PACKAGING

The Basics

U.S. ARMY MATERIEL COMMAND
U.S. ARMY SUSTAINMENT COMMAND
PACKAGING, STORAGE, AND CONTAINERIZATION CENTER

An Army guide for Soldiers and civilians.
The bottom line is to preserve it and pack it right!

Packaging - The Basics should be used as a quick guide for basic preservation, packing, and packaging. Other additional information should be used in conjunction with this guide.

June 2020

Foreword

This document was prepared as a guide for all Soldiers and civilians involved in the packaging of national stock and retrograde materiel. The information contained in this document is derived from the most current government packaging documents at the time of publication. Noted documents and websites may change without notification.

When it comes to packaging materials and publications, other sources will be key to getting the job done right the first time. In some instances, you may be engaged in the packaging of certain items on an ongoing basis; this may require comprehensive knowledge and expertise of a specific type of container or performance of a specific process such as foam-in-place (FIP). These operations often require that applicable specifications/standards be "On Hand" for reference to make sure you do the job correctly. You can find the standard/ specification number you need by accessing the Document Automation and Production Service (DAPS) through the ASSIST web site http://quicksearch.dla.mil/.

Table of Contents

IT IS HARD TO RESIST... PACKAGING

Publications

MIL-STD-2073-1
DoD STANDARD PRACTICE FOR MILITARY PACKAGING
This document outlines standard processes for the development and documentation of military packaging, as distinct from commercial packaging. This standard covers methods of preservation to protect materiel against environmentally induced corrosion and deterioration, physical and mechanical damage, and other forms of degradation during storage, multiple handling, and shipment associated with the military
distribution system.

AR 700-143
Packaging of Hazardous Material
This regulation reissues Reference (b) and establishes uniform policy for packaging Hazardous Materials (HAZMAT) for safe, efficient, and legal storage, handling, and transportation, to include Department of Transportation Special Permit (DOT-SP), Competent Authority Approval (CAA), Certificate of Equivalency (COE) and Packaging Waivers for Military Air in accordance with AR 700-15/NAVSUPINST 4030.28E/AFJMAN 24-206/MCO 4030.33E/DLAR 4145.7 (Reference (c)) and Defense Transportation Regulation (DTR) 4500.9-R-Part II, Cargo Movement. Reference (d).

MIL-HDBK-773
ELECTROSTATIC DISCHARGE (ESD)- PROTECTIVE PACKAGING
Provides detailed guidance for DoD personnel who use, handle, package, or store ESD items. It is designed to promote the use of standardized packaging materials as well as promote an understanding of the ESD threat throughout all levels of maintenance and supply.

TM 38-700
PACKAGING OF MATERIEL, PRESERVATION
Applications and instructions on cleaning, drying, preserving, packing, blocking and bracing, cushioning, reinforcing, weatherproofing, and marking to prepare materiel for shipment and storage.

TM 38-701
PACKAGING OF MATERIEL, PACKING
This manual emphasizes the importance of packing of military supplies and equipment. It contains detailed information concerning the requirements to accomplish packing operations. The requirements include: use of exterior shipping containers; the assembling of items or packs into the container; anchoring, blocking, bracing, and cushioning of items or packages within the container; weatherproofing; strapping of containers; the testing of exterior packs; palletization and unitization of loads; parcel post; and related subject matter. General exterior marking in accordance with MIL -STD-129 is also discussed.

MIL-STD-648
SPECIALIZED SHIPPING CONTAINERS
This standard establishes general design guidelines and associated tests for specialized shipping containers used by the Department of Defense. Definitive requirements for specific containers will be defined by the individual specification, acquisition, or task order. This standard is intended to be used as the basic reference document in all specifications and standards prescribing performance requirements to be applied to a shipping container. Compliance with this intent is expected through normal application of the specification or standard preparation and revision processes

TM 38-8145-709
Care of Supplies in Storage (COSIS) For Army Material
This TM describes the supply support activity (SSA) processes required to adequately care for supplies in storage fulfilling the SSA's custodial responsibility.

Publications (Cont.)

AR 700-15
Packaging of Materiel
Establishes joint policies for all Department of Defense (DoD) components in developing uniform requirements for packaging of materiel; provides uniform criteria for selecting and prescribing packaging; and establishes lead service activities for testing and evaluation of packaging materials and processes

AR 700-37
Packaging of Army Materiel
This regulation defines the policies and requirements of Army-unique packaging.

DA PAM 700-32
PACKAGING OF ARMY MATERIEL
This publication provides uniform guidelines for packaging within the U.S. Army.

DoD Manual 4140.27 DoD Shelf-life Management Program

- **Volume 1: Program Administration**

This manual implements policy, assigns responsibilities, and provides procedures for the shelf-life program to identify and manage items having deteriorative characteristics and to mitigate the risk of shelf-life expiration.

- **Volume 2: Materiel Quality Control Storage Standards**

This manual implements policy, assigns responsibilities, and provides procedures for the shelf - life program to identify and manage items having deteriorative characteristics and to mitigate the risk of shelf-life expiration. It also provides guidance and prescribes procedures for the development, preparation, dissemination, maintenance, and application of MQCSS for shelf-life materiel

MIL-STD-129
MILITARY MARKING FOR SHIPMENT AND STORAGE
This standard provides the minimum requirements for uniform military marking and procedures for their application. It is intended for use only for the application of military specific markings to items intended for transportation and storage within the military distribution system, i.e., for marking of materiel not intended for immediate use, and material that is stored and/or moved within or between DoD facilities. Markings for commercial packaging are discussed in ASTM D 3951.

DOD Manual 4140.65
Issue, Use, and Disposal of Wood Packaging Material (WPM)
To establish guidance for the issuance, use, and disposal of wood packaging material (WPM) in compliance with International Standards for Phytosanitary Measures (ISPM) Number 15.

MIL-STD-147
PALLETIZED UNIT LOAD
This standard establishes the methods, materials, and techniques to be employed in the formation of bonded palletized unit loads of military supplies, which are adaptable to unit loading. The methods prescribed herein are to be utilized with standard, general purpose, 40 x 48-inch pallets conforming to the various classes, types, and styles in ANSI MH1, Part 9. However, the various methods of bonding and types of stability dunnage may be modified for use with other size pallets.

ARs/DA PAMs/SB/FMs can be found: https://armypubs.army.mil/ProductMaps/PubForm/PAM.aspx

MIL-STDs/MIL-HDBKs can be found: https://quicksearch.dla.mil/

Where to Find Item Packaging Data

Military packaging requirements for Army-owned and managed items are located in Army Enterprise Systems Integration Program (AESIP). Gaining Access to AESIP: Access requests should be submitted using AESIP Army Enterprise Portal: https://enterprise.armyerp.army.mil and login.

Step–by-step instructions can be found in the AESIP area of this booklet.

FEDLOG requires a subscription and can be installed on a computer within your work area . For information on subscriptions or updates go to: https://www.dla.mil/HQ/InformationOperations/Offers/Products/LogisticsApplications/FEDLOG.aspx

In FEDLOG:

1. Select “Search Interactive”.
2. Click on “Army Interactive Query” tab.
3. Enter NIIN or NSN in NIIN field (NIIN is NSN minus first four FSC digits).
4. Select “Search”.
5. Click on “Army Packaging” tab.
6. Check for packaging data: MOP, CLNG DRYING, etc.; or SPI NO (Special Packaging Instructions Number)
7. If a SPI NO is listed, go to LIW to retrieve SPI, or contact item manager to request SPI.
8. If no packaging information or SPI is in “Army Packaging”, click on “FLIS Packaging” tab.

Note: If no packaging information is available in FEDLOG or in AESIP, contact the packaging team at AMC PSCC for assistance.

ARMY ENTERPRISE SYSTEMS INTEGRATION PROGRAM (AESIP)

Gaining Access:

Step by step instructions to access AESIP Army Enterprise Portal: https://enterprise.armyerp.army.mil and login.

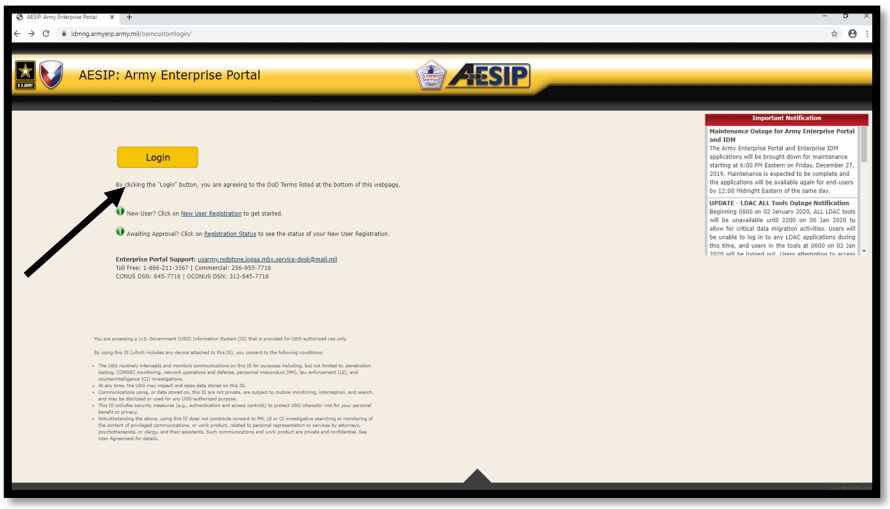


Figure 1: AESIP Home Screen

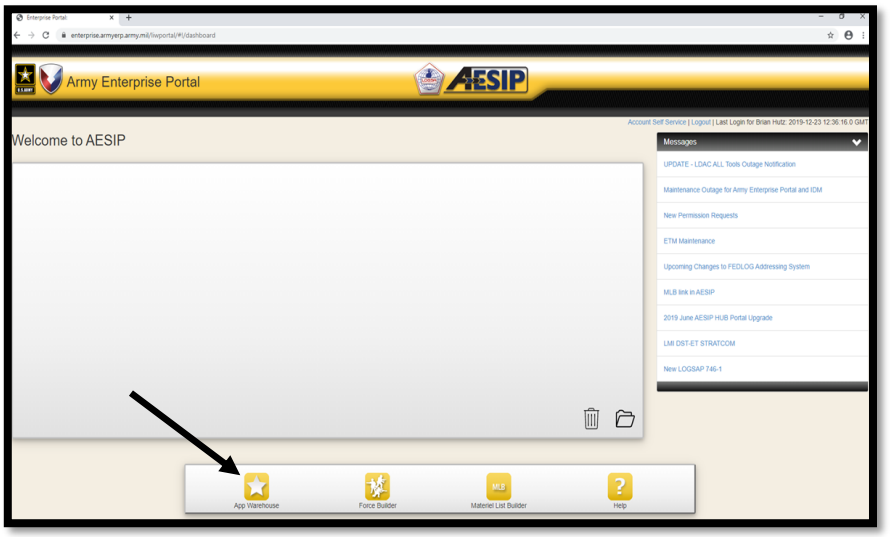


Figure 2: Go into the "App Warehouse"

If you have not requested permission, click on “Go to Permission Request”.

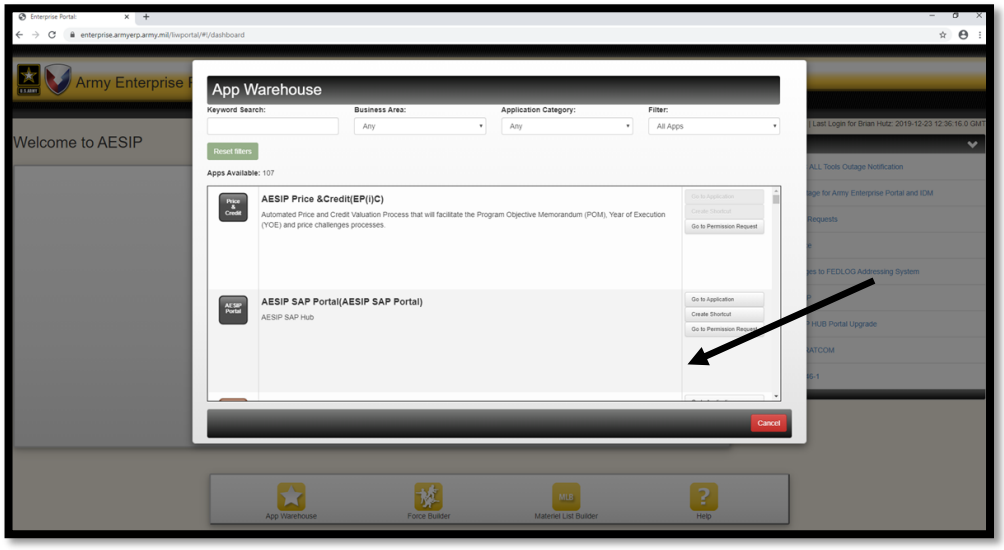


Figure 3: AESIP permission screen

Expand the selection by clicking on “Expand”.

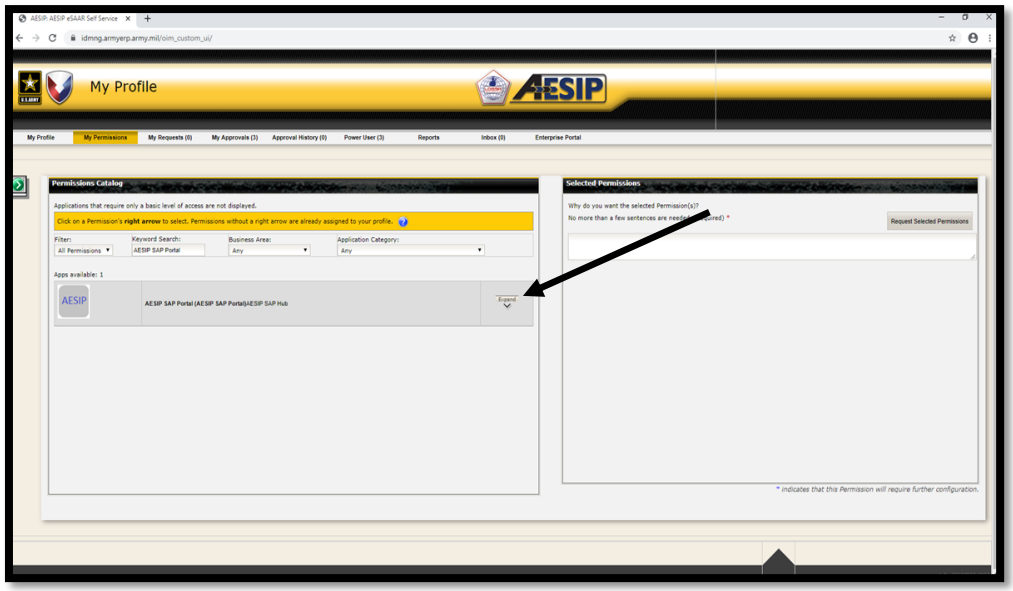


Figure 4: Expand tab.

Scroll to “AESIP Master Data Systems EndUser – Material Master (Job Function) – Authorized User” role and request the role.

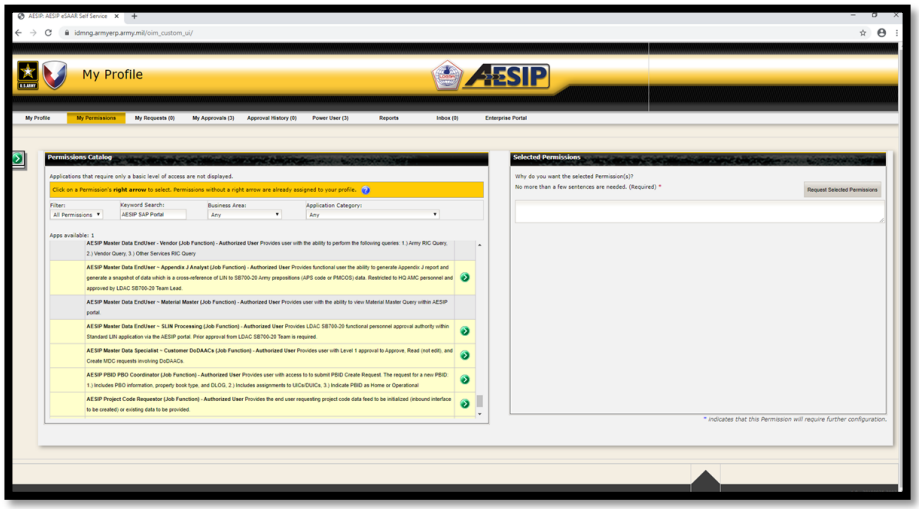


Figure 5: AESIP Master Data Systems EndUser Screen

After you have permission, click on “App Warehouse”.

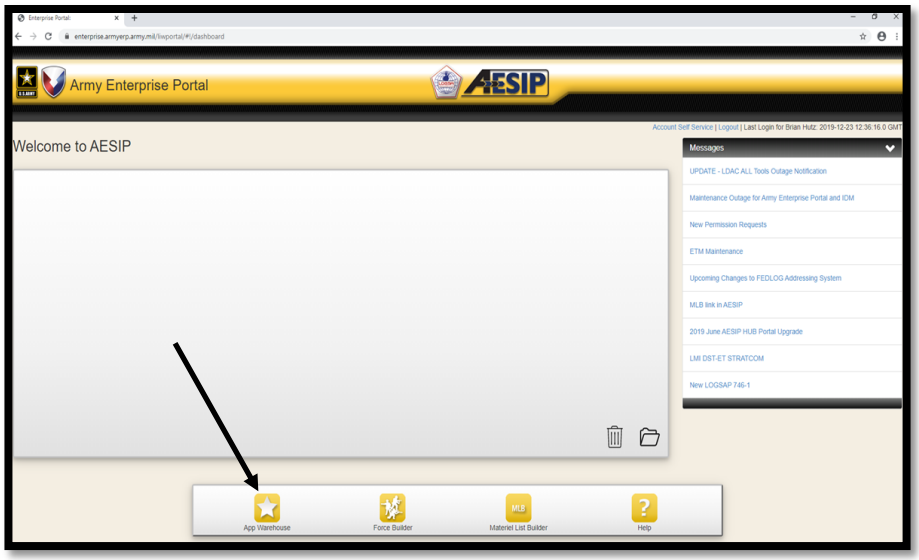


Figure 6: App Warehouse Screen

Create your AESIP SAP Portal Short cut

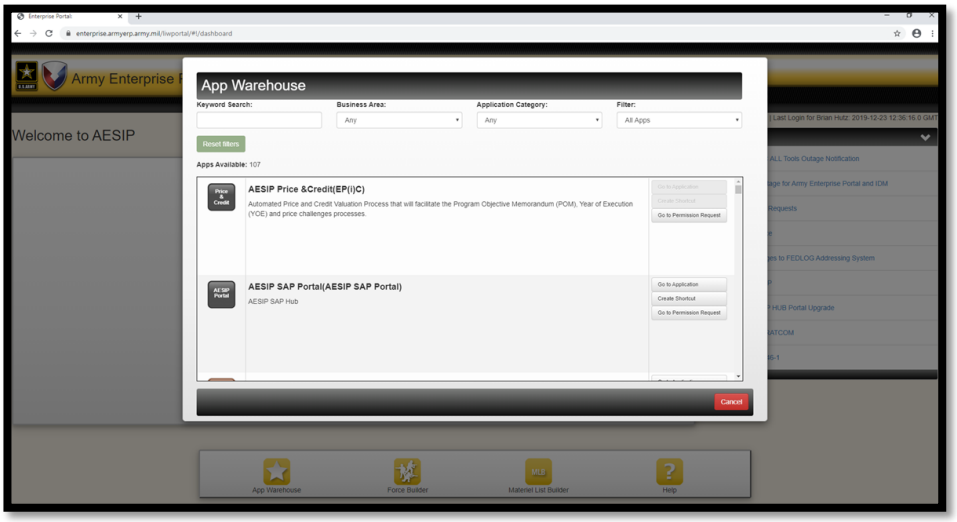


Figure 7: Create a Shortcut Screen

Welcome to AESIP! Click on to open.

