden boxes for gross shipments under 200 pounds do not

require skids. Component shipments in wooden boxes exceeding 200 pounds shall have skids suitable for fork-lifting. Wooden boxes shall be girth strapped using rust resistant steel banding around the box in not less than two places. For skids, the girth straps shall be applied to and immediately adjoining the inner edge of each skid. Wooden boxes, including contents, shall not exceed 800 pounds. Reinforced wooden box sketches which include the blocking, bracing and anchoring arrangement shall be provided in the seller's PP&M procedure.

3.1.1.4. Wooden Crates: Components exceeding 800 pounds shall be packed in skid based wooden crates per the construction requirements of MIL-C-104 using material per 3.1.1.5. Reinforced wooden crate sketches which include the blocking, bracing and anchoring arrangement shall be provided in the seller's PP&M procedure.

3.1.1.5 Materials of construction. Wooden boxes and crates shall be enclosed and constructed using commercial quality lumber and/or plywood fabricated in a manner to adequately protect the component. Knots, knot holes, splits and moisture content shall not impair the integrity of the container and component. Commercial nails and/or other fasteners of sufficient size, spacing and quantity to provide a construction that will adequately protect the component under normal handling during shipment. Nails and other fasteners shall be driven so that neither the head nor the point project above and through the surface of the wood. Steel banding shall be rust resistant.

3.1.1.6 Envelopes for use with Detectors. Envelopes shall be pigmented green polyethylene film conforming to the following requirements:

- (a) The polyethylene shall meet the detrimental material control limits in MIL-STD-2041 for mercury and leachable halides and sulfur. Polyethylene meeting the requirements of MIL-P-24466 is considered acceptable.
- (b) The polyethylene shall be free from gels, holes and foreign material and have uniform texture.
- (c) The polyethylene shall be capable of meeting the physical properties for Type II polyethylene as described in L-P-378.
- (d) Envelope size shall be kept to a minimum.
- (e) Envelope nominal thickness shall be .006 inches (.004 inches minimum). Multiple layers may be used for component protection.

3.1.1.7 ESD Control: Envelopes containing components or assemblies susceptible to damage from Electro-Static Discharge (ESD) shall conform to MIL-B-81705 type 1 material or other equivalent ESD protective, heat sealable material which provides electro-magnetic protection and is resistant to tear, puncture, water, water-vapor, and oil.

3.1.1.8 Other Packaging Materials. At a minimum, other packaging materials shall be of good commercial quality and shall be capable of performing their intended function. Envelope material shall be able to be heat sealed resulting in a water/vaporproof barrier and shall be of sufficient thickness to prevent puncture and tearing during handling and shipment. Cushioning materials, dunnage, blocking and bracing shall be applied as required to protect the item and the enclosing media and restrict the movement of the item within the container.

3.1.2 Foreign Materials. All items packaged and packed and all packaging/packing medium shall be free from debris and other foreign materials.

3.2.3.3 Marking. Marking shall be in accordance with paragraph 3.3.

3.2.3.4 Additional Requirements for Primary Plant Detectors. For detectors intended to be in contact with primary plant fluid, contract cleanliness requirements (i.e., MIL-STD-767) shall apply through all steps of packaging and handling. In addition, the green polyethylene bag shall be purged with dry inert gas (nitrogen or argon) having a dew point of minus 40 degrees Fahrenheit or lower prior to sealing.

3.2.3.5 Calibration Data Sheets. When calibration data sheets are required, three copies of the data sheets shall be placed in a heat sealed waterproof envelope and packaged with the detector. The data envelope shall be labeled with its contents, and the detector standard identifier (SI) and serial number. Additionally, the data envelope shall be labeled:

DATA SHEETS
REQUIRED FOR DETECTOR INSTALLATION
STORE WITH THE DETECTOR
DO NOT DISCARD

3.2.4 Neutron and Gamma Detectors.

3.2.4.1 Packaging.

3.2.4.1.1 Each Neutron Detector shall be packaged per the preservation requirements of MIL-P-116 Method IIc or MIL-STD-2073-1 Method 51. The detector shall be placed in a green polyethylene bag (3.1.1.6) with desiccant and humidity indicators. A second bag made from water/vaporproof material shall be heat sealed around the first, green polyethylene bag. The water/vaporproof bag shall be purged with dry inert gas (nitrogen or argon) having a dew point of minus 40 degrees Fahrenheit or lower prior to sealing. Materials shall be in accordance with paragraph 3.1.

3.2.4.1.2 Each Gamma Detector shall be packaged in a heat sealed green polyethylene bag (3.1.1.6) with desiccant and humidity indicators per the preservation requirements of MIL-P-116 Method IIc or MIL-STD-2073-1 Method 51. The green polyethylene bag shall be purged with dry inert gas (nitrogen or argon) having a dew point of minus 40 degrees Fahrenheit or lower prior to sealing. A second bag made from water/vaporproof material shall be heat sealed around the first green polyethylene bag. Materials shall be in accordance with paragraph 3.1.

