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SUPERSEDING
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# PERFORMANCE SPECIFICATION
# PACKAGING AND PACKING REQUIREMENTS FOR
# SPECIAL PURPOSE MECHANICAL COMPONENTS AND REPAIR PARTS

This specification is approved for use by the Naval Sea Systems Command (NAVSEA), Department of the Navy.

## 1. SCOPE

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

## 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 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.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 03R42, 2531 Jefferson Davis Highway, Arlington, VA 22242-5160 by using the Standardization Document Improvement Proposal (DD From 1426) appearing at the end of this document or by letter.

AMSC N/A FSC PACK

SPECIFICATIONS

MILITARY

MIL-P-24466 - Polyethylene Bags, Sheet, and Tubing, Green.

FEDERAL

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

STANDARDS

MILITARY

MIL-STD-129 - Marking for Shipment and Storage.
MIL-STD-767 - Control of Hardware Cleanliness.
MIL-STD-2041 - Control of Detrimental Materials.

MANUAL

UFC-3 -Standardized Inspection of Shipment Railcars.

(Documents are available from the contracting agency or from the Standardization Documents Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Other Government documents and publications. The following other Government documents and publications form a part of this specification to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

PUBLICATIONS

DEPARTMENT OF TRANSPORTATION (DOT)
Code of Federal Regulations (CFR)
Title 49 - Transportation
Chapter III - Federal Highway Administration
Parts 390-399 - Federal Motor Carrier Safety Regulations

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

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document shall take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exception has been obtained.

## 3. REQUIREMENTS

### 3.1 Definitions.

(a) Components. Any mechanical item, assembly, equipment, component, repair part, and tooling governed by this specification.
(b) Controlled part specifications. Any reference to (or application of) of one or more of the documents listed in MIL-STD-2041 Appendix D.
(c) Critical surface. A surface which, when corroded or otherwise roughened, can impair the component's proper function. Examples include small orifices, bearings, bellows, seating surfaces, seal weld diaphragm closure parts, thread surfaces, seal membranes or heat exchanger tubing up to 1/8 inch thick.
(d) Cushioning. Packaging materials used for component protection during handling and shipment from shock and vibration damage. The cushioning materials shall have sufficient strength to perform this function and resist puncture and tearing of envelopes.
(e) Foreign material. Any material or object that should not be on or within clean components. Examples include grit, chips, particles, oil, slag, scale, fibers, tape, tools and loose articles.
(f) Packaging. The protective measures to prevent deterioration, including as applicable, the use of appropriate preservatives, protective wrappings, cushioning, interior containers and complete identification marking, up to but not including the exterior shipping container.
(g) Packing. The exterior shipping containers, or other shipping media, and assemblies of items or packages therein, together with necessary blocking, bracing or cushioning, weatherproofing, exterior strapping and marking of shipping containers.
(h) Preservation. Protection of components which would deteriorate from exposure to atmospheric conditions or moisture by using preservation methods such as preservatives, water-vaporproof envelopes, purging or desiccating components.
(i) Supplier. The seller under the contract or purchase order which incorporates this specification.

3.2 Cleanliness. If cleanliness requirements are specified in other technical requirements, those cleanliness requirements apply. If not specified, the following cleanliness requirements apply:

(a) Prior to packaging, the component surfaces shall be cleaned to the extent that they are visibly free of water or foreign material. The components shall be maintained clean during handling, packaging, packing, marking, and transportation. Care should be exercised to ensure no foreign material or loose objects such as tape, caps or plugs enter or are placed into the component during final cleaning, packaging and packing.
(b) Metallic materials contacting surfaces of the component being shipped, or which might shed rust or scale into the interior of the component being shipped, shall be corrosion resistant and shall not cause galvanic corrosion or transfer any material at the contact area.

(c) Lead or lead alloys shall not contact surfaces of components being shipped.
(d) Mercury or mercury compounds are prohibited in packaging, packing, and marking materials.
(e) Tape is prohibited on component internal surfaces and weld preparations.