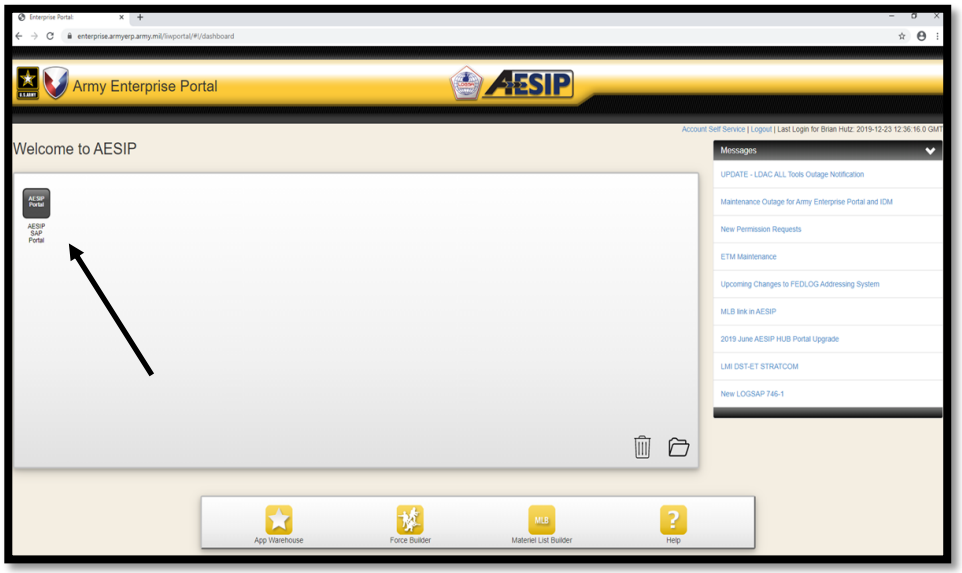


Figure 8: App Warehouse Screen

Getting to Army Packaging Data:

Click on the “Material Master (MM)” Tab

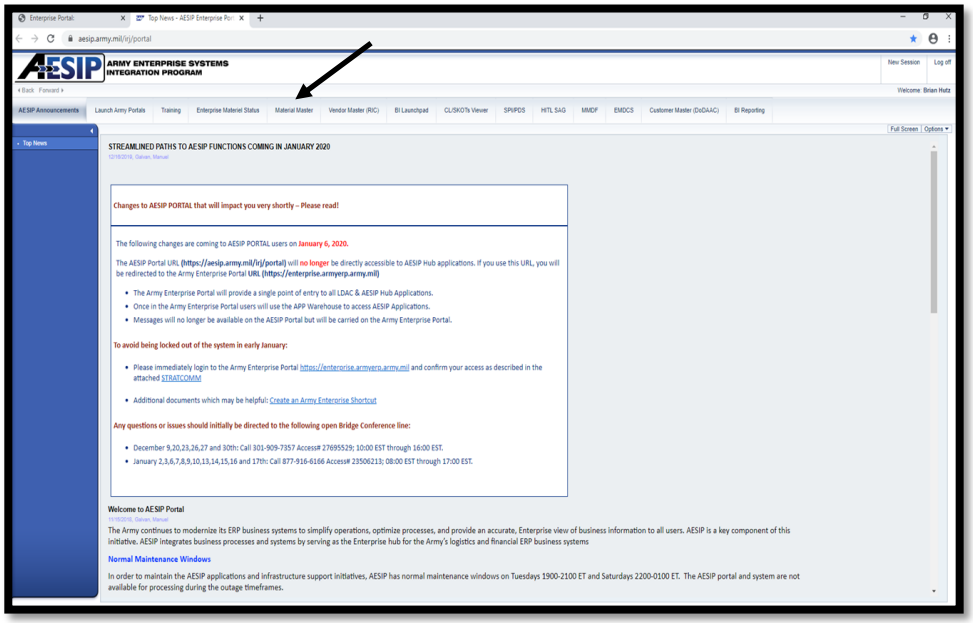


Figure 1: MM Tab

Click on the “MM Packaging Report”

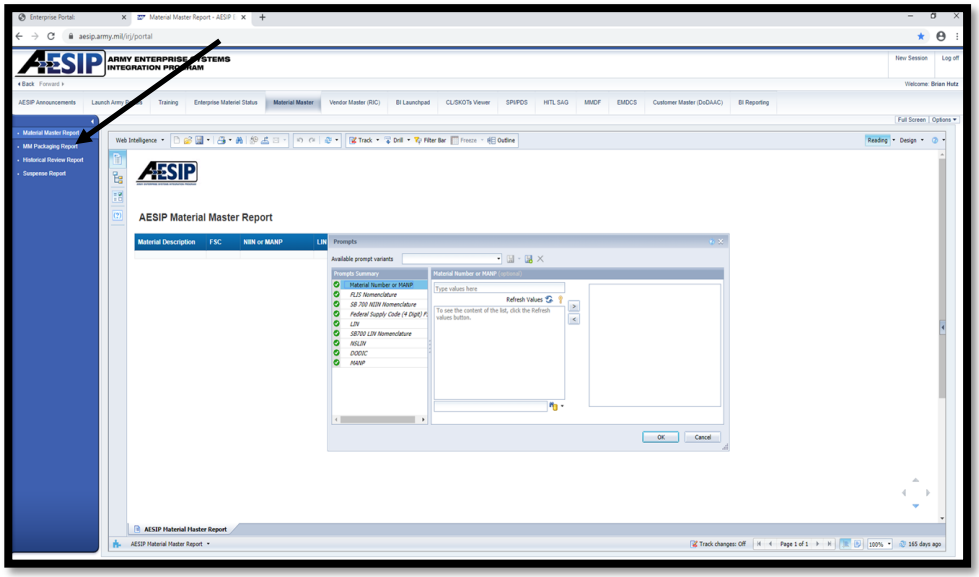


Figure 2: MM Report Screen

Input National Item Identification Number (NIIN) and click on tab as shown that should pull up the packaging information

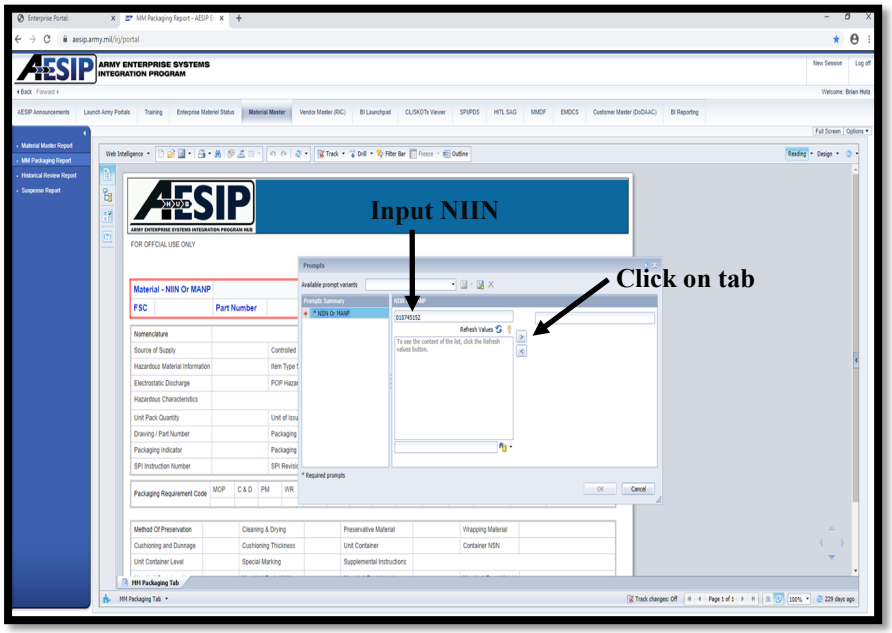


Figure 3: NIIN Input Screen

Click on the Green “Print Packaging Report” Tab

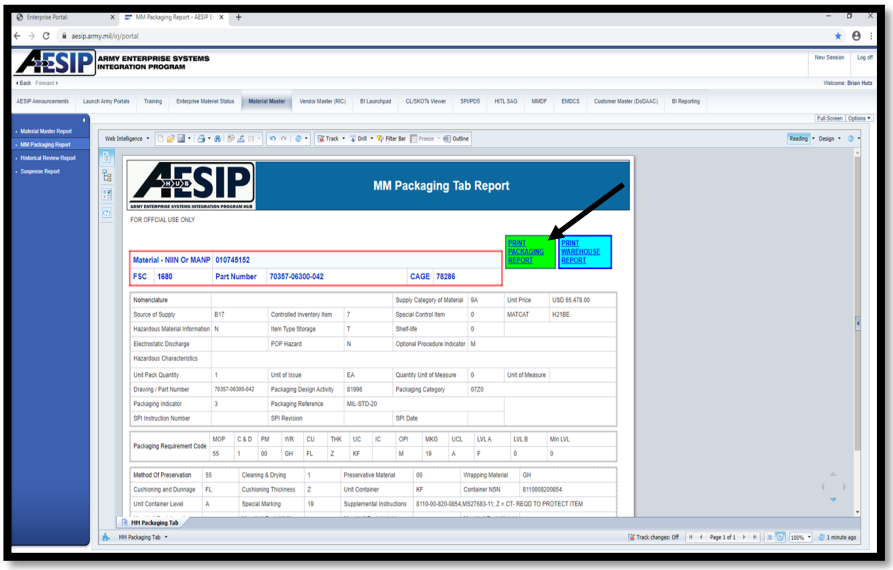


Figure 4: MM Packaging Tab report

To return to main MM, click on MM tab. If you need the warehouse report you can click on the Blue “Print Warehouse Report” tab. This is for SL codes, HAZMAT codes, storage condition codes, etc.

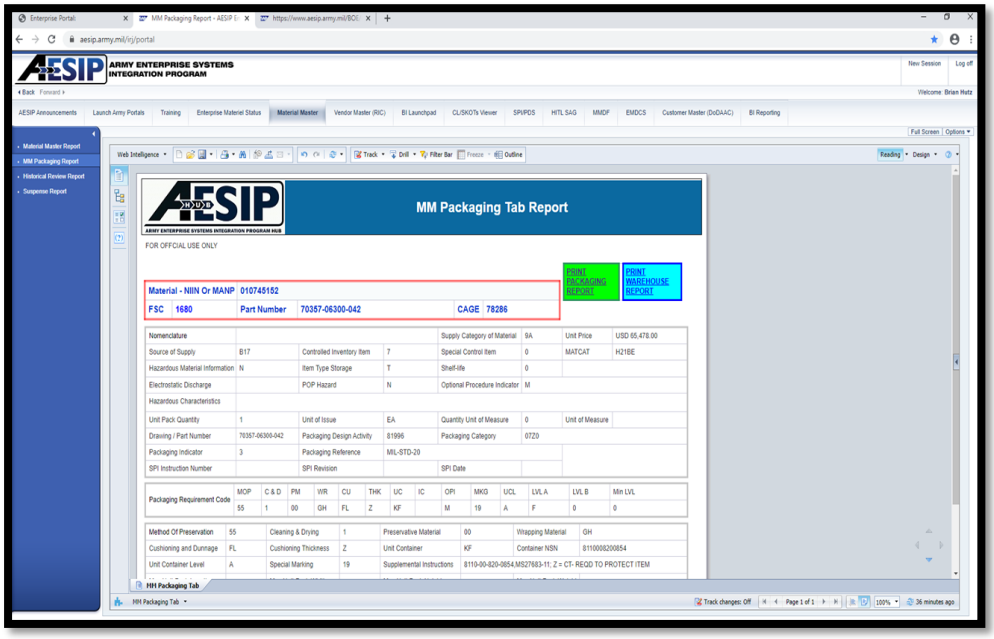


Figure 5: Warehouse Report Tab Screen

To go between Pages, click arrow to advance.
To review pages 1 through 3, click arrow to advance

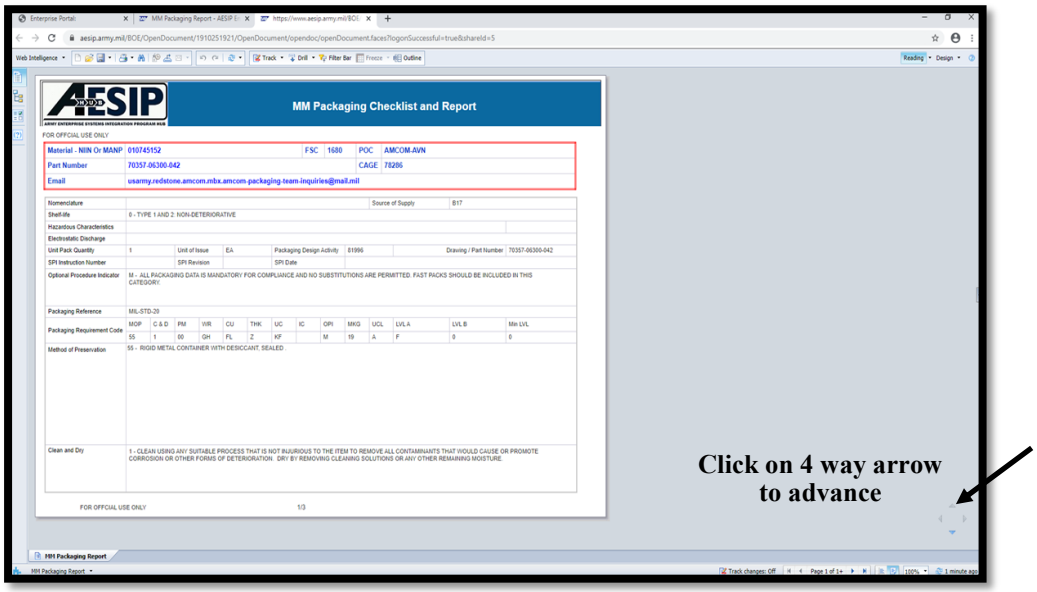
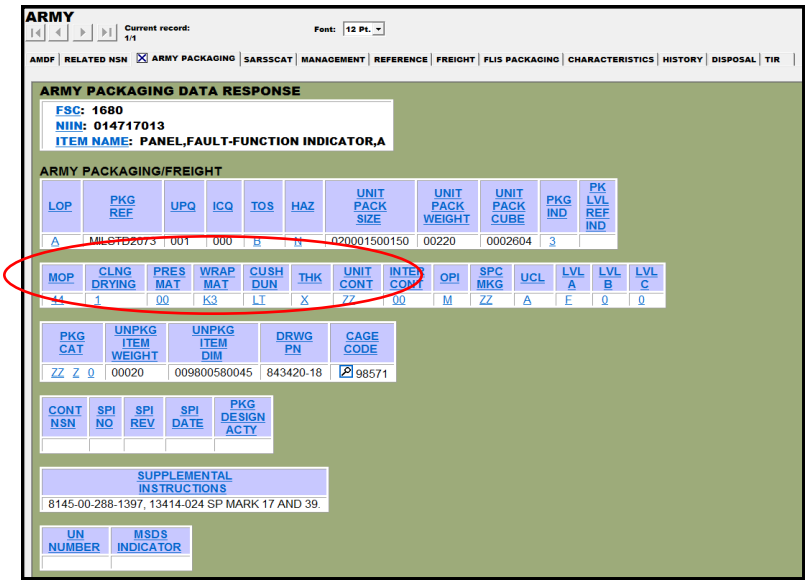


Figure 6: App Warehouse Screen

Where to find Item Packaging Data: FEDLOG

Open FEDLOG

1. Select “Search Interactive”.
2. Click on “ARMY” tab.
3. Enter NIIN or NSN in NIIN field (NIIN is NSN minus first four digits).
4. Select “Search”.
5. Click on “Army Packaging” tab (Figures 6 and 7).
   Figure 6: Results of NIIN 014717013 search in FEDLOG, showing coded packaging requirements (44, 1, 00, K3, LT, X, ZZ)



NOTE: In FEDLOG, you can click on the data elements in blue (e.g., WRAP MAT or K3) to get more information.

If a SPI is listed (Fig. 6), go to AESIP to retrieve SPI or contact the packaging commodity POC to request SPI. You can find the packaging commodity POC using the “Packaging Help for all Commodities” link on the Packing Requirements page in LIW (Fig. 1).

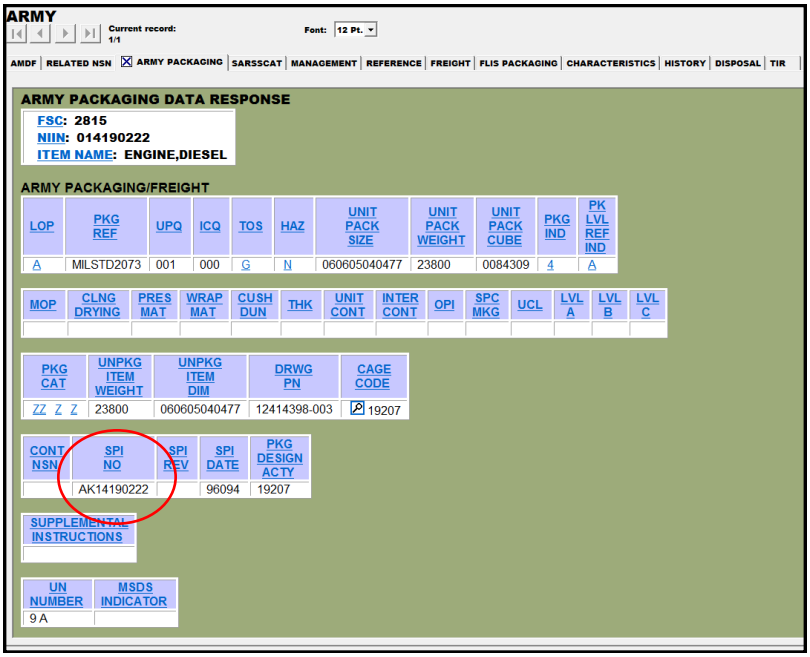


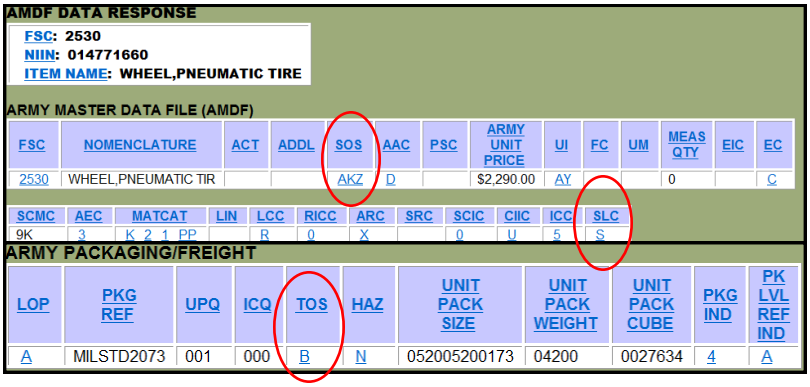
Figure 6: Results of NIIN 014190222 search in FEDLOG, showing SPI AK14190222 is required

6. If no packaging information or SPI is available under the "Army Packaging" tab, click on "FLIS Packaging" tab.

7. If no packaging information is available in FEDLOG/AESIP, contact the packaging commodity POC to request instruction on packaging the NSN.

Other important information retrieved from FEDLOG (Figure 7):
SOS: Source of Supply (AMDF tab)
SLC: Shelf-life Code (AMDF tab)
TOS: Type of Storage (ARMY PACKAGING tab)

Figure 7: Results of NIIN 014771660 search in FEDLOG



Who is the Packaging Commodity POC for my item?