3.2.4.2 Packing. Each detector shall be packed in a wooden box (3.1.1.3) designed to be shipped and handled under cover and stored in warehouses or other structures affording equivalent protection from weather. The packing shall afford adequate protection during multiple reshipments.

3.2.4.3 Marking. In addition to any special labeling or marking required by the Department of Transportation (DOT) and the marking requirements identified in paragraph 3.3, the following requirements apply:

3.2.4.3.1 The shipping container for each detector shall be marked "Fragile"

3.2.4.3.2 Irradiated (operated or tested in a reactor facility) or radioactively contaminated detectors to be shipped to a GPA program facility shall be marked and labeled in accordance with applicable DOT regulations.

3.2.4.4 Shipping Caps. Each detector connector shall have a weatherproof coaxial connector protective cap to prevent damage to the connector threads and degradation to the connector insulation resistance.

3.2.4.5 Integral Cable. The detector's integral cable shall be coiled and held together with twisted wire ties or other suitable methods.

3.2.4.6 Information furnished with Neutron Detectors. A data sheet with the serial number and measured sensitivity value shall be transmitted in a heat sealed waterproof envelope with each compensated ion chamber.

3.2.5 Special Tools. Special tools which are not required to be installed in the equipment shall be separately packaged and packed as Spare Components (3.2.7).

~~3.2.6~~ Miscellaneous Items. Miscellaneous items such as printed wiring assemblies, connectors, meters, resistors, capacitors and transformers shall be packaged and packed Spare Components (3.2.7).

~~3.2.7~~ Spare Components. Spares including On-Board Repair Parts (OBRP), Shipyard Load Lists (SLL) Items and Initial Navy Supply System Repair Parts (INSSRP) shall be packaged and packed as follows:

3.2.7.1 Resealing Requirement: For sealed unit pack envelopes containing parts/assemblies under 6" in length, width or depth, the envelope shall permit opening and resealing once. All other envelopes shall permit opening and resealing two times.

3.2.7.2 Envelopes: Envelope size should be kept to a minimum. Prior to sealing the envelope, excess atmosphere shall be expelled by reducing the envelope to its smallest volume practical without damage to the component. Envelope materials shall meet the requirements of 3.1.1.7 and/or 3.1.1.8 as applicable.

3.2.7.2.1 Parts/assemblies under 6.0" in length, width or depth. As a goal, this envelope should be a standard 3"x3" envelope *(or smaller) whenever possible. The size of the envelope should not exceed 2" in height or width* greater than the part/assembly after the part/assembly has been placed inside the envelope. However, to allow space for label information for envelopes containing very small parts, the packager/seller is not required to utilize an envelope smaller than 3" in height or 3" in width*.

The seller may increase the envelope size due to GPA/Government supplied labels as specified in paragraph 3.2.9.3 below.

3.2.7.2.2 Parts/assemblies greater or equal to 6.0" in length, width or depth. The size

of the envelope* should not exceed 4" in height or width greater than the part/assembly size after the part/assembly has been placed inside the envelope.

3.2.7.3 Cushioning/Protection:

3.2.7.3.1 Multi-pin electronic devices (microcircuits, Integrated Circuits (IC), EPROMs, etc.):

3.2.7.3.1.1 Tubes and Vials. The use of tubes or vials for or in unit packages is prohibited.

3.2.7.3.1.2 Cushioning Material Thickness. The cushioning for the protection of the leads and terminals shall not exceed a standard size of approximately 5/16" thickness unless the device leads/terminals exceed 1/4" from the bottom of the device. Should a cushioning thickness greater than 5/16" be required, then the cushioning shall not exceed the length of the leads/terminals (as measured from the bottom of the device) by more than 3/32". The protective material shall prevent physical damage and maintain leads and terminals in the manufactured condition under handling and transportation environments.

3.2.7.3.1.3 ESD Cushioning. For ESD sensitive multi-pin electronic devices, the cushioning material shall be a high density conductive foam.

3.2.7.3.1.4 ESD Handling. All ESD sensitive components shall be handled and packaged only at a field force protected work station. For packaging purposes, all microcircuits are considered to be ESD sensitive electronic devices.

3.2.7.3.2 Cushioning/Protection (other than as discussed in 3.2.7.3.1). Cushioning included inside the sealed envelope shall be the minimum required to protect the part/assembly during normal handling and storage (Typically, cushioning inside a sealed envelope, other than as defined in 3.2.7.3.1, need not exceed 1/16" to 1/8" in thickness.). Any additional cushioning required to protect the part/assembly during shipment shall be added outside the sealed envelope as a part of intermediate or final pack and packaging.

