

PACKAGING INSTRUCTIONS FOR SUPPLIERS

I. Instructions

- A. This specification is provided to inform vendors of Barber Nichols' minimum packaging requirements. This document is superseded by any special requirements listed on drawings or specifications.
- B. Failure to comply with the requirements specified herein may result in rejection and return of consignment(s) to the supplier at their expense.
- C. **Suppliers must be able to provide proof of compliance to use of military specification materials called out in this document upon request by Supplier Quality.**
- D. For questions related to the application of this Packaging Information, please contact the Barber Nichols Buyer.
- E. Any exceptions to this document must be authorized by the Supplier Quality Representative.

II. Definitions

- A. Drop Shipments – A supplier product delivered directly to a Barber Nichols customer without having to ship through a Barber Nichols facility.
- B. Exterior Shipping Container - A container, bundle or assembly which is sufficient by reason of material, design and construction to protect material during shipment and storage. This can be the unit container or a container with any combination of unit or intermediate containers.
- C. Intermediate Container - A wrap, box, bundle or assembly which contains two or more-unit containers of identical items.
- D. Unit Container - The first container applied to a single item or quantity thereof, or to a group of items of a single part number, which constitutes a complete or identifiable package. The unit container should be overpacked for shipment unless the unit container is specifically designed to provide shipping protection.

III. General Packaging Requirements

- A. The packaging should allow for safe delivery of the shipment to its destination with no damage to the contents.
- B. Follow ASTM-D3951 (Standard Practice for Commercial Packaging) except for Drop Shipments to the Customer or excluded items.
- C. Drop Shipments to the D.O.D. or Barber Nichols Customers shall be per MIL-STD-2073, Level A for both Foreign and Domestic Shipments.
- D. Items excluded from ASTM-D3951:
 - 1. Ammunition, explosives and hazardous materials
 - 2. Tape and reel components
 - 3. Plastic Encapsulated Microcircuits (PEMs)
 - 4. All overseas shipments either to or from the Continental United States.



- E. This document provides supplemental details and clarification for items covered by ASTM-D3951.
- F. No packaging material is to be used that will leave any residue from the packaging material on the parts as a result of packaging or unpacking the product.
- G. Foreign Object Debris (FOD)**
 - 1. **DO NOT USE LOOSE FILL MATERIAL IN ANY FORM.** Loose fill material will be considered as any small piece of packaging material that can be poured into a container to fill void container space. Some examples of loose fill are packing peanuts, shredded paper or plastic, folded paperboard pieces and broken expanded polystyrene (Styrofoam) pieces. See ASTM D3951, Section 5.1.1.4.
 - 2. There shall be no evidence of FOD in received containers.
- H. Staples are not to be used for the closure of packs due to several negative impacts:
 - 1. When staples are removed, they can become FOD
 - 2. Staples do not provide for a proper seal of barrier bags
 - 3. The removal process of staples can lead to potential personal injuries (eye and hand)
- I. Mitigate part movement
 - 1. Helps to prevent part damage due to vibration such as scratches
 - 2. Remove excess air from bags with multiple parts. Roll excess bag material around the bagged items and secure.
 - 3. Fill void spaces with cushioning material or blocking (when necessary to mitigate part movement)
- J. "Pink Poly" in any form, used as cushioning, wraps, bags or dunnage/filler must comply with MIL-STD-3010, Method 3005. "Pink Poly" does not provide ESD shielding properties and may not be used to replace conductive materials as the ESD protective shielding medium for static sensitive devices. Acceptable "Pink Poly" material shall comply with military specifications (i.e. A-A-3129, Type I, Style B, Class 2, Grade B or PPP-C-795, Class 2).
WARNING: Suppliers must be able to supply proof of compliance to MIL-STD-3010, Method 3005.

IV. Cleaning and Preservation

- A. Cleaning - Items shall be clean and free of contaminants. Any process may be utilized which will attain this condition without damage to the items.
- B. Drying - Items shall be thoroughly dried to remove cleaning solutions or residue moisture by any process which is not injurious to the items. The items must be dry, both internally and externally, if their configuration requires it. All entrapped cleaning fluid shall be completely drained from the items.
- C. Preservation of Non-Electric Items - Immediately after cleaning and drying of items, a continuous coating of contact preservative shall be applied to bare ferrous items which require protection against corrosion and deterioration.
 - 4. Unpainted and Unplated Surfaces of partially painted or plated surfaces shall be coated.
 - 5. Completely Non-Ferrous, Painted or Plated Items shall not require preservation. (Examples: gold plate, silver plate, cadmium plate, zinc plate, tin plate, stainless steel)