The packaging commodity POC is based on the SOS for the item. The SOS can be found on FEDLOG, AMDF tab. Based on the SOS, you may contact the POCs below:

B17 and B64 Packaging Support— U.S .Army Aviation and Missile Command

B16 Packaging Support—U.S. Army Communications-Electronics Command

B14 (AKZ) Packaging Support— TACOM and Joint Munitions Command

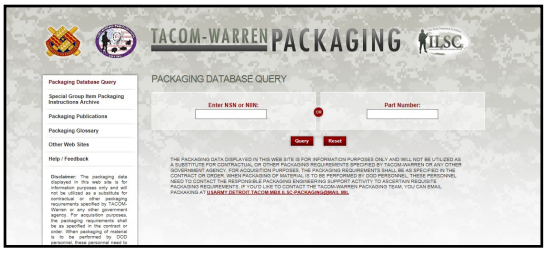
AKZ Packaging Support—Warren, MI (TACOM—Tank/Automotive)

Go to website:

https://www.ilsc.army.mil/packaging/

Select "Packaging Database Query" (home screen view below)

Search by NSN, NIIN, or Part Number



A12 Packaging Support—Aberdeen Proving Ground, MD (RDECOM)

A12 Packaging Support—Natick, MA (TACOM—Soldier Support)

What if the SOS is "SMS" (DLA)?

You may contact DSCC.packaging@dla.mil

If the original SOS (B16, AKZ, etc.) cannot be determined, contact PSCC for assistance at (570) 615-7175, or by email at usarmy.tyad.usamc.mbx.pt@mail.mil

Methods of Preservation

Preservation is defined as "protection that is provided for the bare item to prevent deterioration from exposure due to atmospheric conditions during shipment and storage." In military packaging, there are five basic methods of preservation:

Method 10 – Physical protection

Method 20 – Preservative coating only (with greaseproof wrap, as required)

Method 30 – Waterproof or waterproof-greaseproof protection (with preservative, as required)

Method 40 – Watervaporproof protection (with preservative, as required)

Method 50 – Watervaporproof protection with desiccant

Preservation, along with other applications of packaging, is normally preplanned or approved by technicians. The criteria for deciding the correct method is based on the item's characteristics such as its physical composition and the nature of the surface.

Many items, however, do require the same high level of protection. These include some engines, navigation equipment, gyros, ESD-sensitive items, etc. This is due to their high dollar value or their susceptibility to rapid deterioration/sensitivity to other elements. For unserviceable reparable return items, preservation requirements are usually of a lesser degree than their serviceable counterparts because this materiel is usually shipped to a depot or repair facility for short-term or controlled storage while awaiting maintenance. Before attempting to develop the method of preservation for any individual item, check for packaging instructions in AESIP or FEDLOG, or contact the item manager. If no instructions are available, examine the characteristics of the item or requirements for a similar item, or Contact PSCC for assistance at (570) 615-7257. MIL-STD-2073-1 lists all methods and sub-methods for military packaging.

Method 10

Method 10 – Physical protection: A method of preservation for items of chemically noncritical nature, made of corrosion-resistant metals or inert nonmetals such as crockery, ceramics, or non-optical glass, or items rendered deterioration-resistant by the application of metal plating, paint, prime coatings, plastic coatings, or similar treatments/ finishes. Items appropriate for Method 10 preservation include: motor vehicle bumpers, tires, and windshields; tent-poles, pegs, and wire fencing; and many other items designed to be used in an unprotected environment.

Method 10 (Bundling) – Bundling is appropriate for items of military supply such as lumber, tent-poles, stakes, rods, metal and non-metal pipes, etc. The following steps should be followed:

- STEP 1: Clean and dry the item as required.
- STEP 2: Apply cushioning, dunnage, or blocking and bracing to individual items that are damageable. Materials will be clean and as dry as practicable.

Note: Also apply protective pads (i.e., cushioning or fiberboard) between the item and the bundling material as required to prevent the strapping, wire, or twine from inflicting damage to the item).

- STEP 3: Tie, strap, or tape the items, as applicable, to form the unit pack.
- STEP 4: Apply markings according to MIL-STD-129.

Method 10 (Cartonizing or Boxing) – This involves enclosing the item cleaned, dried, cushioned, blocked and braced, as required, in a carton or box. Contact preservatives are prohibited as well as barriers that afford protection from the environment. Remember that any and all techniques used in Method 10 preservation protects the item from physical and mechanical damage only.

- STEP 1: Clean and dry the items required.
- STEP 2: Apply cushioning materials, dunnage, blocking and bracing as required to protect the items and the enclosing box or carton, and to restrict the movement of the item within the container.
- STEP 3: Enclose the item into a carton or box selected from MIL-STD-2073-1, as appropriate (see page 48-49, Container Selection, Examples, Specs).
- STEP 4: Apply markings according to MIL-STD-129.

Method 20

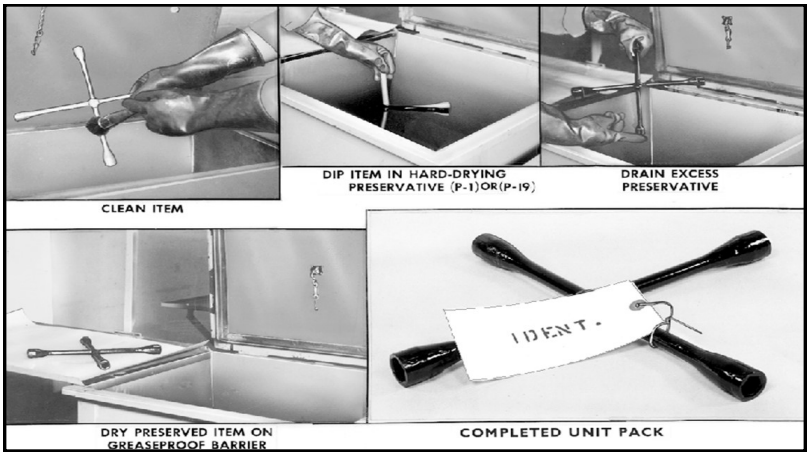
Method 20 – Preservative coating only (with greaseproof wrap, as required) is used primarily on metal items whose characteristics allow ready application of a corrosion preventive compound by dipping, flow coating, slushing, spraying, flushing, brushing, or fogging. Items preserved by Method 20 must be such that de-preservation by means of solvents, vapor degreasers, or alkali metal-cleaning compounds will not damage the item nor impair its operation. This is accomplished by applying a preservative coating to the item and using greaseproof wrap as required. The preservative coating protects the item against water, salt spray, gasses, and fumes that may be encountered during handling, shipping, and storage. The entire chemical protection afforded to the item is through the contact preservative.

- STEP 1: Clean and dry the item, as required.
- STEP 2: Select and apply a preservative coating to the item (or parts of the item), as required.

Note: Before proceeding to Step 3:

Parts coated with code 01 or code 19 preservatives and allowed to dry do not require the wrap specified in step 3 unless called for in the contract or order. Items treated with Code JL, VCI-treated barrier material (MIL-PRF-22019) or bag (MIL-B-22020), and securely taped to make an airtight enclosure, shall be exempted from the wrap specified in step 3.

- STEP 3: Enclose the coated item, cushioned as required, in a wrap conforming to: MIL-PRF-121, Type I or II.
- STEP 4: Apply markings according to MIL-STD-129.



Method 30

Method 30 – Waterproof or waterproof-greaseproof protection (with preservative, as required) packs are appropriate for almost any time the item will fit into a bag; a rigid container other than all metal; or as long as only waterproof or waterproof-greaseproof protection is needed. If Watervaporproof is required, then you must choose the Method 40 or Method 50. Method 32 application involves placing the item preserved, wrapped, and cushioned as required into a close-fitting box or carton that, in turn, shall be enclosed in a sealed waterproof bag. To assemble this method, perform the following steps:

- STEP 1: Clean and dry the item, as required.
- STEP 2: Select and apply a preservative coating to the item (or parts of the item), as required.
- STEP 3: Apply a greaseproof wrap conforming to MIL-PRF-121, Type I or II
- STEP 4: Select a close fitting inner container from MIL-STD-2073-1 (or a container specified by the contract or order) (see page 53, Container Selection).
- STEP 5: Insert the item into the container along with the application of cushioning and dunnage, as necessary, to protect the item as well as the container from the item's projections and sharp edges, and also to restrict its movement within the container.
- STEP 6: Blunt the sharp edges and corners of the box to protect the bag selected in step 7.
- STEP 7: Enclose the box in a bag conforming to MIL-DTL-117, Type I, Class B. The following are examples of barrier (bag) material meeting the MIL-DTL-117 requirement: A-A-3174, Type I or II, Grade A, Class 1(see note) and MIL-PRF-22191, Type III.

Note: When specified, a protective wrap of heavy-duty kraft paper or equivalent (tape sealed) shall be used to protect the barrier material.

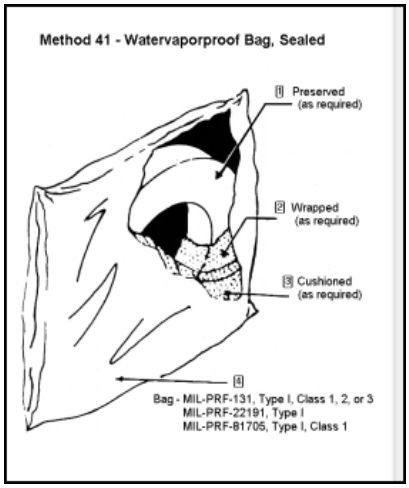
- STEP 8: Heat seal the bag. The trapped air between the box and the bag shall be kept to a minimum by compressing the bag or by a mechanical evacuation process (i.e., vacuum cleaner attachment). Caution shall be taken to prevent rupture of the bag.
- STEP 9: Apply markings according to MIL-STD-129.

Method 40

Method 40 – Watervaporproof protection (with preservative, as required). Sub Method 41, unit packing is intended to provide protection to metallic and nonmetallic items against deterioration caused by water or water vapor and by natural or industrial contaminates and pollutants. Items packed by Method 41 are generally light in weight and flat in shape, so as to lend themselves to easy insertion into the flat or envelope-type bag. This is accomplished by inserting the item, wrapped and cushioned as necessary, into a watervaporproof bag, exhausting the excess air, and closing the bag. In the steps that follow, notice that this method is also used for items (such as circuit cards) that are sensitive to damage caused by ESD. Make sure that only the correct electrostatic protective materials, as indicated in the steps that follow, are used for the wrap and the bag when packaging items are ESDS:

- STEP 1: Clean and dry the item, as required.
- STEP 2: Select and apply a preservative coating to the item (or parts of the item). The manufacturer normally applies permanent preservative coatings to ESDS items.
- STEP 3: Apply a greaseproof wrap only if a soft dry preservative has been applied to the item.
- STEP 4: When greaseproof is not a requirement, apply a neutral wrap where a noncorrosive, dust protective wrap is required prior to or as part of unit packing. Wrap ESD-sensitive items in ESD protective cushioning material (see page 47).
- STEP 5: Place the item (wrapped and cushioned as required) into a close-fitting, heat-sealed bag, MIL-PRF-131.
- STEP 6.: Mark the bag in accordance with MIL-STD-129.

<u>Note</u>: When specified by the contract or order, a carton or box shall be required to be used, with unit container cushioning specified in the contract, or order will be placed between the bag and the carton or box. Mark the carton or box in the same manner as the bag.



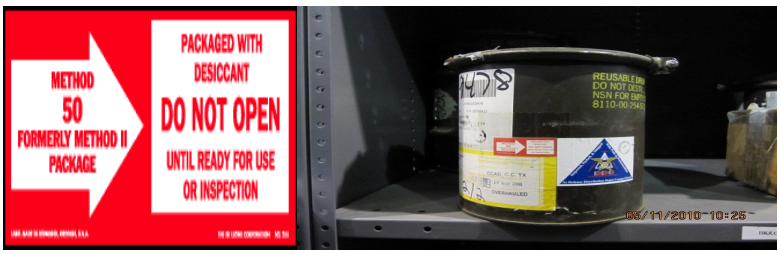
Method 50

Method 50 – Watervaporproof protection with desiccant. For Sub Method 51, the item preserved, wrapped, cushioned and desiccated, as required, shall be enclosed within a sealed bag. A humidity indicator and Method 50 label is required.

- STEP 1: Clean and dry the item, as required.
- STEP 2: Select and apply a preservative coating to the item (or parts of the item), as required. The manufacturer normally applies permanent preservative coatings to ESDS items.
- STEP 3: Apply a greaseproof wrap only if a soft drying preservative has been applied to the item.
- STEP 4: When greaseproofness is not a requirement, apply a neutral wrap where a noncorrosive, dust protective wrap is required prior to or as part of unit packing, if applicable.
- STEP 5: Place the item, including the required number of units of desiccant, wrapped, and cushioned, as required, into a close-fitting, heat-sealed bag, conforming to MIL-DTL-117. Bags made from the following material meet the MIL-DTL-117 requirements: MIL-PRF -131, Type I or II, Class 1 or 2 and MIL-PRF-81705, Type I, Class 1 (ESDS items only).
- STEP 6: Firmly secure the humidity indicator immediately within the closing edge of the bag that is applied in the next step.
- STEP 7: Mark the bag in accordance with MIL-STD-129, including the application of a Method 50 label.

Note: When specified by the contact or order, a carton or box shall be required to be used with the unit container. Cushioning specified in the contract or order will be placed between the bag and the carton or box. Mark the carton or box in the same manner as the bag.

Note: When space is not available to permit the use of a label, the words "DESICCATED PACKAGE - DO NOT OPEN UNTIL READY FOR USE" shall be placed on the container adjacent to the identification markings.

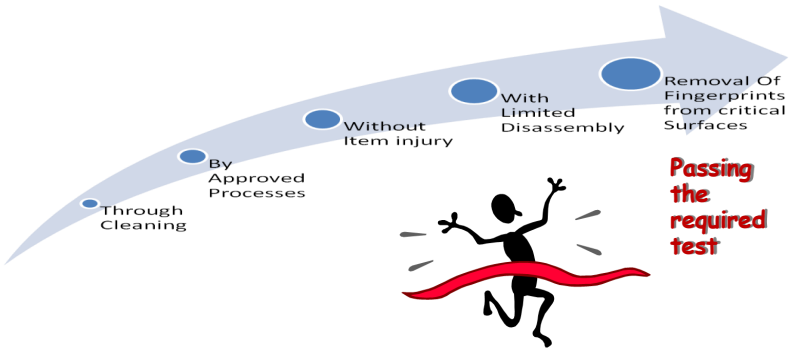


Preservation Procedures

Cleaning—All contaminants must be removed before items that are being shipped internationally can be accepted for transport by the U.S. Department of Agriculture, or host nation customs. Also, any contaminant left on an item will cause deterioration. **The cleaning process must not harm the item**. Limit the disassembly to a point where reassembly can be easily done without special tools or skills.

Methods to use include:

- Wire brushing to remove loose scales and light rust from items.
- Vacuum cleaning for radios and electronic items to remove dust, lint particles, etc.
- Jet spray washing, a high-pressure stream of water, is best used on items that won't be harmed by the pressure or water.
- Abrasive blasting, a high velocity stream of an abrasive material against the surface of the item, should be used on surfaces where the abrasive action will not affect the function of the item such as rough castings, pintle hooks, etc.
- Steam cleaning, a stream of steam with an added cleaning compound followed by steam alone, is to remove heavy greases from automotive equipment, such as trucks.
- Ultrasonic cleaning is used on nonabsorbent materials such as those found in electronic devices.



Drying—The following methods can be used: compressed air, ovens, infrared lamps, wiping, and draining. **The drying process must not harm the item.** Immediately after cleaning, items must be thoroughly dried to remove cleaning solutions or residual moisture.

Contact Preservatives- Are applied to items to protect them from deterioration due to exposure to adverse environmental conditions during shipment and storage. Most contact preservatives are oily or greasy in nature and vary greatly in chemical composition and consistency; therefore, they cannot be used indiscriminately on all kinds of materials. Lubricating oils and greases can be used, but oils and greases may be inadequate for the full protection desired. Selecting the right preservative must be as carefully considered as selecting a proper cleaning process.

Permanent types of preservatives for metal items include paint, plastic, porcelain, and rubberized coating. Temporary preservatives that are used in packaging are identified as Method 20. They are applied by dipping, flowcoating, slushing, brushing, filling, flushing, fogging, and spraying. Volatile Corrosion Inhibitors (VCI) are also classified as a preservative and are applied by wrapping the VCI material around the item.

Petroleum-based preservatives can cause skin and eye irritation. Avoid direct contact by wearing the approved safety equipment. When spraying or fogging, always wear goggles and a respirator. When applying preservatives by hand, always wear rubberized gloves, safety glasses and an apron, if appropriate. To choose which preservative to use, consult the item's Technical Manual or MIL-STD-2073-1.

Are you using proper PPE?

Application of Contact Preservatives

DIPPING - Due to ease of application and total coverage afforded by this procedure, it is the preferred method of application. When items are dipped in a tank by hand or by conveyor, care must be taken so that air bubbles are not trapped on the preserved item. Frequent stirring of the preservative will prevent air bubbles from forming. After the preservative has dried or set, the item should be placed on a precut piece of greaseproof barrier material.

FLOWCOATING - Pour preservative into tube, allowing it to flow through tube and cover interior surfaces. Drain excess preservative from tube by holding tube over preservative tank, allowing preservative to drain into tank.

SLUSHING - This procedure is accomplished by pouring the preservative into the part to be preserved and rotating, agitating, or slanting it to ensure that all interior surfaces are coated. The excess preservative is then drained. After slushing, all openings in parts must be closed to exclude dust, dirt, and other foreign matter. Plastic plugs may be used for this purpose.

BRUSHING - This procedure should be used when no other procedure is available or acceptable. Brushing is used frequently when only one portion or small portions of an item or assembly require preservative application.

FILLING or FLUSHING - This procedure is accomplished by completely filling the item with preservative until all interior surfaces are satisfactorily coated and then drained. If the preservative is not drained, space must be allowed for thermal (temperature) expansion. All openings should be sealed to prevent leakage. This procedure is best suited for larger items when their size or weight cannot be easily handled.

FOGGING - This procedure has application in the preservation of such items as gasoline tanks, interior surfaces of engine cylinder walls, and other closed chambers. This procedure consists of coating the interior surfaces with a preservative injected as a cloud or mist from an air atomizing gun until the interior surfaces are completely coated.

SPRAYING– This procedure is accomplished by coating the interior or exterior surfaces of the item with preservative applied as a spray. Normal spray painting techniques should be followed in the application of preservatives by this method.

Desiccant, Think About It.

Desiccant will be needed in some of the preservation steps.

Desiccant is a moisture-absorbing material that is required for all Method 50 packs. Desiccant is furnished in bag units and is available in sizes from 1/6-unit to 80-unit bags. Its purpose is to absorb any moisture that may sneak through the barrier material.

Some dos and don'ts for storing, handling, and applying desiccant :

DO APPLY:

- Desiccant to all Method 50 packs.
- A greaseproof wrap to items having contact preservative to segregate desiccant from incompatible elements.
- Secure bag units evenly around the item.
- Humidity indicators to all desiccated packs.

DO NOT:

- Use damaged or frayed unit bags.
- Allow unit bags to be packed or stored in or near incompatible elements such as lubes or oils.
- Remove desiccant bags from their storage container until ready for use.

Quantity of Desiccant – The minimum quantity of desiccant to be used per unit pack shall be computed in accordance with either Formula I or II as applicable. The various values of "X" take into consideration the quality and types of dunnage calculations.