3.2.8 Circuit Breaker and Solid State Interrupter (SSI) Packaging.

3.2.8.1 Circuit Breakers: Packaging of Circuit Breakers shall be as specified in the Circuit Breaker Military Specification (MIL-C-17361 (SH) for AQB type and MIL-C-17587(SH) for ACB type circuit breakers).

3.2.8.2 SSI: Packaging SSIs shall be based on weight in accordance with the following:

| <u>Weight</u> | <u>Package as</u> |
|---------------------|--------------------------|
| Less than 75 pounds | Drawers, Chassis (3.2.2) |
| 75 pounds or more | Cabinets, Panels (3.2.1) |

3.2.9 Unit Pack Labels

3.2.9.1 Warranty markings. Warranty markings are not required on sealed unit pack envelopes.

3.2.9.2 Marking Size and Font. The marking size and font, including bar code density, shall be determined such that the label/markings requirements will not increase the package size. Except as noted in paragraph 3.2.9.3, the package size shall be determined per paragraph 3.2.7.2 and not by the label/markings size. All markings must meet the requirements of MIL-STD-129.

3.2.9.3 GPA/Government Supplied Labels. Labels fabricated by the packager/seller shall conform to paragraph 3.2.9.2 above. Any label, supplied by the GPA or a Government agency, which exceeds the size of the envelope (as specified in paragraph 3.2.7.2.1) may be trimmed and/or folded over both sides of the envelope provided the label remains legible and bar codes are not folded. Should the packager/seller be unable to fold and trim the label to meet the requirements of paragraph 3.2.7.2.1, then a larger envelope may be used. In this case, the envelope size shall be determined based on the size of the folded and trimmed label and the part size.

3.3 Marking Requirements. All markings must meet the requirements of MIL-STD-129.

3.3.1 Unit Pack Marking

3.3.1.1 Minimum Label Information. The following minimum information to be printed on the label shall include:

Bar Code Marking
National Stock Number
Description
Drawing/Piece Number, MIL Designation or Catalog Number
Quantity and Unit of Measure
Purchase Order Number
Supplier Name or CAGE Code
Equipment Line Item Number (ELIN) when supplied by the GPA

In addition to the above markings, all labels for ESD sensitive components shall be marked with the standard ESD symbol per MIL-STD-129 and the statement "DO NOT OPEN EXCEPT AT APPROVED FIELD FORCE PROTECTIVE WORK STATION" The minimum size of the symbol shall be one third of an inch measured vertically.

3.3.1.2 Shelf Life Marking. When the item being shipped has a finite shelf life (e.g., 60 months or less), insert the additional information:

- Type I Shelf Life Item
- Cure Date (Seller to insert cure date if an elastomer)
- Expires (Seller to insert shelf life expiration date)
- To be disposed of upon expiration

NOTE: Elastomers with a shelf life between 5-20 years must be marked with a shelf life of 5 years. Elastomers with a shelf life of 20 years or greater must be marked "Cure Date ____". Do not use 20 years beyond cure date."

3.3.2 Intermediate Packing and Marking. Upon completion of paragraphs 3.2.7 and 3.3.1, the parts for the same NSN for a single address shall be packaged together in a separate carton or bag. The exterior of the carton or bag shall be marked with all unit package information in accordance with paragraph 3.3.1 and the following: "INTERMEDIATE PACKAGE - DO NOT REMOVE EXCEPT FOR USE OR AUTHORIZED INSPECTION"

Repair part packaging shall be accomplished so that the number of line items per page of DD-250/DD-1149 form is the maximum number of items per box, carton or bag.

3.3.3 Outer Container Marking. Exterior markings shall contain only that information specified in 3.3.3.1-4, 6-10, 15 and 16 (Mandatory) and 3.3.3.5, 11-14 and 17 (as appropriate) below. Markings on exterior containers shall not reference any: (1) Project, (2) Equipment Specification, or (3) Number of Installed Components

3.3.3.1 Name and Address of Seller

3.3.3.2 Include the complete destination address as provided by GPA and note "For APA Stock", "On-Board Spares", "Shipyards Installation Tools", "Tender Load List", or "Tender Allowance List" if applicable. Include hull number. The specific destination will be furnished by the GPA prior to shipment.

3.3.3.3 Item description(s), including National Stock Numbers (NSN) with Bar Code marking. When shipments include components intended for both installation and on-board spares, the item descriptions should delineate the quantities intended for each use.

3.3.3.4 Standard Identifier and Serial Number as provided by the GPA. The Serial Number must match exactly the serial number marked on the equipment nameplate and shipping document.