6. Complex Items requiring interior preservation shall be sloshed, sprayed or dipped.
 - a. Preservation shall be applied in such a manner as to insure complete coverage of both interior and exterior surfaces.
 - b. The preservation shall be thoroughly drained to avoid entrapment of preservative, which could subsequently damage the package.
 - c. If openings cannot be sealed by design features, the openings shall be sealed with caps or plugs.
7. Castings or Forgings shall be individually wrapped or separated.
8. Grease Fittings - Items such as universal joints and flexible cables that are equipped with grease fittings shall be preserved with grease per MIL-PRF-10924.
9. Volatile Corrosion Inhibitor (VCI) - In lieu of contact preservation, bare ferrous items may be protected with the following VCI materials:
 - a. VCI treated transparent bags per MIL-DTL-22020
 - b. VCI treated transparent barrier material per MIL-PRF-22019
 - c. VCI treated wrapping material per MIL-PRF-3420

V. Part Surface Protection

- A. Individual part protection is required if grouping together multiple items of these types (see list below, Section C) in the same unit container.
- B. Types listing a requirement for a heat-sealed bag (see list below, Section C) must either:
 1. Bag and heat seal the group of parts as a whole utilizing the bag specified. If the item weighs over 1/2 pound, then the item must be individually bagged and heat sealed utilizing the bag specified.
 2. Individually bag and heat seal the parts utilizing the bag specified
- C. The following types of items shall be individually bagged or individually wrapped in a non-tarnishing and non-abrasive material to prevent tarnishing, scratching or abrasion:
 1. Items weighing more than 1/4 pound
 - a. Does not apply to hardware items (E.G. - nuts, washers, etc.)
 - b. Does not apply to threaded bolts as long as bolts are restrained from movement
 - c. Does not apply to raw stock material to be machined
 2. Items of a critical nature
 3. Painted or Plated Items which could be damaged by scratching or abrasion
 4. All precision finished items
 5. Precious Metal Items
 - a. Wrapping Material: If individually wrapping items, utilize lens paper per A-A-50177 or equivalent.
 - b. **All items of this type shall be placed in a bag conforming to MIL-DTL-117, Class E or F and heat sealed to protect against tarnishing or corrosion.**
 6. Tin- and Silver-Plated Items that can be soldered in subsequent assemblies



- a. Wrapping Material: If individually wrapping items, utilize chemically neutral (non-corrosive) wrapping paper conforming to MIL-DTL-17667. Equivalent, non-tarnishing materials may be used.
 - b. All items of this type shall be placed in a bag conforming to MIL-DTL-117, Class E or F and heat sealed to protect against tarnishing or corrosion.
 - c. If necessary to prevent tarnishing, desiccant shall be placed inside the bag, but not in direct contact with the parts.
- D. Silk-Screened Plexiglass Items should have a protective tape placed on the item surface. The tape should not leave behind a residue.

VI. Cushioning

- A. Fragile and Delicate Items shall be cushioned to prevent damage.
- B. Blocking and bracing of items within their shipping containers shall be accomplished by utilizing cushioning to prevent movement and damage.
- C. Cushioning shall conform to:
 1. Cellulosic Cushioning: A-A-1898
 2. Corrugated Fiberboard: ASTM D4727
 3. Flexible Closed Cell Plastic Film: PPP-C-795
 4. Foam Sheet: A-A-59135, Class 1 (polyethylene) or Class 2 (polypropylene), Grade A (standard) or Grade B (static dissipative)
 5. Polyethylene Foam Plank: A-A-59136, Type I, Class 1, Grade A (standard) or Grade B (static dissipative)
 6. Paperboard Wrapping and Cushioning: A-A-1051
 7. Flexible Open Cell Plastic Film: A-A-3129, Type I, Style B, Class 2, Grade B
 8. Polyurethane Foam: MIL-PRF-26514, Type III, Class 2, Grade B
 - a) Foreign Object Debris (FOD) - Due to the nature of conductive polyurethane foam and ester polyurethane foam disintegrating over time to create FOD, they are NOT ACCEPTABLE.
 - b) Ether polyurethane foam is ACCEPTABLE because it does not disintegrate over time.
 9. Semi-Rigid Foam-In-Bag: MIL-PRF-83671, Class 3
 10. 3-Ply Kraft Paper: A-A-59311

VII. Unit Container

- A. Size - The size shall provide a snug fit for the item.
- B. Separation - Items requiring separation from each other because of a delicate nature shall be packed in a compartmentalized unit container to prevent shifting or movement of the items.
- C. Multiple Quantities - Containers with multiple quantities shall allow easy access to the individual parts without disturbing the remaining items.
- D. Maximums - When practical, the unit packages shall not exceed fifty (50) pieces or twenty-five (25) pounds, whichever occurs first. One kit, one set or one pair of items shall always be utilized as one (1) regardless of weight.