Desiccant Formula I: All other than a rigid, all metal type container:

$$U = CA + X_1D + X_2D + X_3D + X_4D$$

Desiccant Formula II: For rigid, all metal container:

$$U = KV + X_1D + X_2D + X_3D + X_4D$$

U = Number of units of desiccant to be used.
C = 0.011 when area of barrier is given in sq. in.
C = 1.6 when area of barrier is given in sq. ft.
A = Area of container (barrier) in either sq. in. or sq. ft. (A=L x W) (This is the surface area of the barrier material.)
K = 0.0007 when the volume is known in cu. in.
K = 1.2 when the volume is known in cu. ft.
V = Volume within the container in cu. in. or cu. ft.
X = A numerical factor varying with the quality and type of dunnage used. The following applies as appropriate.
X_1 = 8 for cellulosic material, including wood and any other material not categorized below.
X_2 = 3.6 for bound fibers (synthetic or vegetable fibers bound with rubber).
X_3 = 2.0 for glass fibers (fiberglass).
X_4 = 0.5 for synthetic foams and rubber.
D = Pounds of dunnage within the sealed barrier.

Barrier Bag Fabrication and Sealing

Sealed bags are designed to protect an item from water/water vapors. Bagged items should never be opened or removed from the unit, intermediate, or shipping container to facilitate storage. Bags, in themselves, are very susceptible to damage from tearing or pinholes, which can cause corrosive deterioration to the item. Supply discipline dictates that you should keep the bagged item in the box until it is ready for use.

The following instructions exemplify preservation Methods 32, 42, and 52, where the item is packed in a box and the box is sealed in a bag. For other preservation methods that require bagging the bare item, the same measuring procedures should apply, except the bare item dimension will apply as opposed to the box dimensions. When measuring the bare item, always allow for cushioning. If the item is being preserved by Method 50, allow for units of desiccants.

Wraps Size Length = 2 x Item Width + 2 x Item Ht. + 4"

Width = Item Length + Item Ht. + 1.5"

Weight = Length x Width x Wrap Weight

(Two inches are added to facilitate inspection)

- STEP 1: MEASURE THE BOX/ITEM - If the box is 20" x 12" x 12". The material size will be determined using the following procedure:

Material Length = (12 x 2) + (12 x 2) + 2 = 50 inches

Material Width = 20+12+2= 34 inches

Flat Cut Material is 34 x 50 inches

- STEP 2: CUT AND FOLD THE MATERIAL.

- STEP 3: HEAT SEAL TWO EDGES OF THE FOLDED MATERIAL - Before attempting to heat seal, adjust the dwell temperature and pressure according to the manufacturers recommendations. Allow the heat sealer to warm up and make a "test" seal before using it to seal the bags. The minimum width of the sealed joining should be 5/8 inch.

- STEP 4: BLUNT ALL CORNERS OF THE BOX AND PLACE BOX INTO THE BAG - AIR EVACUATION - Bags used for preservation Methods 30 and 40 with submethods may have excessive air removed by simply collapsing the bag by hand or vacuum nozzle around the boxed item. For bags being fabricated for Method 50 including sub methods, air must be evacuated by following steps 5 and 6.

- STEP 5: Seal remaining opening and cut off one corner.

- STEP 6: Evacuate air with a vacuum nozzle and seal the corner.

Basic Packaging Materials

Basic packaging materials are listed here by spec number, type, class, National Stock Number (NSN), and function. This should help you in determining which materials you need for the types of items that you are processing. For example, we have listed two different types of MIL-P-81997 barrier material, but each of them have a different function and come in different sizes. To order the type that you may need, you must first determine what types of items are going to be packaged. You should be able to decide which type you need by referring to the "Intended Uses" information provided under the material spec in this section.

Not all packaging materials will be listed here. Purchasers shall select the preferred options permitted herein and include the following information in procurement documents: basic information asked such as title, number, and date of the document.

Type, grade, finish and nominal thickness.

- **Color required, if applicable**
- **Length and width required**
- **Single thickness or lay-flat tubing**
- **Unit of issue**

For additional information that may be needed, please check the individual document.

Barriers Used In Military Packaging

A-A-3174 -Plastic Sheet, Polyolefin

Classification

Type I - Normal-strength polyethylene
Type II - High-strength polyethylene
Type III - Polypropylene
Type IV - Heat-shrinkable polyethylene
Type V - Heat-shrinkable weather-resistant polyethylene
Type VI - High-density polyethylene

Class 1 - For non-food application
Class 2 - For use in contact with food
Class 3 - Biaxial-oriented
Class 4 - Preferentially-oriented

Grade A - Low slip
Grade B - Medium slip
Grade C - High slip
Finish 1 - Untreated
Finish 2 - Treated

Intended Use

Type I or II, Class 1 is used in Methods 31 and 32
Polyolefin film covered by A-A-3174

For use in general-purpose packaging applications where high degree of water resistance, moderate moisture vapor resistance, and dust protection are desired.

- Flexible
- Colorless, Transparent
- Impact resistant
- Water resistant
- Tear resistant

Barrier Materials (cont.)

QQ-A-1876 -Aluminum Foil

Classification

Type I - Rolls
Type II - Interfolded Flat Sheets
Type III - Single ply flat sheets

Class 1 - Flat Sheets, 12" x 10 3/4
Class 2 - Flat Sheets, 9" x 10 3/4

Grade A - Food Use
Grade B - Other use

Intended Use

Grade A used to wrap food.
Grade B used in Method 20 as a greaseproof wrap.
The foil is .0005-inches thick and less is suitable for aircraft applications such as shielding or insulating components. Foil .0010 inch and heavier is suitable for use as a non-corrosive barrier between wood and other surfaces coated with a preservative or between treated surfaces to prevent corrosion.

QQ-A-1876 specifies uncoated aluminum foil.

- Dry-annealed or slick-annealed finish
- Non-corrosive
- Uncoated
- Flexibility and strength permit folding and shaping in both manual and machine operations

Barrier Materials (cont.)

MIL-PRF-22019 -Barrier Materials, Transparent, Flexible, Sealable, Volatile Corrosion Inhibitor (VCI) Treated

Classification

Type I - Heat-sealable
Type II - Pressure (cold) sealable

Class 1- Medium Duty
Class 2– Light Duty

Intended Use

Type I Material is used where a heat-sealable, VCI-treated barrier material is required.

Type II Material is used where either production or custom hand processing requires a cold-sealable material with corrosion inhibiting ability material.

MIL-PRF-22019 establishes the requirements for heat or pressure sealable, transparent flexible barrier material containing a VCI for use in military packaging.

CAUTION: Wear gloves and protective clothing. Mild irritant to eyes and hands.

- Vapor inhibitor ability
- Vapor inhibitor ability after exhaustion
- Transparent
- Storage stability
- Long-term protection
- Seam and fabrication strength
- Flexible
- Non-corrosive

Barrier Materials (cont.)

MIL-PRF-22191 -Barrier Materials, Transparent, Flexible, Heat Sealable

Classification

Type I - Watervaporproof, greaseproof
Type II - Waterproof, greaseproof
Type III - Waterproof

Class 1 - Unlimited use
Class 2 - For use on automated bag making machines only

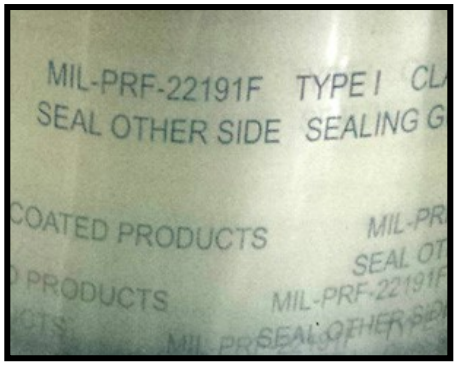
Intended Use

Type I is used in Methods 41 and 51
Type II is used in Method 33
Type III is used in Methods 31 and 32

Used where a transparent protection is required.

MIL-PRF-22191 establishes the requirements for transparent, flexible, heat-sealable barrier materials having waterproof or low water vapor transmission characteristics for use in military packaging.

- Transparent
- Flexible
- Heat sealable
- Non-corrosive
- Waterproof (all 3 Types)
- Greaseproof (only Types I and II)
- Watervaporproof (only Type I)



Barrier Materials (cont.)

MIL-PRF-3420 –Wrapping Materials, Volatile Corrosion Inhibitor (VCI) Treated, Opaque

Classification

Class I - Heavy duty
Class 2 - Medium duty
Class 3 - Light duty

Style A- Kraft, flat: Single-ply or laminated
Style B - Kraft, creped or embossed: Single ply or laminated
Style C - Greaseproof, waterproof, moldable: Laminated to carriers conforming to QQ-A-1876

Intended Use

MIL-STD-2073-1 uses MIL-PRF-3420 as the premier source of wrapping material coated or impregnated with a volatile corrosion inhibitor that provides protection for applicable items exposed to high moisture, high salt concentration, transfer at sea, rough handling, and minimal storage conditions.
VCI materials should not be used in applications where they might come in contact with high explosives or propellants associated with ammunition.
Procedures covering the use of VCI materials are specified in MIL-I-8574.

MIL-PRF-3420; covers wrapping materials (carriers) which have been treated either by coating or impregnating with a corrosion inhibitor.

CAUTION: Wear gloves and protective clothing. Mild irritant to eyes and hands.

- Vapor inhibitor ability
- Vapor inhibitor ability after exhaustion
- Long-term protection
- Seam and fabrication strength
- Non-corrosive
- “DO NOT USE WITH FOODSTUFF”

Barrier Materials (cont.)

MIL-PRF-81705 -Barrier Materials, Flexible, Electrostatic Discharge -Protective, Heat-Sealable

Classification

Type I - Watervaporproof, electrostatic, protective, and electrostatic and electromagnetic shielding
Type III - Transparent, waterproof, electrostatic protective, electrostatic shielding

Class 1 - Suitable for hand operated or automated sealing equipment
Class 2 - Suitable for automated sealing equipment

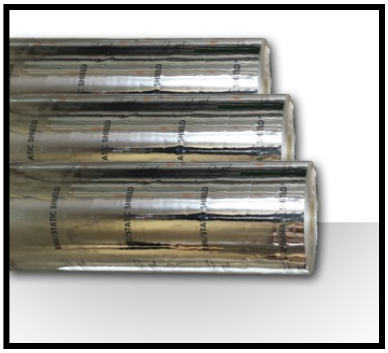
Intended Use

Type I barrier material is intended for use for watervaporproof, electrostatic and electromagnetic protection of microcircuits and semiconductor devices, such as diodes, field effect transistors, and sensitive resistors.

Type III barrier material is intended for use where a transparent, waterproof, electrostatic-protective, and electrostatic field protective barrier is required. Use of Type III material is limited to an intimate wrap or bag.

MIL-PRF-81705 specification establishes the requirements for heat-sealable, electrostatic discharge protective, flexible barrier materials used for the military packaging of microcircuits, sensitive semiconductor devices, sensitive resistors, and associated higher assemblies. In addition, the Type I materials provide for watervaporproof protection and attenuation of electromagnetic interference effects.

- Characteristics ESD Protective
- Watervaporproof
- Non-corrosive
- Heat-sealable



Barrier Materials (cont.)

MIL-PRF-121-Barrier Materials, Greaseproof, Waterproof, Flexible, Heat-Sealable

Classification

Type I - Medium Duty
Type II - Light Duty

Intended Use

MIL-PRF-121 is used in Methods of Preservation 20 and 33 as a primary source of barrier materials that provide waterproof and greaseproof protection for applicable items. MIL-PRF-121 provides one of the building blocks for applying specialized military preservation techniques approved under MIL-STD-2073-1.

Identification of material

The specification number, type, manufacturer's name, manufacturer's designation, month and year of manufacture, and lot number shall be clearly and legibly marked using water-resistant ink on the backing surface of the material. The color of the markings shall be red.

Barrier Materials (cont.)

MIL-PRF-131 -Barrier Materials, Watervaporproof, Greaseproof, Flexible, Heat-Sealable

Classification

Class 1 - Plastic backing (non-woven)
Class 2 - Kraft backing (limited use)
Class 3 - Scrim backing (woven fabric)

Intended Use

Used in Methods 41, 42, 43, 51, 52, and 53 of MIL-STD-2073-1 as the premier source of barrier materials that provide watervaporproof (and watervaporproof with desiccant).

Class 1 (general use) material with plastic non-woven backing is intended to be used in packaging applications where heat-sealable, flexible, watervaporproof, greaseproof, barrier materials are required.

Class 2 (limited use) material with kraft backing is used for packages where the combined weight inside the barrier does not exceed 10 pounds. Class 2 material should be limited to use in bags whose length plus width does not exceed 42 inches.

Class 3 (specialized use) is similar to Class 1, but is used for those applications where a higher strength heat-sealable, flexible, water-vaporproof, greaseproof barrier material are required.

MIL-PRF-131; covers the requirements for heat-sealable, greaseproof, flexible barrier materials having low water vapor transmission characteristics for use in military packaging.

- Flexible
- Heat-sealable
- Non-corrosive
- Watervaporproof
- Greaseproof

Wraps Used in Military Packaging

MIL-DTL-17667 - Paper, Wrapping, Chemically Neutral (Non-Corrosive)

Classification

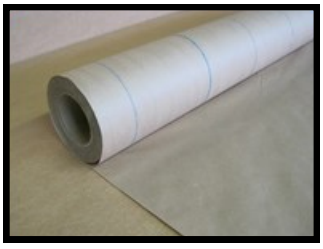
Type I - Flat
Type II - Creped

Intended Use

The chemically neutral, non-corrosive wrapping paper covered by this specification is intended for use in specialized military methods of preservation. It is a premier material required for the Navy's Prime Program. It provides a neutral wrap or cushioning material for unique Navy plastic disposal requirements in a marine environment.

This specification covers chemically neutral, non-corrosive wrapping paper used for packaging military supplies and equipment.

- Non-corrosive
- Flexible
- **NOT** Greaseproof



Wraps (cont.)

A-A-203- Paper, Kraft, Untreated

Classification

Style 1 - Rolls
Style 2 - Sheets

Intended Use

General wrapping applications.
Does not provide chemically neutral or watervaporproof barrier.

A-A-203; describes brown paper kraft paper used for general wrapping applications.

- Untreated
- Unbleached

Wraps (cont.)

A-A-50177- Paper, Lens

Classification

Type I - Cleaning Paper
Class 1 - Lightweight, white colored
Class 2 - Medium weight, white colored
Class 3 -Heavyweight, silicone treated, lavender color
Class 4 - Heavyweight, wet strength, white colored
Class 5 - Lightweight, wet strength, white colored

Type II - Wrapping/covering for coated optical surfaces
- White or natural

Intended Use

Type I lens paper is used for wrapping and cleaning lenses and other glass and highly polished surfaces. Classes 1, 2, and 3 are for dry cleaning applications; Classes 4 and 5 for wet cleaning.

Type II lens paper is used for wrapping or covering all coated optics.

Paper, Lens covered by A-A-50177 covers non-abrasive lens paper.

- Non-abrasive
- Non-corrosive

Tapes Used in Military Packaging

MIL-DTL-43036 Tape, Pressure-sensitive, Adhesive Plastic Film (for Sealing Fiber Containers and Cans)

Classification

Type I – Reinforced polyester film
Type II – Non-reinforced polyester film

Intended Use

Used primarily for sealing fiber containers and cans and for slipcover metal containers.

- Waterproof
- Watervaporproof
- Medium Tensile Strength
- Good low temperature
- Pressure sensitive

Tapes (cont.)

SAE AMS-T-22085 Tapes, Pressure-sensitive Adhesive, Preservation and Sealing

Classification

Type II - For use with or without over coating.
Type IV - For use with or without over coating for extended times.

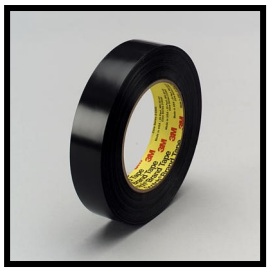
Intended Use

Type II primarily used for sealing military vehicles, aircraft, and related equipment. Used without coating when not exposed to outdoor elements. Used with over coating when outdoor storage is expected.

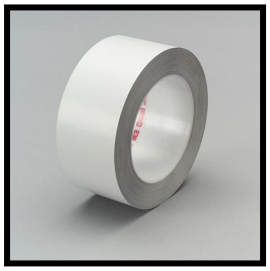
Type IV used for extended periods of outdoor storage.

This specification establishes the requirements for pressure-sensitive adhesive tapes designed for exterior preservation and sealing of military vehicles, aircraft, missiles, and other related equipment during handling, shipment, and storage.

- Pressure-sensitive adhesive
- Water-insoluble
- Colors:
  Type II - Black
  Type IV - Any color other than black



Type II



Type IV

Tapes (cont.)

A-A-1671 -Tape, Gummed, (Paper, Reinforced, Asphalt), Laminated

Classification

Type I - Laminated with an asphalt or asphaltic-type material.
Type II - Laminated with a water resistant material non asphalt-type material.

Class 1 - Strippable, suitable for use on food packages.
Class 2 - Non-strippable, suitable for closure of fiberboard boxes for domestic shipment and storage, and in securing wrappers of packages.

Style A - 2-way reinforcement.
Style B - 3-way reinforcement.

Intended Use

Closure of packages and fiberboard boxes.
Reinforced laminated Kraft-paper backed tape.

Tapes (cont.)

ASTM D5486/ D5486M -Standard Specification for Pressure-Sensitive Tape for Packaging, Box Closure, and Sealing

Classification

Type I - Waterproof, weather-resistant, polyester backed
Class 1 - Colored
Class 2 - Transparent

Type II - Water-resistant, polyester-backed
Class 1 - Tan
Class 2 - Transparent

Type III - Weather-resistant, polypropylene

Type IV - Water-resistant, woven-cloth backed

Type V - Weather-resistant, paper backed

Intended Use

Type I is used for box closure and sealing, where strength and resistance to sunlight, rain, and other deteriorating elements are required and is also used for label attachment.

Type II is used for domestic fiberboard box closure. It is the most suited for center seam closure of regular or regular slotted boxes and other applications where the tape will not be overlapped onto itself.

Type III is used where water resistance is desired.

Type IV is used for less critical packaging applications where a cloth-backed tape is desired.

Type V is used for box closure and sealing for weather-resistant and water resistance

- Pressure sensitive adhesive

Tapes (cont.)

ASTM D5330 / D5330M - Standard Specification for Pressure-Sensitive Tape for Packaging, Filament-Reinforced

Classification

Type I - Cut-resistant (polyester reinforced)

Type II - Medium Tensile Strength

Type III - High Tensile Strength

Type IV - High Tensile Strength, Weather Resistant

Intended Use

Type I is used for bundling and similar applications and used where a greater amount of stretch before break provides an improvement in impact resistance over glass filament reinforcement.

Types II and III are used for reinforcement of Regular Slotted Container (RSC) and similar fiberboard boxes, and for bundling where a snug bundle must be maintained and other similar applications.

Type IV is used when weather resistant tape high-tensile strength is required.

- Filament Reinforced
- Water insoluble, Pressure-sensitive
- Adhesive
- Colors:
  Types I and III - other than black
  Type II - Transparent
  Type IV - Black

Tapes (cont.)

ASTM D5749/ D5749M -Standard Specification for Reinforced and Plain Gummed Tape for Sealing and Securing

Classification

Type I - Reinforced, laminated
- Class 1 - Strippable
- Class 2 - Non– strippable

Type II - Plain, single ply, strippable
- Grade A - Light duty for light weight packages
- Grade B - Medium duty for medium weight packages
- Grade C - Heavy duty for heavy weight packages

Intended Use

Type I is used for box closure Methods 2C2, 2C3, and others listed in ASTM D1974/D1974M.

Type II is used for box closure Methods 2C4, 2C5, and others listed in ASTM D1974/D1974M.

- Water activated (Type I)
- Pressure-Sensitive adhesive (Type II)

Tapes (cont.)

ASTM D6123 / D6123M Standard Specification for Pressure Sensitive Tape for Light Duty Packaging and General Purpose Masking

Classification

Type I - Creped paper backed
Type II - Flat paper backed

Intended Use

Type I is used where conformability is desired.