3.3.3.5 Equipment Line Item Number (ELIN), when supplied by the GPA

3.3.3.6 Purchase Order Number

3.3.3.7 Government or Commercial Bill of Lading Number/TCN Number/Registered Number/Way Bill Number

3.3.3.8 Gross weight and cube of the parcel as shipped

3.3.3.9 Boxes containing field change kits shall be identified with the following external markings:

- | | |
|-------------------------------------|----------|
| Ship/Alt Number _____ | Note (a) |
| Field Change Number _____ | Note (b) |
| OBRP Are/Are Not Enclosed | Note (c) |
| Box ___ of ___ | Note (d) |
| TCN/Reg. No./GBL Way Bill No. _____ | Note (e) |
| Ship Hull Number _____ | Note (f) |

Notes:

- (a) To be supplied from the GPA if available. If not available, mark "Not Available" or "Later" as directed by GPA
- (b) To be supplied by GPA. Do NOT include project identifier (i.e, S6W)
- (c) Mark one way or the other. OBRP, if required to support the field change, shall be packaged separately and marked (OBRP Field Change____/ShipAlt No.____) identified on the DD-250/DD-1149 by PVR line item and included in the field change box, unless specifically directed by GPA.
- (d) Mark each box "1 of 3", "2 of 3", "3 of 3" etc. If shipment is made from a single box, mark it "1 of 1". Only complete kits shall be shipped unless GPA specifically authorizes shipments of partial kits; in such cases, GPA may provide additional marking instructions to suitably indicate the shortage.
- (e) Enter data as applicable to the shipment
- (f) To be supplied from the GPA if available. If not available, mark "Not Available" or "Later" as directed by GPA

3.3.3.10 **Precautionary note or label (must be in red): "Government-Furnished Equipment - Open per Requirements of Cognizant Government Inspector"**

3.3.3.11 **Precautionary note or label (must be in red): "Warehouse Storage Only"**

3.3.3.12 **For primary plant detectors, the container or unpacked item shall bear the precaution note (must be in red): "Do Not Open Seal Closures Except in Clean Area"**

3.3.3.13 **If arrows are required to indicate the desired position of the container during shipment and storage, place an arrow and the word "UP" on all four sides of the container.**

3.3.3.14 **If applicable, mark "FORK LIFT HERE"**

3.3.3.15 **Two copies of the DD Form 250/DD Form 1149 shall be placed in a waterproof enveloped labeled "Packing List" attached to the outside of each container. In addition, one copy of the DD Form 250/DD Form 1149 shall be placed in a waterproof envelope attached to the inside of the container.**

3.3.3.16 **Mark center of balance as required by MIL-STD-129**

3.3.3.17 **If the shipment consists of one box, mark it "1 of 1". If multiple boxes are involved, each box shall be marked "1 of 5", "2 of 5", etc.**

3.3.4 **Additional Requirements Applicable to Items that are assigned 2S/X1 National Stock Numbers**

For all 2S/X1 components, the unit pack and exterior container must be one and the same (i.e., each 2S/X1 component must be individually packaged for shipment). Individually packaged components may be overpacked in a temporary shipping container for transportation to the destination. The overpack container shall not be marked with the Buyer-provided bar coded labels. Overpack markings shall be in accordance with MIL-STD-129.

In conjunction with providing shipping destinations and applicable shipping documents, the Buyer will supply for Seller use two (2) bar coded labels for each component that is assigned a 2S/X1 NSN. The Seller shall affix one of these labels immediately above the exterior markings required above. The second Buyer-furnished label is to be affixed completely opposite of the first (i.e., if the first label is on the front upper left, the second label is on back panel lower right).

When tags are used to meet the requirements for exterior markings the tags must be made of plastic in accordance with MIL-STD-129 and the bar coded labels are to be applied to the front (preferred) or reverse side of such tags.

3.3.5 Requirements for Classified Shipments. Classified shipments shall be in accordance with the National Industrial Security Program Operating Manual (NISPOM). Additional classified hardware markings shall be as specified in the latest revision of the Contract Security Classification Specification and its attachments.

4.0 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 inspection requirements as follows. If PP&M is performed at a packaging supplier and the equipment is to be drop shipped from the packaging supplier, the seller shall perform periodic audits and overchecks to determine compliance with this specification and the applicable PP&M procedure.

(a) PP&M shall be visually inspected as necessary to determine compliance with this specification. Sample inspection per the seller's sample inspection procedure is acceptable.

(b) The shipping vehicle shall be visually inspected when the shipment exceeds 1,000 pounds. Shipping vehicles with unsatisfactory conditions shall not be used. All truck shipments shall have a driver vehicle inspection report in accordance with DOT CFR Title 49, Chapter III, Part 396.11 and the items to be checked on the loaded vehicle prior to release shall be identified in the supplier's packaging, packing, and shipping procedure when the shipment exceeds 1,000 pounds. As a minimum, the loaded truck shall be inspected for (1) load shored and tied down as needed, (2) weight properly distributed and not overloaded, and (3) tailgates and doors closed, and all equipment secured.

Preparing activity:
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