3.3 Packaging.

3.3.1 General. Unless otherwise specified (see 6.1), components shall be individually packaged and provided with minimum volume packaging, meeting the following criteria:

3.3.2 Packaging in sealed envelopes. Components (1) having areas inaccessible for cleaning or inspection, (2) procured to controlled part specifications as defined in 3.1.(b), or (3) cleaned to MIL-STD-767 or MIL-STD-2041 shall be packaged in heat sealed envelopes. If heat sealing of the envelope is not possible due to size or configuration, the component shall be covered and enclosed with the envelope and sealed with tape. The tape contact with the component external surfaces shall be minimized and for components to which MIL-STD-767 and/or MIL-STD-2041 applies, the tape shall conform to the requirements contained in MIL-STD-767 and/or MIL-STD-2041. The contents of the package shall be arranged to provide the smallest practical cubage. Prior to sealing the envelope excess atmosphere shall be expelled by reducing the envelope to its smallest volume practicable without damage to the component. Component projections which might pierce the envelope or be damaged during shipping and handling shall be wrapped or cushioned with envelope material and secured to the component prior to insertion into the envelope. No cushioning material shall be permitted inside the envelope unless permitted herein.

3.3.2.1 Envelopes. 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.

3.3.3 "Loose fill" cushioning/plastic materials. "Loose-fill" material is prohibited. Plastic materials shall not be used unless required to provide the necessary degree of physical, environmental and/or mechanical protection. Yellow pigmented material shall not be used for packaging envelopes/wrappings for any components.

3.3.4 Externally threaded components. Externally threaded components shall be protected with polyethylene or polyvinylchloride mesh tubing which extends the entire threaded length.

3.3.5 Rigid unit/intermediate container. Rigid unit/intermediate containers shall be used to package components which are fragile, delicate, or have critical external surfaces susceptible to point contact damage, prior to placement in outer containers. The packaged component shall be cushioned and braced as needed within the rigid container in a manner to prohibit movement.

3.3.6 Sealing component nozzles/openings. All component openings shall be capped, plugged or sealed by using expandable plugs, nonexpandable plugs and shipping caps or other method to provide for hardware protection and cleanliness during shipping and storage. The sealing method used shall be described in the supplier's packaging, packing and shipping procedure. The following general requirements apply to the use of caps, plugs and seals:

(a) Prior to use, all sealing devices shall be verified clean to the cleanliness requirement of the component to which it is applied.
(b) For components to which MIL-STD-767 and/or MIL-STD-2041 applies, sealing devices shall conform to the requirements for temporary seals, plugs, and caps contained in MIL-STD-767 and/or MIL-STD-2041.
(c) Nonmetallic materials used for nonexpandable plugs and caps shall be brightly colored and not be made from tearable items such as cloth, paper, plastic film or foam.

3.3.7 Specialized preservation methods. When specified (see 6.1), a specialized preservation method such as purging, desiccants and humidity indicators, preservatives, or water-vaporproof envelopes shall be used to protect components from atmospheric conditions and moisture. The use of contact preservatives, volatile corrosion inhibitors, and other material intended to inhibit corrosion is prohibited except when specified above. Purge gas when used shall be dry inert gas (nitrogen or argon), free of dirt, oil, or halogens, and shall have a dew point of minus 40 degrees F or lower. When desiccants are used on component internal surfaces, the desiccant bags shall be placed into nylon bags, the nylon bags placed into perforated metal canisters, and the canisters attached to the component internal surface. Humidity indicating cards when used on component internal surfaces shall be properly secured. Preservative and desiccant labeling shall be as required by 3.5.6.1 and 3.5.6.2, respectively.