Type II is used for where additional strength is desired or for straight-line masking:

- Used for bundling small parts to be over-packed.
- Used to hold small parts to larger assemblies.
- Used for temporary closure of chipboard and fiberboard boxes.
- Used for masking of surfaces to prevent being covered by paints, stains, varnishes, or other finishing materials.

- Pressure-sensitive adhesive

Reuse/Recycle of Packaging Materials

Reuse

When practical and economically feasible, all packaging materials will be recovered and reused as long as material performance is not compromised. With this in mind, packaging personnel will:

(1) Unpack materiel to prevent packaging material damage.

(2) When opening fiberboard containers, avoid stripping tape/labels but instead use shallow cutting to minimize container delamination.

(3) When opening foam-in-place encapsulated packs, use a rip-type hand saw to cut along the marked cut line. Then use a pry bar to separate all four sides evenly. After item is removed, reassemble pack, tape together, and store in a clean, moisture-free area until reuse.

(4) Remove protruding sharp metal objects including nails, staples, and metal strapping.

(5) Consolidate reusable container cushioning and hardware, and place in or attach to the container to prevent loss/damage.

(6) Segregate cushioning before storage.

(7) Identify specific packaging material collection, segregation, and storage sites to avoid comingling with refuse.

(8) Identify mandatory reusable containers by either container NSN, SPI number, part number, or associated item NSN, and store them for reuse.

(9) When renailing wood containers, avoid driving nails into existing nail holes, as doing so will reduce container integrity.

Recycle

(1) Packaging materials should be recycled to the greatest extent possible, but secondary to reuse options.

(2) Feasibility of recycling packaging materials will be dependent on established installation recycling programs in effect and quantities generated, keeping in mind changes due to fluctuating prices for recycled commodities.

(3) Packaging materials include:

(a) Liquids - chemicals, e.g. cleaner/degreasers, lubricants, and preservatives.

(b) Solids (flexible and rigid) - glass, metals, papers, fiberboard, plastics, laminates, textiles, wood.

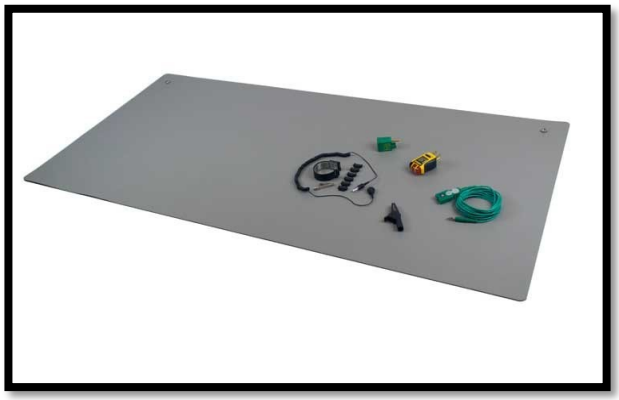
Work Areas

Basic Packaging Area -

ESD Packaging Area -

All ESD areas should be clearly marked and segregated from the Basic Packaging Area.

The most basic packaging area for ESD items is included in an ESD protective field service kit:



"If an ESD workstation isn't properly grounded it will not provide the necessary protection while working on sensitive electronic items. Because of this, it is highly recommend that any ESD kit you purchase come with a grounded plug attachment similar to the Prostat PRM-653 kit shown here. When wrist strap and plug are both connected to the mat, grounding the work-station is as easy as plugging into any standard three prong outlet."

The ESD area should be free of debris, food, drinks, electronic devic-es (cell phone, radio, etc.), and only authorized tools may be used.

Basics of Electrostatic Discharge (ESD)

CAUTION: Only trained personnel should handle unprotected ESD sensitive items. Disconnect all power before handling any item. Never handle a circuit card with bare hands!!

The following instructions provide minimal procedures for packaging of ESD-sensitive items. For process, we will be following Preservation Method 41, per MIL-STD–2073.

- STEP 1: Connect the field service kit (or work station) to ground and wrist.
- STEP 2: Wrap the bare item in antistatic cushioning and wrapping, e.g., MIL-PRF-81705, Type I or II.
- STEP 3: Place the wrapped item in a bag made of MIL-PRF-81705 barrier material and heat seal.
- STEP 4: Apply ESD attention label and ID markings to the bag. If this label is not available, type the same information on a gummed label.

Note: *Per MIL-STD-129, "all unit packs shall be marked with the ESD sensitive devices attention label prescribed by ASTM D 5445"; the label shall include the ESD sensitive device symbol (triangle and reaching hand), the words "ATTENTION STATIC SENSITIVE DEVICES," and the statement "HANDLE ONLY AT STATIC SAFE WORK STATIONS." The symbol and lettering on the label shall be marked in black on a yellow background."*

.

- STEP 5: Place the preserved item in the appropriate fast-pack.
- STEP 6: Close the box and apply appropriate tapes.
- STEP 7: Apply ESD attention label and unit ID markings per MIL-STD-129.

NOTE: ***Packaging requirements for ESD items are all the same, regardless of the item's condition.***

Basic Tools and Equipment

Heat Sealer - You should purchase heat sealers that can be used in handheld or tabletop configurations. You want to make it easy and light-weight to use so that an operator may insert any heat sealable material into the slot on the bottom edge of the machine.

Heat sealers are sold for both "supported" and "non-supported" heat sealable packaging materials. If possible, both types should be purchased.

Basic Use– The material is guided through the machine by a pair of timing belts at a fixed speed of 200 inches per minute. While inside the machine, the material is heated, then compressed, creating a secure airtight seal. Sealed material exits opposite end of unit.

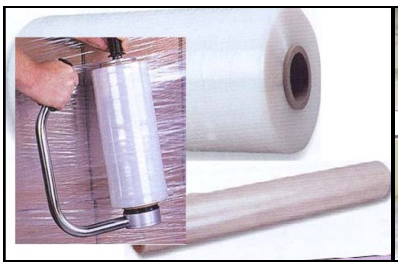
Stretch Wrap– Machine/Manual

Stretch wrap or stretch film is a highly stretchable plastic film that is wrapped around items. The elastic recovery keeps the items tightly bound.

Basic Use - In pallet unitizing, stretch wrap can have several functions:

- Improved stability of products or packages, forming a unit load.
- More efficient handling and storage of unit loads.
- Some degree of dust and moisture protection.
- Some degree of tamper resistance and resistance to package pilferage.

Making sure cartons stay on the pallet is an important consideration in warehouse distribution, especially as the demands for increased throughput continues to rise. Stretch wrapping is the most cost-effective way to keep loads secured on a pallet.



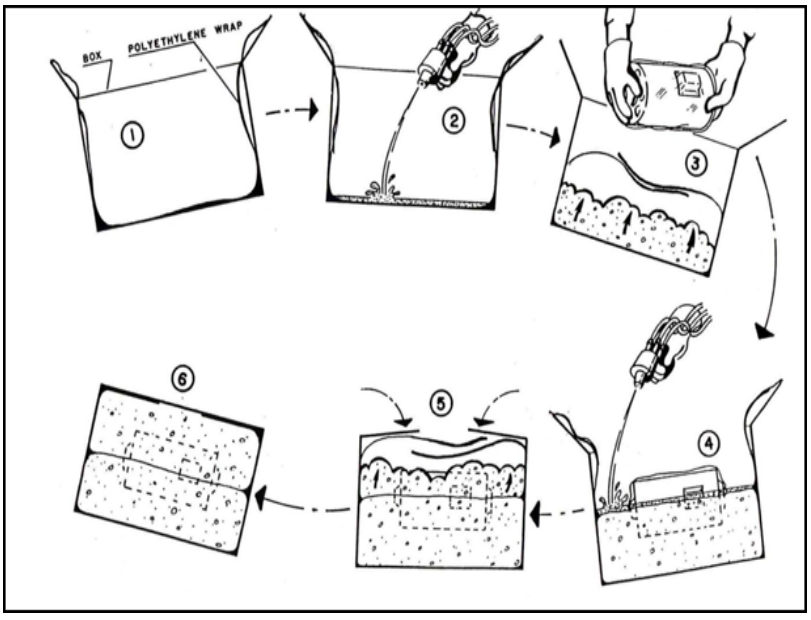
Foam–In-Place

Foam-In-Place (FIP) - Is a packaging process where two chemical components are dispensed in liquid form, which chemically react, expand, and rise as foam, and conform to the item and the inner walls of the box to form a complete pack.

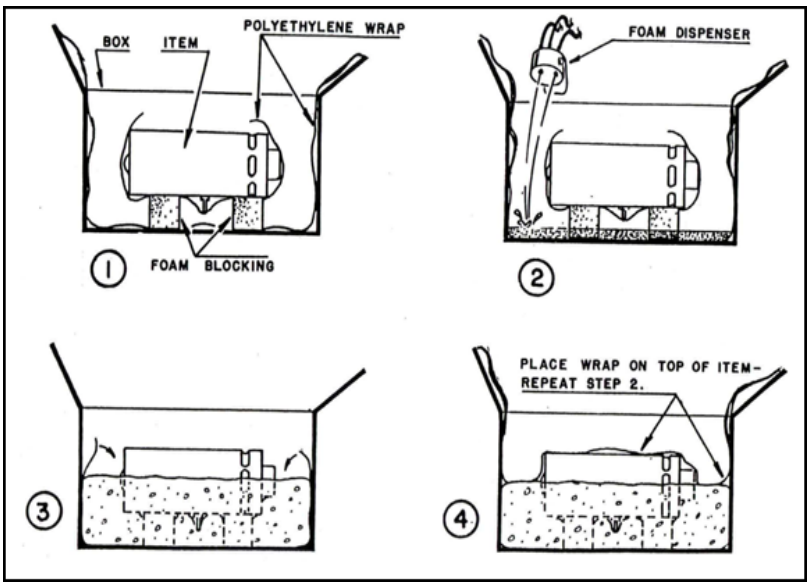
Basic Uses - FIP can be applied to a variety of items large and small; it eliminates the necessity for extensive packaging design, it's comparatively inexpensive and, most important, FIP affords very good protection for the item

MIL-HDBK-775 - Packaging Procedures for FIP provides instructions for the application of eight techniques of FIP. As with any other packing procedure, the item must be preserved by the proper method. Foam is provided in three classifications: flexible, semi-rigid, and rigid. To select the proper type, you must determine the weight of the item of which FIP technique you desire. All FIP packs are reusable if proper care is taken when opening and are stored properly in a clean, dry area. Saving these packs, as with saving any other pack, can save a lot of time and money in packaging planning and packing.

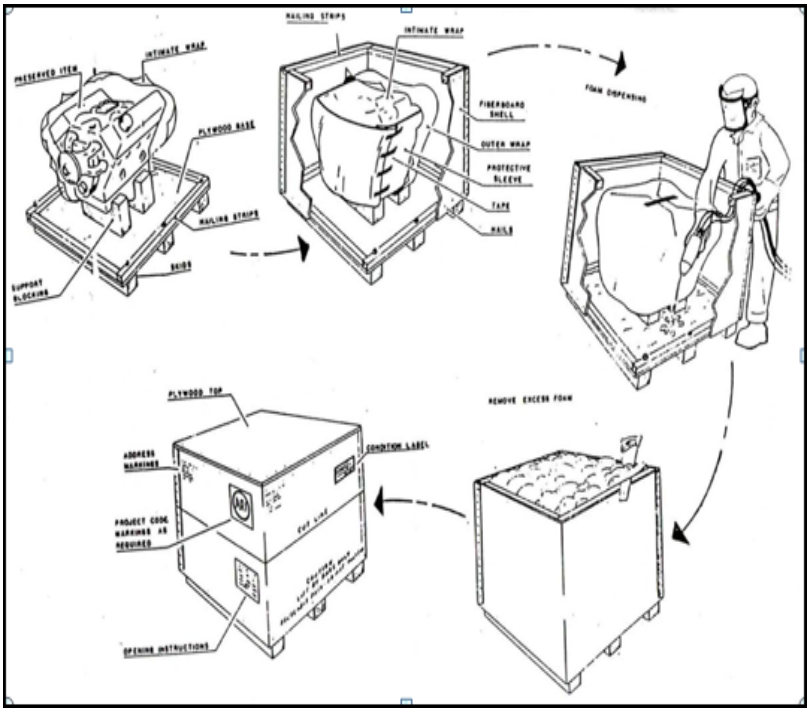
For items under 50 lbs:



For items from 51 to 150 lbs.



For items from 51 to 150 lbs.

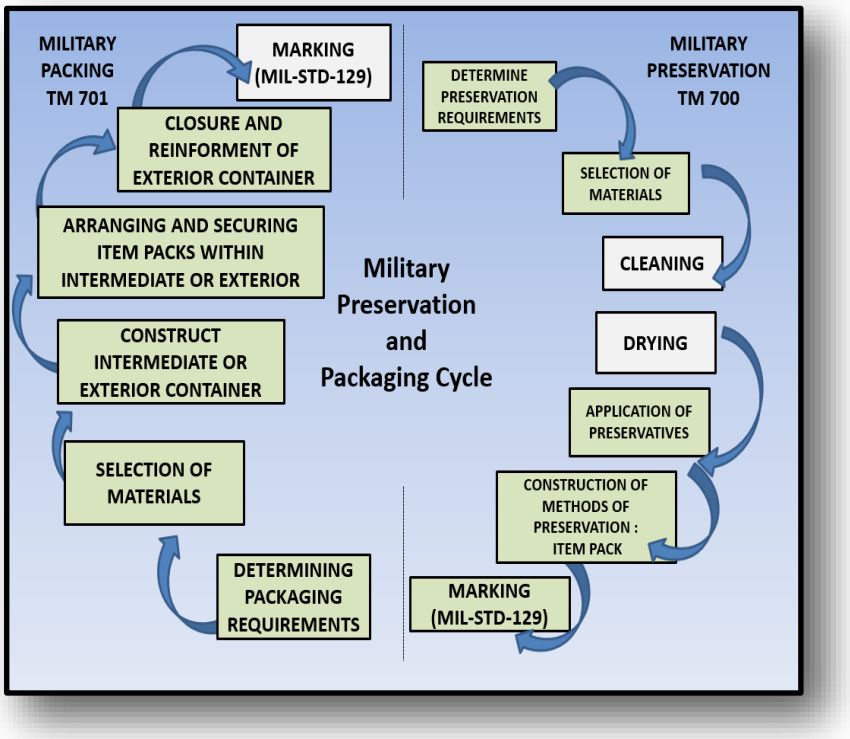


Packaging, The Cycle of

Two different areas are affected in the packaging cycle:

- First, preserve for storage,
- Second, package for shipment.

Prior to storage, ensure the item in question is properly cleaned and dried. Next, ensure the correct preservatives are applied and the item is properly wrapped and secured. The next step is to unitize the item and ensure correct markings are annotated on the package for proper identification. After storing the item, it is now time to ship. The first step in preparing the item for shipping is to ensure that it is in the correct shipping container in accordance with MIL-STD-2073-1. Next, load the unit container into a shipping container, if needed, secure the item, and mark according to MIL -STD-129.



Levels of Military Packing

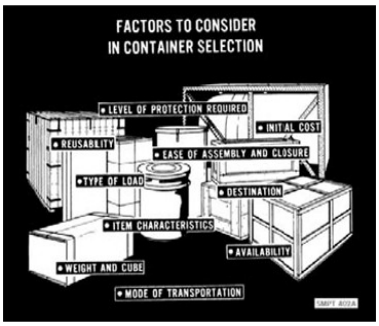
Military Packing: Application of any exterior protective methods, materials, or devices to assure the integrity of the preserved item per MIL-STD-2073-1 as follows:

Level A– Most Severe Protection is required to meet the most severe worldwide shipment, handling, and storage conditions. A Level A pack must, in tandem with the applied method of preservation, be capable of protecting material from the effects of direct exposure to extremes of climate, terrain, and operational and transportation environments. Examples of situations which indicate a need for use of a Level A pack are: War Reserve Material, mobilization, strategic and theater deployment and employment, open storage, deck loading, and Foreign Military Sales (as specified in the contract). Examples of containers used for Level A packing requirements include, but are not limited to, overseas-type wood boxes, and plastic and metal reusable containers.

Level B– Moderate Protection is required to meet moderate worldwide shipment, handling, and storage conditions. A Level B pack must, in tandem with the applied preservation, be capable of protecting material not directly exposed to extremes of climate, terrain, and operational and transportation environments. Examples of situations which indicate a need for use of a Level B pack are: security assistance, such as Foreign Military Sales (as specified in the contract) and containerized overseas shipments. Examples of containers used for Level B packing requirements include, but are not limited to, domestic wood crates, weather-resistant fiberboard containers, fast pack containers, weather-resistant fiber drums, and weather-resistant paper and multi-wall shipping sacks.

Basically:

- **Select the right container**
- **Secure the item**
- **Select the correct closure**
- **Mark it IAW: MIL-STD-129**



Container Selection, Examples, Specs

MIL-DTL-117, Type III	Class C, Style 1, medium duty, waterproof, greaseproof, opaque bag
PPP-B-566 or PPP-B-676	Folding or setup box.
PPP-B-566, PPP-B-676, or ASTM D5118	Folding, setup or fiberboard box.
PPP-B-566	Folding paperboard box.
PPP-B-676	Setup box.
ASTM-D5168	Box, triple wall, fiberboard.
ASTM-D5168	Class 1, non-weather resistant triple wall fiberboard box.
ASTM-D5168	Weather resistant triple wall fiberboard box
ASTM-D5118	Fiberboard box.
ASTM-D5118	Type CF, Class domestic, single wall, corrugated fiberboard box
ASTM-D5118	Type CF, Class domestic, double wall, corrugated fiberboard box
ASTM-D5118	Class weather resistant fiberboard box; or PPP-B-566, water resistant
	folding box; or PPP-B-676, water resistant setup box.
MIL-DTL-6054	Reusable metal drum.
ASTM –D7478	Wood crate, lumber or plywood sheathed, nailed or bolted.

Container Selection, Example, Specs (cont.)

When selecting a container for any item, you must first determine the item characteristics, or more simply put, determine whether the item will be protected from vibration, shock, or stacking forces during shipment, handling, and storage. Items are preserved to protect them from deterioration from the elements. The items are then packed in an intermediate/ shipping container for protection during handling. If either procedure is applied inadequately, the item stands a good chance of being damaged from corrosion or breakage.

Other factors to be considered are the methods used to ship and store the item. Unit, intermediate, and shipping containers are in FEDLOG/ LIW for individual items by specification number. To describe or instruct on the application of all the types of containers that are available is beyond the scope of this text. However, there should be sufficient information provided here to allow you to select the proper container. If your packaging operation is involved in ongoing packaging of specific types of items requiring certain types of containers, you should get the appropriate spec for that container. You usually end up with three choices, which are:

FIRST CHOICE - The same container that the new item was received in.

SECOND CHOICE - Any suitable container that is available that is not designated for any specific item other than the one being packed. Excellent choices are fast-packs and prefabricated boxes that are available through the GSA catalog.

THIRD CHOICE - FIP containers may be included in the first and second choices and should always be considered for all types of items, but are excellent for heavy/odd-shaped items. They are also reusable.

Remember, a good packaging operation should maintain a container reclamation and reusability program. Planning a pack can be a lot easier and save a lot of time if the materiel can be packaged in the same container that the new item was received in.

Long life Reusable Containers (LLRC)

As per AR 700-15, Packaging of Materiel, selection and handling of LLRCs will be as follows:

1. When an LLRC is specified for an item, it is the only authorized method of packaging without specific deviation authorized by the integrated materiel manager (IMM) packaging office.

2. When LLRCs are determined to be excess, the following will be accomplished:

(a) At the installation/activity/depot level, notify the IMM of the item for which the container was designed. If the item IMM cannot be determined, contact the container IMM.

(b) When the container is determined to be excess to the needs of the IMM, it will be referred to PSCC to determine if the container can be used to support any other packaging program. If PSCC determines no use for the container, the container IMM will be notified, and disposal of the container will be initiated.