- E. Bulk Items - The unit container quantity for bulk items shall be specified on the purchase order.
- F. Matched Pair Items - Matched pair items or items that come in matched sets shall be packaged so as to keep the sets separated from one another.
- G. Unit Containers shall conform to the following, equivalent or better than:
 - 1. Folding Paperboard Box: PPP-B-566
 - 2. Set-up Box: PPP-B-676
 - 3. Heat Sealable Bag: MIL-DTL-117
 - 4. Fiberboard Box: ASTM D5118

VIII. Intermediate Container

- A. Use of intermediate containers are preferred but not mandatory for large quantities of small items.
- B. Limitations
 - 1. Quantity: one hundred (100) unit containers
 - 2. Weight: a maximum net load of forty (40) pounds
 - 3. Size: a maximum size of 1.5 cubic feet
- C. Any remaining quantities over the above restrictions shall be placed in the smallest container which will accommodate the unit packages.
- D. Intermediate containers shall conform to ASTM D5118.

IX. Exterior Shipping Container

- A. Assure containers are in accordance with carrier rules and regulations, applicable to the mode of transportation.
- B. Exterior shipping containers shall be of a minimum size container to provide a snug fit for the item.
- C. All wood boxes, wood skids, wood filler assemblies, wood dunnage assemblies, and wood pallets must be compliant to International Standards for Phytosanitary Measures No. 15 (ISPM-15).
- D. Wood packaging material shall be assembled using materials certified compliant with the American Lumber Standards Committee (ALSC) Non-Manufactured Wood Packing (NMWP) regulations and International Plant Protection Convention (IPPC) standard requirements.
- E. The shipping container shall be capable of multiple handling and storage periods at a minimum of one year in enclosed facilities without damage to the product.
- F. Usable container specifications
 - 1. Commercial equivalents must meet performance specifications of ASTM D3951, Section 2.
 - 2. Fiberboard Containers
 - a) Barber Nichols insists on strict compliance with Uniform Freight Classification, Rule 41 from the railway industry for the minimum requirements of fiberboard containers regarding weight and size limitations.



- b) Staples are not to be used for closure.
 - c) Fiberboard Shipping Boxes: ASTM D5118
 - d) Triple-Wall Corrugated Fiberboard Containers: ASTM D5168
3. Crates
- a) Crate specifications
 - 1) Wood-Cleated Panelboard Shipping Boxes: ASTM D6251
(Preferred design is ASTM D6251, Type III, Class 2, Style A or B)
 - 2) Wood Boxes: ASTM D6880
 - 3) Wood-Cleated with Skidded, Load-Bearing Bases: ASTM D6256
 - 4) Wire bound Pallet Type Wood Boxes: ASTM D6254
 - 5) Steel or Aluminum Slotted Angle Crates: ASTM D6255
 - 6) Open and Covered Wood Crates: ASTM D6039
 - 7) Heavy Duty Sheathed Wood Crates: ASTM D7478
 - 8) Open Wood Crates; 12,000 and 16,000 Pound Capacity: MIL-C-3774
 - b) Weight and size limitations: See ASTM D3951, Table I or container specification.
 - c) Crates with gross weight over 250 pounds
 - 1) Provided with skids made from 4" x 4" nominal lumber or larger
 - 2) If the crate specification requires a skid size larger than 4" x 4" nominal lumber, the larger skid size shall be used.
 - d) Closure for shipments within the Continental United States (CONUS) to Barber Nichols facilities
 - 1) Use closure methods that allow for ease of uncrating
 - 2) Closure method should not inhibit the integrity of the crate construction
 - 3) Suitable method examples:
 - i. Phillips wood screws (appropriate size, not drywall screws)
 - ii. Klimp fasteners per Military Specification MS24535
 - iii. ASTM D6251, Figure 3: Unnailed Top Panel Closure secured with strapping
- G. Parcel Post Shipments - Containers shall conform to any container capable of meeting postal regulations. The container must be of sufficient strength to retain and protect its contents from the weight of other mail shipments.
- H. Palletized Loads
- 1. Efficient Pallet Utilization - When four (4) or more exterior shipping containers (except skidded containers) are being shipped to the same destination, the pallet load will utilize eighty-five (85) percent of the pallet base to a minimum height of thirty-five (35) inches, including the height of the pallet.