3.4. Packing.

3.4.1 General. Unless otherwise specified (see 6.1), each component shall be separately packed except for repair parts and tools which may be separately or multiple packed in one shipping container. The package(s) or component(s) shall be cushioned, blocked, braced, and anchored as needed within the container to prevent movement and resulting damage to the component. Unless otherwise specified (see 6.1), the supplier shall design, construct and test the container, as needed, to ensure component protection is provided during handling, shipping and storage and shall be capable of withstanding multiple reshipments.

3.4.2 Outer containers. The selection of the container shall be at the option of the supplier. The container shall be made of fiberboard, wood, or metal provided that the container complies with the requirements specified below. Components having critical surfaces which cannot be effectively protected, shall be packaged in metal containers.

3.4.2.1 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 exceed 200 pounds. When the gross weight of the fiberboard box exceeds 70 pounds, a wooden apron shall be added around the base of the box to protect the contents from forklift damage.

3.4.2.2 Wood boxes. The gross weight of a wood box, including contents, shall not exceed 30,000 pounds. For component shipments exceeding 200 pounds, the box shall have skids suitable for forklifting. Components exceeding 800 pounds shall be packed in reinforced wooden boxes with bases and the component shall always be placed on and secured to the base with bracing by bolting through the base and skids. Wood boxes shall be girth strapped using steel banding around the box at not less than two places. For skids, the girth strap shall be applied to and immediately adjoining the inner edge of each skid. Reinforced wood box sketches which includes the blocking, bracing and anchoring arrangement shall be provided in the supplier's packaging, packing and shipping procedure.

3.4.2.2.1 Materials of construction. Wood boxes shall be enclosed and constructed (1) using commercial quality lumber of at least 1 inch nominal size and plywood of at least 1/2 inch nominal thickness fabricated in a manner to adequately protect the component, (2) such that knots, knot holes, splits and moisture content will not impair the integrity of the container and component, and (3) with 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. Banding shall be steel with rust resistant coating.

3.4.2.3 Metal containers. Metal containers shall be water-vaporproof and provide component protection against deterioration and damage due to environmental conditions, handling, shipment and storage. The integrity of the container design, and any associated equipment shall be the responsibility of the supplier. Metal containers shall conform to the following requirements:

(a) The container design, construction methods and materials, and drawing shall be contained in the supplier's packaging, packing and shipping procedure.
(b) The container shall have skids suitable for forklifting the container if forklifting is required for handling and lifting.
(c) Each container shall be leaktight and sealed with gasket closures.
(d) All noncorrosion resistant container surfaces shall be painted.

3.5 Labeling and marking.

3.5.1 General. In addition to any special labeling or marking required by the Department of Transportation, contractual requirements and as specified (see 6.1), unit and intermediate packages and shipping containers shall be labeled and marked for shipment in accordance with MIL-STD-129 and the following:

3.5.2 Unit/intermediate package marking. Unit or intermediate packages, if provided, shall be marked with the following precautionary marking: "FINAL PACKAGE - DO NOT

REMOVE FOR WAREHOUSE STORAGE - DO NOT OPEN EXCEPT FOR USE OR AUTHORIZED INSPECTION". When components are cleaned in accordance with MIL-STD-767, unit or intermediate packages if provided shall be marked "DO NOT OPEN, INSPECT OR REPACKAGE EXCEPT IN CLEAN AREA IN ACCORDANCE WITH MIL-STD-767".

3.5.3 Repair part marking.

3.5.3.1 Exterior marking for heat-sealed packages. For packaging other than rigid unit/intermediate containers, the outer container shall state that "Exterior packaging down to, but not including the sealed envelope, may be removed by end users prior to placement in bin or drawer storage to reduce the package to minimum cube. Packaging shall not be removed for warehouse storage".

3.5.3.2 Exterior marking for rigid unit/intermediate packages. The outer container shall state that "Exterior packaging down to, but not including the rigid unit/intermediate package, may be removed prior to placement in bin or drawer storage to reduce the package to minimum cube".