3. Best business practices for containers with humidity indicators is that they should be checked monthly.

4. Questions, please don't hesitate to call ASC PSCC @ (570) 615-7257.

To the greatest extent possible, LLRCs will not accompany supply condition code "H" condemned materiel destined for disposal at DRMO without approval from the managing NICP packaging POC. Criteria for container disposal will include:

(a) Age and condition of the container.

(b) Cost to refurbish the container.

(c) Whether the container is necessary to contain excess fluids/ lubricants.

Basic Inspection of Long Life Reusable Containers

Container: Inspect container for structural defects. Containers with any of the following defects are considered unserviceable and will require repair or replacement.

(1) Cracks, holes or ruptures in the container cover or base.

(2) Container deformity to the extent that the container cannot be closed (sealed where required).

(3) Dents that will interfere with the item envelope (include volume of motion permitted by the container suspension system).

(4) Functional damage to the mounting/suspension system to include cracks, damaged, or missing special hardware, splits, tears, and bond separation of the elastomeric mount exceeding one thirty-second of an inch.

(5) Shock mount is twelve (12) years or older from cure (manufacture) date printed on mount.

(6) Stage four corrosion.

Hardware: Inspect for damaged or missing mounting and closure hardware.

Molded Contour Cushions: Inspect cushions for deterioration, loss of resilience, voids, insect or rodent infestation, de-bonding, and contamination from dirt, oil, or grease.

Nameplates: Inspect for damaged, unreadable or missing nameplates.

Latches: Inspect for damaged or missing latches.

Skids: Inspect skids for decay, excessive damage (cracks, splits), and insect infestation. Defects that reduce the skid load bearing surface to the extent that stacking of the containers is adversely affected will require replacement of the skid. Replacement skids may be ordered as components or locally manufactured from any available hardwood. All skids shall be made from hardwood only and shall be treated and marked in accordance with ISPM-15.

Humidity Indicator: Replace indicator card that does not show a blue color on any number.

Record Receptacle: Inspect record receptacle cover and attachment chain for condition.

Gaskets: Inspect gaskets and seals for permanent deformation, cuts, abrasions, and other defects which affect sealing of the container.

Other items: Inspect lifting rings, eyes or lugs, stacking guides, desiccant holder, relief valve, and view ports for damage, corrosion and other defects.

Markings: Inspect exterior markings for incorrect, missing, or unreadable characters.

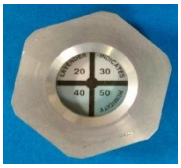
Additional information can be found in Technical Manual: 1-8145-695-24&P 3-2

Humidity Indicators for LLRC

There are many types of humidity indicators that must be checked. The simple fact is that depending on the environment in which the LLRCs are going to be stored, they will have to be checked more or less frequently. We say this because a cyclic schedule should be followed. The two most basic types of humidity indicators are: reversible and non-reversible. If you have any questions, more specific guidance can be provided to you by ASC PSCC.

Color-Change (Reversible) Humidity Indicator Discs - Includes "Single Spot Disc" and "Multiple spot/multiple section (pie) disc." The color-change disc turns from blue to lavender to pink as the humidity increases, and turns back to blue as the humidity decreases, which allows for the disc to be reused, as long as it has not turned white. A white disc indicates the humidity indicator has been exposed to excessive humidity and is no longer functioning and must be replaced.

Blue: Humidity level less than number indicated on disc/spot – GOOD
Lavender: Humidity level equal to number indicated on disc/spot – CAUTION
Pink: Humidity level surpassed the number indicated on disc/spot – BAD
White: Humidity Indicator not functioning – BAD



Non-reversible Delayed Response Maximum Humidity Indicator Discs - These discs contain a color-stain element which is irreversible; therefore, they should only be installed in a desiccated (dry) atmosphere. The disc, initially white, is stained orange when it has been exposed to 55% RH for an eight-hour continuous period or 85% RH for two hours. The disc will turn brown with continued exposure.

White: GOOD
Orange/Brown: Humidity level exceeded -BAD


Effects of Corrosion

Corrosion can be defined as the destructive attack on a metal through interaction with its environment. As an aid in evaluating rust damage and planning rust repair actions, rust shall be classified into four stages:

- **Stage 1**: Red, black, or white corrosion deposits on surface accompanied by minor etching and pitting. Base metal is sound.
- **Stage 2**: Powdered, granular, and scaled condition resulting in erosion of material from the surface. Base metal is sound.
- **Stage 3:** Surface condition and corrosion deposits are similar to Stage 2, except that metal in the corroded areas is unsound and small pinholes may be present.
- **Stage 4 :** Corrosion has advanced to a point where the surface has been penetrated. No metal remains at point of severest corrosion. There are rust holes in the surface area, or metal is completely missing along the edge.

Exterior surfaces of units with areas of Stage 1 or Stage 2 rust shall be blasted, cleaned, treated, primed, and painted. Units with areas of Stage 3 or Stage 4 rust shall be repaired, cleaned, treated, primed, and painted in those areas or should have assemblies replaced with new assemblies if repair is not economical.

Any evidence of corrosion on working surfaces of close tolerance parts is not acceptable. Pitting or surface deterioration in the area of any seal or gasket is not acceptable if it affects the proper functioning and/or proper performance of the applicable component

Supply Discrepancy Report (SDR)

What is an SDR?

The purpose of preparing SDRs is to determine the cause of discrepancies, effect corrective action, and prevent recurrence. Such reports provide support for adjustment of property and financial inventory accounting records; information as a basis for claims against contractors; notification to shippers; visibility of preservation, packing, marking, and unitization discrepancies; required corrective actions; disposition instructions; and information for management evaluations.

To add SDRs to DLA website, please go to WEBSDR - Supply Discrepancy Reporting (SDR) [formerly referred to as Reports of Discrepancy (RODs)] Web-based entry method for SDRs at:
https://www.transactionservices.dla.mil/daashome/websdr.asp

In GCSS: The following process flow, descriptions and other information pertains to the named business process:

Purpose: For SSA management to manage the SDR, LOGIC, entries into the SDR have two sources: a goods receipt with an overage, shortage, or damage posts directly to the SDR; a late purchase order submitted for proof of delivery (POD) in the ZPODRPT transaction is also posted to the SDR. The SSA manager transfers the postings from the GCSS-Army SDR, ZPODRPT to WEBSDR.

Start - Supply and transportation discrepancy issues periodically occur and must be managed.

Step 1a - The Receiving Section processes a goods receipt which has an overage, shortage, or damage.

Step 1b - Management has used ZPODCHK to request proof of delivery from National for an overdue purchase order.

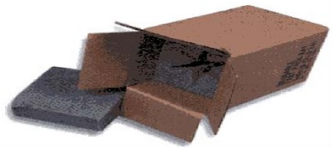
Step 2 - Management opens the SDR, ZPODRPT. In ZPODRPT, enter your SLOC. Select the checkboxes for Shortages, Overages, Damages and Discrepancy. Execute the report. Refer to the Manage the Supply Discrepancy Report simulation for the step-by-step instructions.

Step 3 - Open another window session with WEBSDR. Use the information in ZPODRPT to update WEBSDR.

End - Supply and transportation discrepancy issues have been updated in WEBSDR.

Fast Packs-PPP-B-1672

Fast Packs are prefabricated cushioned containers. There are four types of fast-packs. Advantages are: reusability, cost, and simplicity of use. The most important advantage to using fast-packs is the excellent protection provided the item. These packs have a very wide range of application and are presently being used as unit containers.



Uses:

Items that should be shipped in fast-packs include delicate and fragile items that are susceptible to damage in shipment, especially electronic items and circuit cards that are vulnerable to ESD damage. Any item compatible in size and weight may be shipped in a fast pack. Overseas activities and continental United States (CONUS) installations will use the containers as often as possible for the shipment of items to depots or other activities. Although fast packs are identified as reusable containers, they are not accountable items. Each receiving activity should reuse the containers for the return of items and should not return any empty containers to shippers.

To help you in determining the type and size of fast-pack you may need when planning a pack, the four types of fast packs are described below (these packs may be used for items weighing from 1 to 90 pounds and ranging in size from 2 to 25 ½ inches long):

Types:

TYPE I – Vertical Star Pack. For fragile and non-fragile items that are cylindrical or oblong in shape. Examples include meters, gauges, and indicators. Item maximum weight 23 lbs.
TYPE II – Folding Convoluted Pack. For circuit cards and other flat items. They are also available with antistatic cushioning for ESD packaging. Item maximum weight 10 lbs.
TYPE III – Telescoping Encapsulated Pack. For larger cube or rectangular-shaped items such as amplifiers and power supply units. Item maximum weight 90 lbs.
TYPE IV – Horizontal Star Pack. For larger or longer rectangular items such as voltage regulators, panels, transmitters, and amplifiers. Item maximum weight 31 lbs.

Closure and Sealing of Fast Packs

TYPE I, STYLE A packs shall be sealed with minimum two-inch wide tape conforming to ASTM D 5486 (formerly PPP-T-60 and PPP-T-76) applied over all seams, corners, and manufacturer's joints. The tape shall be centered over the seams and joints and shall extend over all the corners and edges of the box a minimum of two inches onto the adjacent box panels. Tape shall be applied over the lengthwise seam of the outer flaps, sealing the opening of the box and over the manufacturer's joint prior to tape being applied to the edge seams of the box. The tape applied to the manufacturer's joint shall cover the joint but not extend over the corners of the box onto the adjacent panels. This method serves as the closure.

TYPE I, STYLES B and C packs shall have one band of two-inch wide tape conforming to ASTM D 5330 (formerly PPP-T-97), type IV, fully encircle the pack. Sealing is not required.

TYPE II, STYLE D packs shall be treated in the same manner specified for Type I, Style A containers, which is to seal all open seams and manufacturer's joint with two-inch wide tape conforming to ASTM D 5486 (formerly PPP-T-60 and PPP-T-76), Type III or IV. This method serves as the closure and seal.

TYPE III, STYLE G packs shall be sealed with bands of two-inch wide tape conforming to ASTM D 5330 (formerly PPP-T-97), Type IV. Two bands shall be positioned six inches from the ends over the top, bottom, and sides. Add one lengthwise band over the top, bottom, and ends for XE9 and XF1 Fast Packs. All bands will fully encircle the pack. Sealing is not required.

TYPE IV, STYLE B packs shall be sealed as specified for Type III, Style G, except that the lengthwise band shall not be applied. Sealing is not required.

Note: Level B packing is the highest level attainable in fiberboard containers, as compared with Level A in hard surfaced containers of wood, glass, metal, etc. Mark and label all containers in accordance with MIL STD 129.

Let's Talk Closures/Reinforcement

CLOSURE is described as the procedure that is used to secure the opening of the container after the packing is accomplished. Box closures vary with practically every type and style of container. Closure requirements are spelled out in all of the container specifications. The most common containers used are ASTM 5118, ASTM-D 6251, PPP-B-621, ASTM-D7478/D7478M (Superseded MIL-C-104), MIL-B-3774, and MIL-B-26195. General instructions for closures for some of these boxes and crates are given herein.

***CAUTION -** When marking, closing, and reinforcing boxes, make sure that the markings and labels are not covered by strapping or closure tape.

CLOSURE FOR WOODEN BOXES
ASTM-D 6251 and PPP-B-621 are normally accomplished by simply nailing the lid onto the box. The lid for the cleated, plywood box, ASTM-D 6251 should be placed on the top with the cleats facing down. When the cleats are faced up, the pockets formed by the cleats trap water. Care must be taken to select the proper nail size. When nailing box tops into the side cleats, the requirement is six penny (6d) for one-inch nominal lumber and 10 penny (10d) for two-inch nominal. Nail placing should be eight inches. When assembling or closing a wood box that has been previously used, never use the same nail holes - MAKE NEW ONES. When opening these boxes, use a NAIL PULLER, if available, to prevent splitting the wood. If a nail puller is not available, use a pry bar and pry the lid off carefully as not to break the cleats or plywood. Remove the nails and store the box if it is not to be used immediately.

BOXES AND CRATES WITH BOLT CLOSURES
Boxes and crates that are closed with bolts are usually closed at the bottom, keeping the top, ends, and sides assembled for easy removal and better access to the item. Lag bolts, FF-B-561, and washers, FF-W-92, are used for the assembling of the top and for closing. Style 1 Hex Head and Style 2 Square Head are both permissible, but Style 1 is more adaptable to common hand tools and is faster to install. The Grade C bolt is corrosion resistant and is also recommended, so the preferred bolt would be FF-B-561, STYLE 1, GRADE C. The length and diameter of the bold is determined by the size of the lumber that you are bolting into. Example, if you were assembling cleated plywood panels with one-inch nominal cleats to a four by four nominal base, you should use bolts three inches long, and one half inch in diameter. For bolting into the edge of two-inch nominal lumber, you would use quarter-inch diameter bolts. Spacing should be about 12 inches apart. The corner bolt should be no less than three inches from the end.

When installing lag bolts, drill a starter hole for each bolt using a bit diameter slightly smaller than the bolt. This prevents splitting of the wood and allows for easier installation of the bolt. When installing bolts in a previously used container, DO NOT use the existing holes - DRILL NEW ONES. Additionally, you should NEVER drive lag bolts into the wood with a hammer.

ASTM 5118/5118M Fiberboard box is the easiest and most common material. For closing fiberboard boxes, use two-inch tape conforming to ASTM 5486/5486M. Closure is accomplished by taping completely over all box openings. Box openings will vary depending on the box style and openings may include the top and bottom, top only, bottom only, or the ends. Openings will also include the manufacturer's joint, staples, or stitching.

When opening boxes that are taped in this manner, DO NOT remove the tape. Removing of the tape will cause delamination of the fiberboard and damage the box. To open, cut along the opening with a shallow blade knife. To reseal, tape over the old tape.

REINFORCEMENT IS THE STRENGTHENING OF CONTAINERS
Fiberboard boxes, wood boxes, and crates require reinforcing when used as shipping containers. NOTE: Reinforcement (i.e., strapping) should only be done at the time of shipment. Specific requirements for individual types and styles of containers are called out in the specification for that container, but generally, fiberboard boxes are reinforced with nonmetallic strapping and wood boxes, and crates are reinforced with metallic strapping. The metallic strapping must conform to ASTM-D3959, and nonmetallic strapping to ASTM-D3950. Although specified or permitted for specific operations, the application of metallic strapping for fiberboard boxes should be avoided. Reinforcing requirements are determined by the size and weight of the box. The size of the box determines the number of straps, and the weight determines the size of the strapping (see Figure 1).

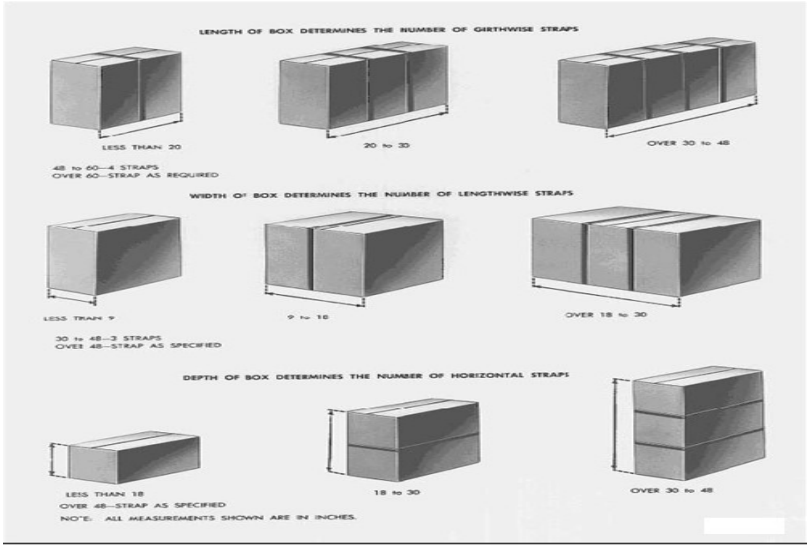
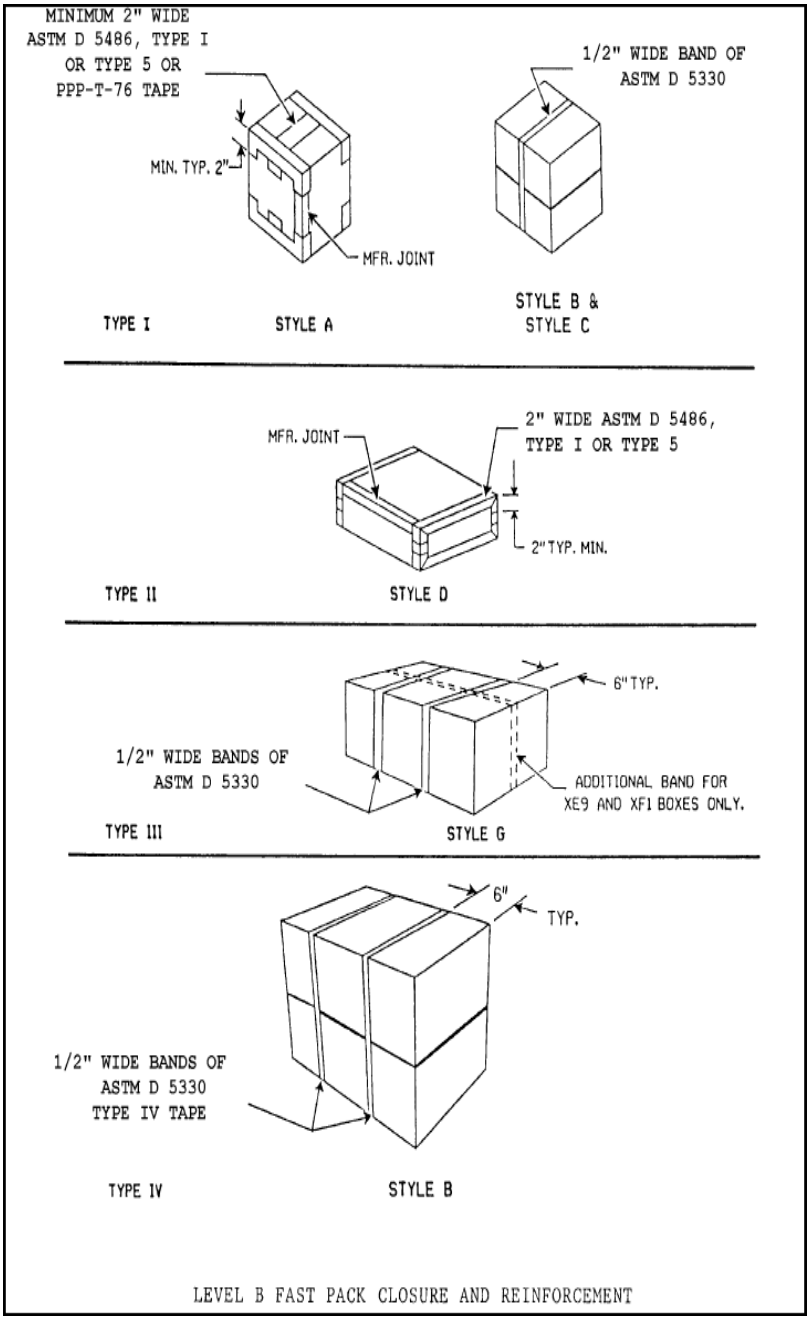


Figure 1

Basic Views of Closures and Sealing



LEVEL B FAST PACK CLOSURE AND REINFORCEMENT

Marking and Labeling, MIL-STD-129

Marking and labeling requirements are specified in MIL-STD-129, which should be readily available to all packaging operations. Many packaged items are lost or shipments are frustrated because of illegible or inadequate markings. Marking and labeling requirements are the same for all military shipments, but their application may vary depending on the type of container and where or how it is being shipped. Common rules for marking and labeling include:

- Marking must be legible and contrasting
- Marking surface must be clean and dry
- Old markings must be obliterated
- Use approved marking materials

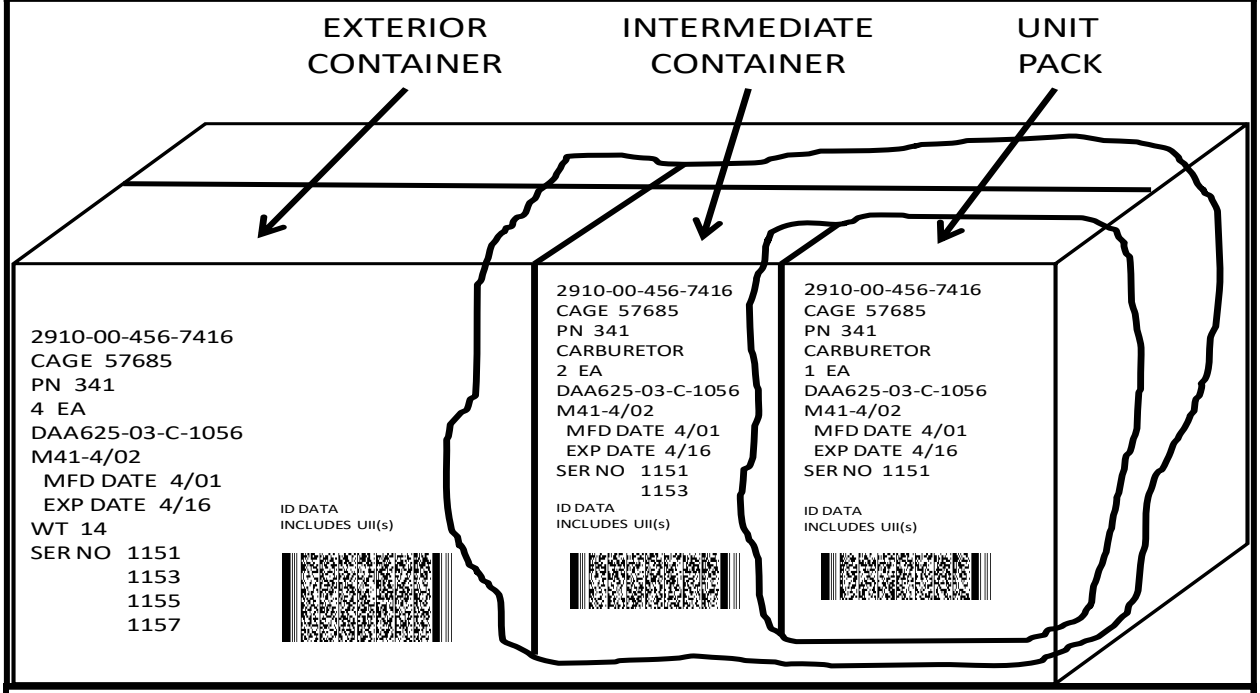
***CAUTION** - When marking, closing, and reinforcing boxes, make sure that the markings and labels are not covered by strapping, closure tape, or stretch wrap.