2. Maximum Load Height - The load shall not exceed a height of forty-one (41) inches maximum, including the height of the pallet.
3. Balanced Loading - Containers which are stacked during shipment shall have the weight of the top container evenly distributed over the top of the lower container.

X. Marking

- A. Markings shall be sufficient to clearly and visibly identify the contents of the package.
- B. Markings shall be in accordance with carrier rules and regulations.
- C. Hazardous or restricted items must be properly marked in accordance with Title 49 of the United States Code of Federal Regulations (49 CFR).
 1. Exterior shipping packages (shipping cartons) shall be marked with U.N. certification markings indicating the level of performance achieved through testing.
 2. For interior packaging such as cans and bottles, a certificate of compliance or actual test reports indicating the level of performance achieved through testing must be provided.
 3. Reference Title 49 of the United States Code of Federal Regulations (49 CFR).
- D. Minimum Container Markings
 1. Minimum container markings apply to the unit container, the intermediate container (when unit containers are overpacked into an intermediate container) and the exterior shipping container.
 2. Minimum container markings shall be IN ADDITION TO other required markings such as hazardous material markings.
 3. Shipments within the Continental United States (CONUS) to Barber Nichols facilities shall be in accordance with ASTM D3951, Section 5.1.6 except for Classified Items. The nomenclature shall not appear on the exterior container for Classified Items.
 4. All drop shipments to the Department of Defense shall be in accordance with MIL-STD-129.
 5. Include precautionary markings, if applicable
 - a) Static Sensitive: Affix static electricity labels to the unit package and exterior container when applicable.
 - b) Magnetic
 - c) Fragile
- E. Temperature Sensitive Materials (when required)
 1. Only required when the item is susceptible to damage from temperature extremes due to the shipping or storage environment or when specified in the contract, purchase order or drawing.
 2. Affix storage temperature warning labels
 3. Locations of storage temperature warning labels
 - a) On the package closest to the product
 - b) On the outside shipping container
- F. Lot, batch or identification control numbers (when required)
 1. Only required when specified in the contract or purchase order.



2. Place on unit packs, intermediate containers and exterior containers.
 3. Precede with the proper designation. (Example: LOT A03, Serial Number 15790)
 4. Show adjacent to the contract number.
- G. Shelf-Life Marking (when required)
1. Only required when specified in the contract, purchase order, drawing or Q-Note other than PIV.
 2. Apply shelf-life markings as part of the item identification data to unit packs, intermediate containers, exterior containers and unpacked items.
 3. Mixing different shelf-life dates in the same unit container is not allowed.
 4. When two or more-unit packs of the same item are consolidated within any intermediate or exterior containers and have different shelf-life dates, the earliest dates shall be shown on those containers.
 5. For items that contain rubber or synthetic elastomers, calculate dates from the cured date
 6. Examples
 - c) EXAMPLE 1 (TYPE I) - Non-Extendable Shelf-Life Items, (Month/Year)
MFD DATE 4/12
EXP DATE 4/16
 - a) EXAMPLE 2 (TYPE II) - Extendable Shelf-Life Items, (Month/Year)
ASSEMBLED DATE 10/13
INSP/TEST DATE 10/16
 - b) EXAMPLE 3 (TYPE II) - Identify cured items by calendar quarter, (Quarter/Year)
CURED DATE 4Q13
INSP/TEST DATE 4Q16
- H. Marking for Aluminum Electrolytic Capacitors
1. The unit package shall be marked "DO NOT DE-TRASH".
 2. The unit package, intermediate package (if an intermediate container is utilized) and shipping container
 3. shall be marked: **"WARNING! Capacitors may contain an electrical charge.** If found not bonded or not shorted (terminals not tied together with conductive material such as a bus wire or bus bar), handle with electrical safe work gloves rated for the voltage of the parts within."
- XI. **Quality Assurance**
- A. Failure to comply with the requirements specified herein may result in rejection and return of consignment(s) to the supplier at their expense.
 - B. For questions related to the application of this Packaging Information, please contact the Barber Nichols Buyer.
 - C. Any exceptions to this document must be authorized by the Supplier Quality Representative.