3.5.4 Shipping container marking. Shipping containers shall be marked with the following precautionary marking, prominently located: "WAREHOUSE STORAGE ONLY".

3.5.5 Packing list. The packing list shall consist of two copies of the shipping documents such as DD Forms 250 and 1149, placed in a waterproof envelope labeled "Packing List" and attached to the exterior of the shipping container. In addition, one copy of the shipping documents shall be placed in a waterproof envelope attached to the inside of the shipping container.

3.5.6 Specialized marking.

3.5.6.1 Preservative labeling. When a preservative is specified for use, a note shall be placed on the unit package label stating the need for and method of preservative removal (if required) prior to component use.

3.5.6.2 Desiccant labeling. When desiccant is specified for use, warning notices shall be placed on the container to indicate the location and quantity of desiccant in the unit package and the location of the humidity indicating card, if used.

3.5.7 Bar code marking and labels. Identification labels shall be secured inside the envelope with the component or heat-sealed in a section (tab end) separated from the component so as to be permanently legible. When bar code markings are required by MIL-STD-129 or other contractual requirements and cannot be read through the envelope, such as with green polyethylene, or could be made illegible from component preservatives; the identification label containing the bar code national stock number shall be permanently affixed to the outside of the envelope. Labels shall be fabricated to fit the envelope. If labels are supplied and which may exceed the envelope size, the label may be trimmed and/or folded over the envelope provided the label remains legible and bar codes are not folded.

3.6 Shipment. If the vehicle is not covered, the component shipment shall be covered with a water repellant tarpaulin. The supplier shall ensure that components which need to be secured to the transportation vehicle are adequately secured. Rail and barge shipments of components and shipments of hazardous materials are permissible provided they are permitted by the procurement documents or approved by the contracting agency.

3.7 Packaging, packing and shipping procedures. A procedure is required which describes the methods that will be used by the supplier to clean, preserve, package, pack, mark, and ship components and shall be made available for review upon request. Unless otherwise approved by the contracting agency, the procedure shall conform to the requirements of this specification.

## 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 inspection requirements as follows:

4.1.1 Inspection/visual tests.

(a) All packaging, packing and marking shall be visually inspected to determine compliance with specification requirements. Wood boxes, including contents, exceeding 10,000 pounds shall be inspected to verify the integrity of the box.
(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 comply with DOT CFR Title 49, Chapter III, Parts 390-399 and have a driver vehicle inspection report in accordance with Part 396.11. 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 on enclosed components secured. Rail shipments shall be inspected in accordance with UFC-3.

## 5. PREPARATION FOR DELIVERY

This section is not applicable to this specification.

## 6. NOTES

6.1 Ordering data. Procurement documents shall specify the following:

(a) Title, number, and date of this specification.
(b) Whether the quantity per unit package is other than one and whether packaging to be used is other than in accordance with paragraph 3.3 (see 3.3.1).
(c) Whether specialized preservation methods are required and, if so, the specific method (see 3.3.7).

(d) Whether each package does not require a separate pack (see 3.4.1).
(e) Whether any specific design, construction and testing of the container are required (see 3.4.1).
(f) Special marking requirements (see 3.5.1).

6.2 Relationship to previous revisions.

6.2.1 Packaging and packing levels. Previous revisions to this document referenced levels A, B, and C of packaging and packing. This revision eliminated these level designations; thus, any contractual document referencing these levels are no longer applicable. The entire specification should be assumed applicable unless otherwise noted in contractual documents.

6.2.2 Packaging and packing of electronic components. Previous revisions to this document contained packaging and packing requirements for electronic components which have been eliminated in this revision. Packaging and packing requirements for electronic components which includes instrumentation and control equipment are now contained in MIL-PRF-23199/1.

6.3 Changes from previous issue. Margin bars are not used in this revision to identify changes with respect to the previous issue, due to the extent of the changes.

Preparing activity:
Navy - SH
(Project PACK-N059)