BASIC UNIT IDENTIFICATION LABEL

The marking surface of a unit pack shall be the outermost wrap, bag, or container of the unit pack.

Quick guide to MIL-STD-129

Example of unit pack , intermediate, and exterior container identification markings



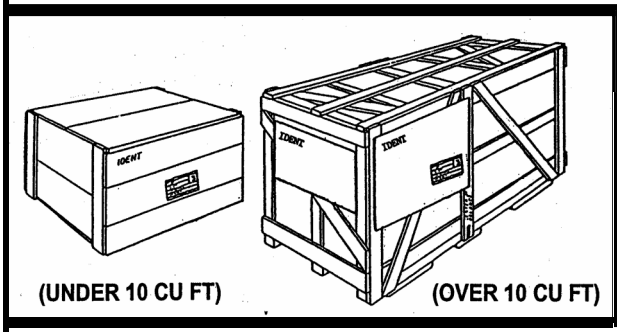
NOTE: For additional material requirements, see 5.13.
Linear bar codes are optional when the 2D (PDF417) bar code includes the identification data.

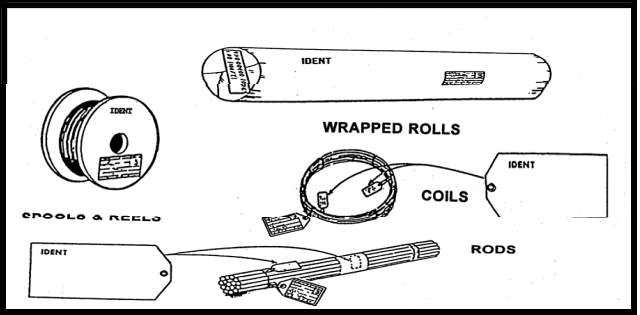
Unless specifically exempted in the contract or solicitation, the following identification information shall be marked on all unit packs and intermediate containers, in the order listed. This requirement applies to all unit packs and intermediate containers repacked for shipment by military installations. Additional identification markings may be required by the contract and shall be placed either below these markings or in a conspicuous location on the identification-marked side of the container. Unit packs used as exterior containers at the time of packaging shall be marked in accordance with 5.1.2. of MIL-STD-129

1. **NSN/NATO stock number.**
2. **CAGE code.**
3. **Part Number.**
4. **Item description or nomenclature.**
5. **Quantity and UI.**
6. **Contract # or purchase order # (PIIN) including four-digit delivery order or call number, modification for change order number, and lot number shall be shown.**
7. **Military preservation method and date of unit preservation**
8. **Shelf-life markings, if applicable, shall be applied as specified in 5.10.1.**
9. **Serial number(s)).**
10. **Hazardous materials (HAZMAT) and ammunition and explosives marking (see 5.13 and 5.14).**

Quick guide to MIL-STD-129 (continued)

Exterior Container Markings





Identification marking information on exterior containers and unpacked items
Unless specifically exempted in the contract or solicitation, the following minimum identification information shall be marked on all exterior containers, palletized Unit Loads and unpacked items, in the order listed. Ammunition and explosives shall be marked as specified in 5.14 of MIL-STD 129 standard or as specified by the contract or solicitation. Hazardous items shall be marked with identification markings as specified herein and in 5.13. Bar code markings are required as specified in 5.4.1.2.

1. **NSN/NATO stock number**
2. **CAGE code**
3. **Part number**
4. **Item description or nomenclature shall be left blank unless otherwise specified (Required for hazardous items and ammunition and explosives see 5.13. and 5.14**
5. **Quantity and UI**
6. **Contract number or purchase order number (PIIN) including four-digit delivery order or call number, modification for change order number, and lot number shall be shown**
7. **Military preservation method and date of unit preservation**
8. **Gross weight. The capital letters "WT" shall precede the gross weight.**
9. **Proper shipping name (PSN) and North American (NA) or United Nations (UN) identification number, where assigned**
10. **Shelf-life markings, if applicable**
11. **Serial number(s).**
12. **Hazardous materials (HAZMAT) and ammunition and explosives marking. See 5.13 and 5.14**

Basic Shelf-Life Markings

Shelf-life markings shall be shown as part of the item identification data on unit packs, intermediate containers, exterior containers, and unpacked items. Shelf-life markings shall include the manufactured, cured, assembled or packed date (apply one date), and the expiration or inspect/test date, as appropriate.

SHELF- LIFE EXTENSION NOTICE

PER DOD 4140.27- M, CONTAINERS REQUIRE RE- MARKING WITH EXTENDED SHELF- LIFE DATA. UNITS OF ISSUE REQUIRE RE- MARKING UPON OPENING CONTAINER.

NSN: _____

CONTRACT NUMBER: _____

LOT/ BATCH NUMBER: _____

DATE TESTED: _____

NEXT INSP/ TEST DATE: _____

AUTHORITY: _____
(QSL, MQCSS, OTHER)

INSPECTED BY: _____
(ACTIVITY AND INSPECTOR'S NAME OR NUMBER)

DD FORM 2477-1 (Large), -2 (Medium), or -3 (Small) APR 1999
PREVIOUS EDITION MAY BE USED.

For Type I shelf-life items: manufactured (MFD) date, cured date, assembled date, packed date (subsistence only) (apply one date, as appropriate), and expiration (EXP) date (see note). For items that contain rubber or synthetic elastomers, the expiration date shall be calculated from the cured date of the rubber/ elastomer.

For Type II shelf-life items: manufactured (MFD) date, cured date, assembled date, packed date (subsistence only) (apply one date, as appropriate), and inspect/test (INSP/TEST) date (see note). For items that contain rubber or synthetic elastomers, the inspect/test date shall be calculated from the cured date of the rubber/ elastomer.

Quick Guide To Military Shipping Label (MSL)

FIGURE 2A. Generic MSL

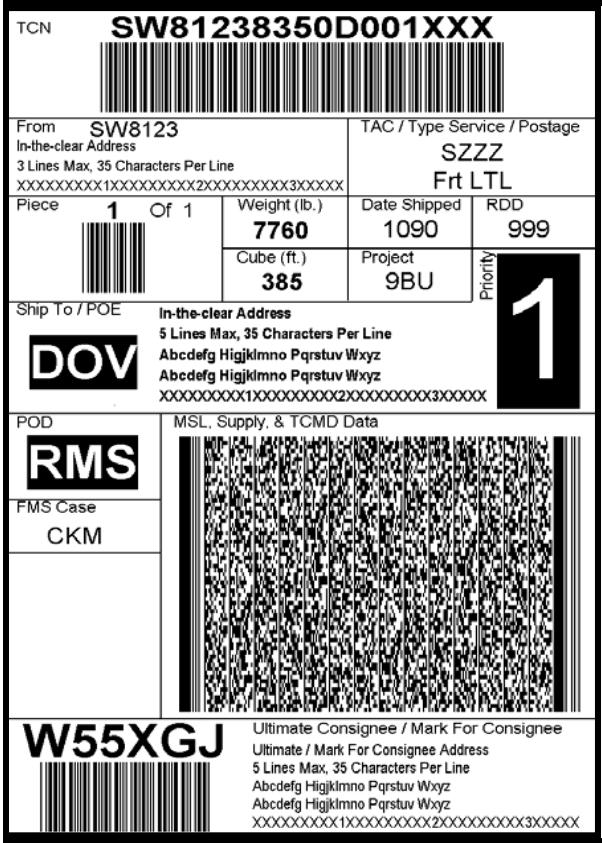


FIGURE 2 B. Unit Move MSL

Military Shipping Label markings consist of both human readable and barcoded information on a recommended 4 x 6-inch label. (MIL-STD 129, para 5.2.2.).

Basic Information needed on the MSL

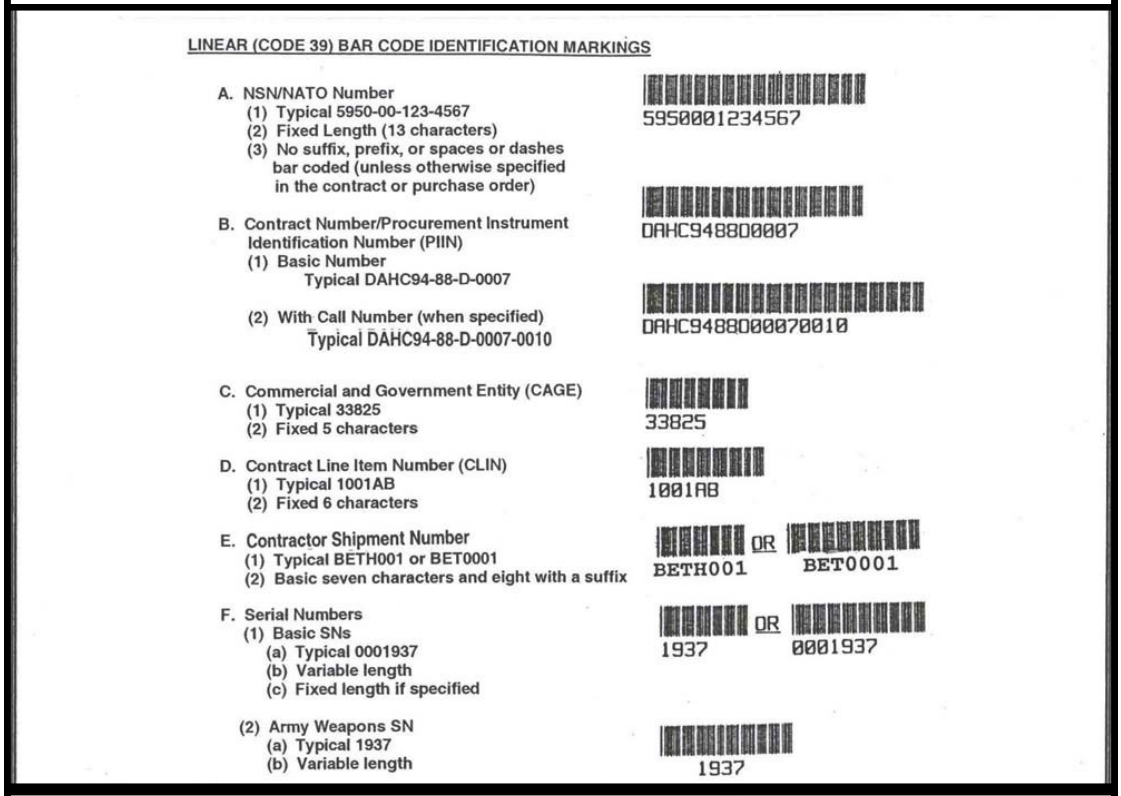
1. **Transportation Control Number (TCN)**
2. **Transportation Account Code (TAC)/Postage - in some cases this may be left blank**
3. **From - The consignor DODAAC/CAGE and address of the shipping activity**
4. **Type Service - The type of transportation service to the "ship to" address (such as Frt LTL, Air Express, Express Mail, etc.)**
5. **Ship to/POE - Ship-to address or, if applicable, the three-digit air/water Port of Embarkation (POE) code and its Ship-to address**
6. **Transportation Priority (1, 2, 3, or 4) Should be blank for Unit Move shipments**
7. **POD - air/water Port of Debarkation three-digit code, if applicable**
8. **Project code if applicable**
9. **Ultimate Consignee/Mark For Consignee DODAAC or MAPAC and address**
10. **Weight - Gross weight (lbs)**
11. **RDD - Required delivery date if specified by the requisitioner**
12. **Cube - Cubic feet rounded to the next whole digit (do not zero fill)**
13. **Date shipped**
14. **FMS (foreign military sales) case number, as appropriate**
15. **Piece Number - the piece number of the cargo documented by the TCN for this shipment unit.**
16. **Total Pieces- Example: 1 of 2, 2of 2, etc.**

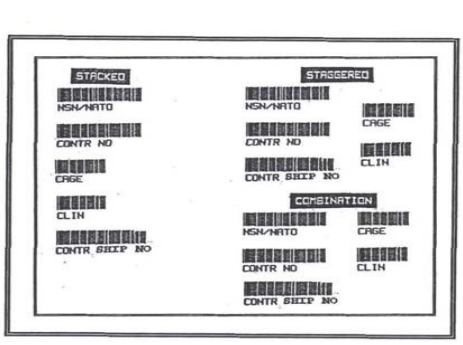
Basic Information For Barcodes

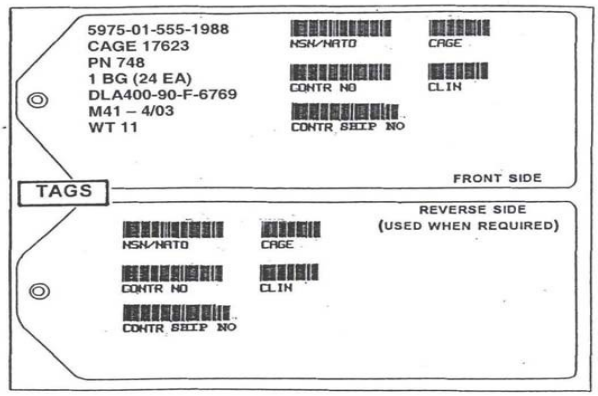
- **Code 39 linear barcodes (MIL-STD 129, Section 5.4): Linear bar codes are optional when the 2D (PDF417) bar code includes the identification data.**

- **2D PDF417 symbology is required for UII information and MSLs. See MIL-STD 129, para 5.4.1.1.2 for UII requirement and see Appendix A for detailed information on encoding 2D PDF417 bar codes**

Examples of typical linear (Code 39) bar code fields.





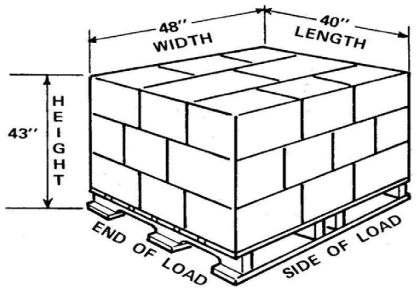


Unitization/Consolidation

Unitization is the grouping of like or unlike items for shipment kept together as a unit until the user receives the items. Advantages of unitizing loads are: eliminates laborious and expensive manual handling of individual items; reduces damage to items by eliminating manual handling; permits savings in handling costs; reduces personnel accidents by eliminating manual handling and lifting; simplifies inventorying and reduces inaccuracies; utilizes storage heights not possible by manual means; reduces pilferage because of unitization of items by steel straps and other bonding methods; permits faster movement of supplies and equipment; and reduces marking requirements on individual containers.

Please remember the Military Shipping Label (MSL) will be completed in accordance with 4.2.2.5 of MIL-STD-129 and attached in accordance with 4.3.2 of MIL-STD-129. Each shipment unit in a unitized load shall be marked with a MSL. For example, the shipment unit in a palletized unit load is the pallet (see page 65 for MSL).

Palletization - Use the dimensions according to MIL-STD-147; the basic pallets will fit in most military shipping containers.



Wood Packaging Materials

Wood Packaging Material (WPM) Quick Reference Guide

Examples of WPM:
Wood pallets, boxes, crates, skids, load boards, cleats, reels, frames, and DUNNAGE

WPM does not include:
Material made **wholly** of manufactured wood products, such as furniture, plywood, particle board, and OSB. If the item has solid wood components, i.e., frame, skids, etc, it is WPM

International & DoD WPM Regulations

ISPM 15
"Regulation of Wood Packaging Material in International Trade"

DoD 4140.65-M
"Issue, Use, and Disposal of Wood Packaging Material"

WPM Affects the Entire Supply Chain & the Warfighters

Procurement

Cite WPM requirements in every DoD solicitation for goods, including local purchases

Receiving

Identify and report contractors and DoD activity that are not compliant. Prepare SF-364 Supply Discrepancy Report IAW DLM 4000.25-M, Volume 2, Chapter 17

Shipping

If the WPM is not in compliance, the material shall not be offered for shipment. Inspect, treat, replace, or repack non-compliant WPM using the most economic solution

Transportation

Non-compliant WPM cannot enter the Defense Transportation System. In the event material is not in compliance, it shall be held (frustrated) until remediated

Requirements for Site Self-Certification

- Personnel are certified, taken online WPM training
- Site Custodian/Auditor appointed, submit SAAR
- Lumber Usage and Pest Free Certification Monthly reports are submitted by 15th of following month
- Initial/annual site audits performed using DA 7635
- Stamps are routinely inspected and secured
- Moisture meter to read moisture content of wood
- At least one ISPM #15 Certification Mark that is not to be used for dunnage
- An ISPM #15 Certification Mark that is to be used only for dunnage
- At least one DoD "Pest Free" Certification Mark

WPM Site Levels of Responsibility

Site Worker: Is a person located at the site who is a front-line worker within the packaging or WPM fabrication or shipping areas and is required to maintain daily hard-copy records. They apply the appropriate WPM certification marks and provide information to their Site Custodian or WPM Manager. They are not required to view or input records into the WPM Compliance Website. Additionally, personnel taking training for general knowledge should select this level of responsibility.

Site Custodian: Is a trained person located at the Site within the packaging or WPM fabrication or shipping areas who controls the certification mark and maintains local lumber tracking records. The WPM Site commander or WPM Manager assigns this person and they must complete the on-line Lumber Usage Monthly Report and DoD Pest Free Certification Monthly Reports to ensure DoD compliance. This person oversees Site Workers, has overall responsibility for DoD compliance at sites within their command, ensures all required personnel have successfully completed the on line WPM Certification Testing, has a copy of the training certificates, and ensures personnel re-take the training every 2 years.

Site Auditor: Is a trained, independent, and impartial person assigned by the WPM Site commander or WPM Manager who performs a WPM Audit on one or more sites to ensure procedures are being properly followed and records are in compliance with the DoD guidelines.

Training is located at: https://tarp.navsup.navy.mil/WPM

All WPM Toolset users (Managers, Custodians and Auditors) must register one of their CAC certificates. You must re-register each time you receive a new CAC. Custodians and above must also complete SAAR-N for access to the WPM toolset.

For WPM program assistance, contact usarmy.tyad.usamc.mbx.pt@mail.mil

DoD Pest Free Certification

The DoD "Pest Free" certification mark and process do not meet ISPM 15 guidelines

The Pest Free mark can only be used for existing WPM inventories that were not certified as heat-treated and are for:

- OCONUS retrograde shipments directly to CONUS
- Shipments to countries where there are no established host nation ISPM 15 programs
- Austere conditions

Existing WPM or dunnage may be certified as "Pest Free":

- If the WPM is bark free,
- Contains boreholes no larger than 3mm (or a 1/8" drill bit),
- There is no evidence of other insect infestation,
- And, if the pack date is less than 5 years (or unknown) and the moisture content is less than 20%

Follow marking application instructions below

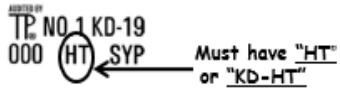
Each requisition or document number is recorded as a single INSTANCE.

QUANTITY is the number of times the DoD Pest Free Certification mark is used for those instances

ISPM 15 Compliant WPM

- Must be made of debarked wood
- Must be treated (Conventional Heat (HT), Dielectric (DH) or Methyl Bromide (MB))
- Must bear approved IPPC certification mark

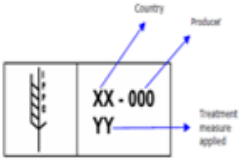
ALSC Heat Treated Lumber Marking



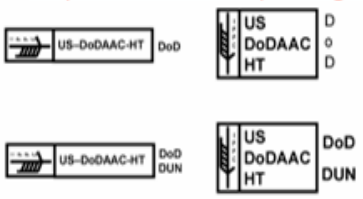
All WPM shall be constructed from lumber which has been heat treated to 56 degrees Centigrade (133 degrees Fahrenheit) for 30 continuous minutes. Compliant WPM should be stored at least 4 ft away from noncompliant materials.

The Mark

ISPM 15 Stamp Format



DoD Self-Certified WPM Stamp Formats



Application of the Mark

Apply in a visible location on at least 2 opposite sides, but not required on each individual component of WPM. On wooden pallets, the marking shall be applied to the stringer or block on opposite sides of the pallet and be clearly visible

Options for dunnage: 1. Multiple applications of the mark along the entire length of the wood. The recommended length is approximately two feet. The wood may be then cut to a size where at least one mark (preferably two marks) may remain present on the cut portion. 2. Marking at the time of use in a visible location on the final cut piece of treated wood.

- Certification markings must be legible and permanent.
- They may be stamped, stenciled, or branded directly onto or into the WPM
- Do not use red or orange ink

Hazardous Materials (HAZMAT) Awareness

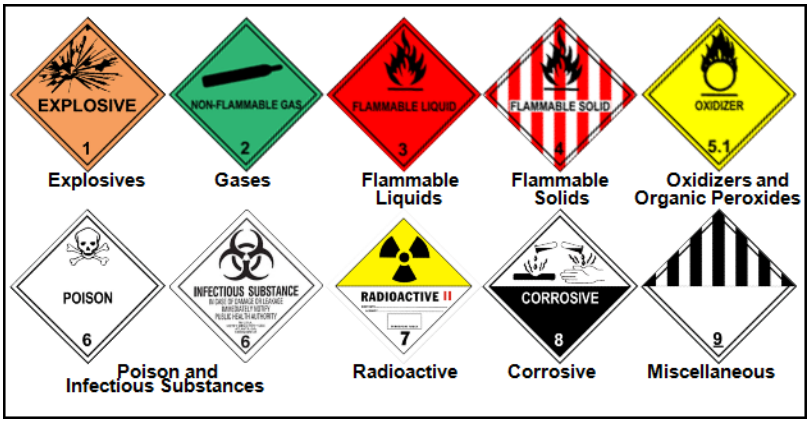
***ONLY AUTHORIZED AND TRAINED PERSONS CAN HANDLE and SHIP HAZMAT**

TRAINING - No person will accept the responsibility of handling HAZMAT including, but not limited to, packaging, marking, labeling, etc., without first meeting the training requirements found in DoD 4500.9 -R, Defense Transportation Regulation (DTR, Part II, Cargo Movement, Chapter 204, Hazardous Material.

If transporting HAZMAT in a Government vehicle from Home Station to a Military Installation for additional unit processing and future movement aboard a vessel, a DD Form 836 must be completed for HAZMAT. If the unit's HAZMAT will be further transported on a vessel, a Multimode Dangerous Goods form must be completed for the unit's HAZMAT. If unit's HAZMAT will be going from Home Station directly to an OCONUS site by Government vehicle vessel, with no stops, only the Multimode Dangerous Goods form must be completed (see DTR). If HAZMAT will be shipped by air, commercial, or military, a Shippers Declaration for Dangerous Goods must be filled out for the movement of the unit's HAZMAT (see DTR).

Packaging of HAZMAT

HAZMAT CLASSIFICATIONS - The proper classification of HAZMAT influences the packaging, hazard markings, shipping paper entries, emergency response, and any other instruction governing the material. It is, therefore, essential that the appropriate classification be made, as improper classification can be extremely dangerous.



HAZARD Classification System

The hazard class of dangerous goods is indicated either by its class (or division) number or name. Placards are used to identify the class or division of the HAZMAT. The hazard class or division number must be displayed in the lower corner of a placard, and is required for both primary and subsidiary hazard classes and divisions, if applicable. For other than Class 7 or the OXYGEN placard, text indicating a hazard (for example, "CORROSIVE") is not required. Text is shown only in the U.S. The
hazard class or division number and subsidiary hazard classes or division numbers placed in parentheses (when applicable) must appear on the shipping document after each proper shipping name.

Class 1 - Explosives

- Division 1.1 Explosives with a mass explosion hazard
- Division 1.2 Explosives with a projection hazard
- Division 1.3 Explosives with predominantly a fire hazard
- Division 1.4 Explosives with no significant blast hazard
- Division 1.5 Very insensitive explosives with a mass explosion hazard
- Division 1.6 Extremely insensitive articles

Class 2 - Gases

- Division 2.1 Flammable gases
- Division 2.2 Non-flammable, non-toxic* gases
- Division 2.3 Toxic* gases

Class 3 - Flammable Liquids (and Combustible Liquids (U.S.)

Class 4 - Flammable Solids; Spontaneously Combustible Materials; and Dangerous When Wet Materials/Water-Reactive Substances

- Division 4.1 Flammable solids
- Division 4.2 Spontaneously combustible materials
- Division 4.3 Water-reactive substances/dangerous when wet materials

Class 5 - Oxidizing Substances and Organic Peroxides

- Division 5.1 Oxidizing substances
- Division 5.2 Organic peroxides

Class 6 - Toxic* Substances and Infectious Substances

- Division 6.1 Toxic* substances
- Division 6.2 Infectious substances

Class 7 - Radioactive Materials

Class 8 - Corrosive Substances

Class 9 - Miscellaneous Hazardous Materials/Products, Substances or Organisms

* The words "poison" or "poisonous" are synonymous with the word "toxic."

Check the Shelf-life!

Shelf-life (SL) is the total period of time beginning with the date of manufacture, cure, assembly, or pack (subsistence only) that an item may remain in the combined wholesale (including manufacturer's) and retail storage systems, and still remain usable for issue/consumption by the end user.

Each item that meets the SL criteria is assigned a NSN and a specific SL code. Typical SL items include food, medicines, batteries, paints, sealants, adhesives, film, tires, chemicals, packaged petroleum products, hoses/belts, mission-critical o-rings, and nuclear/biological/chemical equipment and clothing.

The SL code identifies the SL time period by which an item must be used or subjected to inspection/test/restoration or disposal action. These codes are identified in Appendix A of the DoD Manual 4140.27, Volume 1, and consist of two types: Type I and Type II. Type I is an individual item of supply which is determined through an evaluation of technical test data/actual experience to be an item with a definite non-extendible period of SL and ends with the expiration date. Type II is an individual item of supply having an assigned SL time period that may be extended after completion of inspection, test, or restorative action and is identified by an inspection/test/date.

SL internet site: https://www.shelflife.dla.mil

Shelf-life training must be accomplished throughout the warehouse. DoD SL training is required for all personnel working with SL materiel, per AR 700-37, Packaging of Materiel.

Individuals that should have SL training include, but are not limited to:

- Equipment specialists, product specialists, quality assurance specialists, inventory managers, technical managers, weapons systems managers, logistics, administration, and operations personnel.
- The SSA personnel responsible for receipt, storage, surveillance, and issue of shelf-life materiel as well designated disposition authorities.

Shelf-life vs Service Life

Shelf-life vs. Service-life:

Any item in Shelf-life Extension System (SLES) with a shelf-life code other than zero is designated as a Shelf-life (SL) item. It is critically important to understand the difference between Shelf-life and Service Life.

Shelf-life items include any National Stock Number (NSN) that is catalogued as a Type I (non-extendable) or Type II (extendable) National Stock Number (NSN) in the Federal Logistics Information System (FLIS). All Shelf-life items are managed by Manufactures Contract Lot number based on the items Date of Manufacture, Date Packed (subsistence only), Assembly Date, or Cure Date. Type I non-extendable items have a finite period of SL or point in time that they reach their Date of Expiration, then must be processed for disposal. Type II SL items may be tested and extended. All SL items are stored in accordance with storage standards contained in the Materiel Quality Control Storage Standards (MQCSS) and all storage activities will manage/maintain the serviceability of assets in accordance with Care of Supplies in Storage (COSIS) requirements. ICPs may publish Supply Bulletins that provide additional, commodity-specific guidance to storage activities and end-item users as applicable.

Service-life:

Once a properly stored Shelf-Life item (Type I or Type II) is issued to a customer and removed from its original method of preservation protective packaging; introduced to mission requirements; installed into intended application; or left in storage (e.g. bench stock), management ends and shelf-life date ends and its service-life begins. These items are not eligible for Shelf-Life Extension Testing and will be managed in accordance with applicable Technical Manuals (TMs) or guidance provided by the materiel owner (Services'). If the TMs do not specify service life of an item, contact the items source of supply or your Service's SL Administrator. The Service SL Administrators can be found in the Shelf-life Extension System.

Shelf-life

Item closed in proper storage.
This is a SL item

Service- life

Item in use.
This is an item in service life. This item can no longer be extended or viewed as a SL item.

SHELF-LIFE CODES

			Materiel shall have 85% SL Remaining Upon Receipt from Contractor to first Government activity	
Shelf Life Period	**Type I**	**Type II**	**Months**	**Quarters**
Non Shelf Life Item No Shelf Life Applies	0 (zero)	0 (zero)	N/A	N/A
01 Month	A	N/A	25 days	N/A
02 Months	B	N/A	50 days	N/A
03 Months	C	1	75 days	N/A
04 Months	D	N/A	3	1
05 Months	E	N/A	4	1
06 Months	F	2	5	2
09 Months	G	3	8	3
12 Months (1.00-Year)	H	4	10	3
15 Months (1.25-Years)	J	N/A	13	4
18 Months (1.50-Years)	K	5	15	5
21 Months (1.75-Years)	L	N/A	18	6
24 Months (2.00-Years)	M	6	21	7
27 Months (2.25-Years)	N	N/A	23	8
30 Months (2.50-Years)	P	N/A	26	9
36 Months (3.00-Years)	Q	7	31	10
48 Months (4.00-Years)	R	8	41	14
60 Months (5.00-Years)	S	9	51	17
72 Months (6.00-Years)	I	N/A	61	20
84 Months (7.00-Years)	T	N/A	71	24
96 Months (8.00-Years)	U	N/A	82	27
120 Months (10-Years)	W	N/A	102	34
180 Months (15-Years)	Y	N/A	153	51
240 Months (20-Years)	Z	N/A	204	68
Non-standard shelf life period as assigned by the ICP	V	X	85 percent of number of months	85 percent of number of quarters

HAZMAT. Unless authorized by other applicable regulations, shelf-life items that are HAZMAT will not be procured through local purchase using the government credit card.

STORAGE OF SHELF-LIFE ITEMS

DoD storage activities and end users will:

a. Store all shelf-life items in proper storage environments in accordance with the item type storage code (ITSC) during the entire shelf-life period and during all extension periods.

b. Not compromise or open the integrity of the unit pack, as this triggers service life. If there is not ITSC then store the SL item in a general purpose warehouse or equivalent. If this is not possible, a waiver will have to be obtained from the DoD SL Admin POC.

Where to get Shelf-life Training

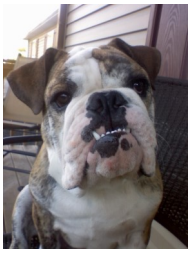
Computer-based Online Training (seven credit hours): Course Title: (Introduction to) The DoD Shelf-Life Program (CLL 120). Students should take the DAU CLL 120. It helps increase potentially unique questions by decreasing redundancy of procedure that is found in the CLL 120. In other words, at least look at CLL 120, then you can 'get in the weeds' as you will know the basics from the CLL 120. For Army specifics and systems, contact your Army SL POC.

Personnel with a Computer Access Card (CAC):

1. Go to https://www.shelflife.dla.mil
2. Click on the "Training" tab, then click on the "DAU Computer Based TRAINING" graphic. This will take you to the Defense Acquisition University (DAU) web site.
3. In the "DAU Global Top 5" box, expand "Continuous Learning", then expand the "Continuous Learning Modules", then select the "Army, Military, and Civilian" link. This will take you to the Army Training Requirements and Resources System (ATRRS) web site.
4. Read the notices/warnings, select "Apply for Training" from the Student menu at the top left, and select the "I Agree" button.
5. Select the "CAC" sign-in option radio button, and CAC will authenticate.
6. Select your organization category from the drop-down menu, e.g. "Non-Acquisition Civilian and Military Workforce", ensure that the "CAC" radio button is enabled, and select the "Logon" button.
7. Select the Continuous Learning Modules" radio button.
8. Under "Step Two", select "Introduction to DoD Shelf Life Program – CLL120" on the drop down menu, and select the "Search" button.
9. Enter/verify your student information, and select the red "Submit Application" button.

On-site Army Workshop (one day): Contingent on funding availability, the Packaging, Storage, and Containerization Center (PSCC) can provide a one-day to two-day classroom workshop (with multiple sessions) on DoD shelf-life management policy and procedures, including the web-based DoD Shelf-Life Extension System (SLES). Specific topics addressed will include shelf-life management within: receiving, storage, issue, maintenance, inventory, stock location, classification, data systems, extensions, marking/labeling, discrepancy procedures, procurement, hazardous materials, and recycling/disposal. PSCC will cover all aspects of shelf-life management at your installation in order to provide the utmost level of Army and DoD guidance and assistance, and provide the tools and techniques for improving your operations. Additionally, PSCC will conduct a through assessment of your installation-level shelf-life management operational areas, address specific situations, and recommend improvements. Point of contact is PSCC at 570-615-7763.

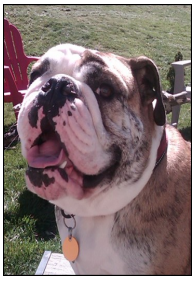
Retrograde (Deployment and Re-Deployment) Packaging "Not That Simple"



Retrograde packaging planning begins upon arrival and unpacking. One of the unit's advanced party members, usually "SGT Ace" Supply NCO (may be a bit new in the rotation), should have been assigned the responsibility for maintaining the packing containers that can be reused for return. In addition to the assigned task, you need to compare the items and quantities on-hand in the pre-deployment property book versus on-hand for redeployment. This establishes a baseline for items lost or destroyed in the deployment theater versus items lost in transit during redeployment.

All the different methods of preservation and packaging must be adhered to when thinking about retrograde. Not only are you going home, but most of those items you have been using will too, and we don't want any "extra" stowaways. Once a listing has been developed of items and supplies on-hand and their retrograde status, each item being returned to a CONUS site will have to be cleaned, washed, and inspected to the requirements of the United States Department of Agriculture. If possible, the unit should seek the cleaning, packing, and crating services of the Theater Retrograde Processing Site. Personnel from this site would probably have portable dry-air compressors, steam cleaners, barrier and cushioning materials, and other packaging materials and equipment.

Once each item is cleaned and inspected for packaging, these packers with heat-sealable barrier material and portable heat-sealers could fabricate bags to enclose and protect each item from contamination. Retrograde materiel placed in a container for return processing must be placed on a packing list denoting each item, quantity, and weight. Each item packed in the container should also be marked with the items NSN, nomenclature, quantity, and packed weight. The Container Packing Certificate and other retrograde/customs processing papers should also be enclosed in container packing list envelopes. The Armed Forces Pest Management Board has a website that has Technical Information Memorandums (TIMs) (e.g., TIM #24 and #31) and other guidelines that can be downloaded and reviewed for item retrograde processing, including vehicles: http://www.acq.osd.mil/eie/afpmb/.



So good luck, from a more mature SGT Ace.

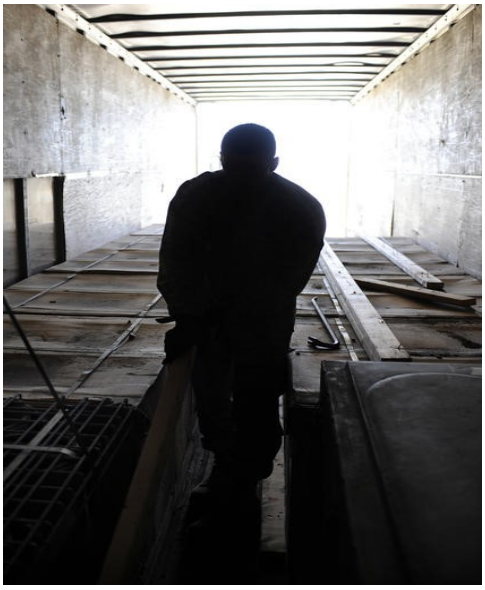
Blocking and Bracing

Blocking and Bracing is the application of wood, plywood, or mechanical devices to prevent movement of the skidded load or movement of the skid within the carrier. Blocking and bracing for shipment is also referred to as external blocking.

Cargo, or items to be shipped, are placed in containers. These must be secured to withstand the most stringent transportation modes to which it will be subjected during multimodal shipment. For example, containerized cargo/equipment can be moved through any one or any combination of highway, rail, air, and ocean modes. Therefore, it must be secured to withstand the most severe load conditions to which it will be exposed.

Container contents may be subjected to sudden jolts during transport. Containers loaded on rail cars must withstand the impact, up to eight MPH, resulting from coupling the rail cars together in the rail yard. Twenty-foot containers picked up with palletized load system trucks will be tilted to approximately a 35-degree angle during the loading process. All containers are subject to varying G-forces during transit.

It is a shipper's responsibility to ensure that cargo is secured to withstand any combination of these situations. Shippers are either commercial vendors, DoD depots, supply activities, or in the case of unit equipment, the unit.



Blocking & Bracing (cont.)

The shipper's main responsibility is ensuring that the cargo stuffed inside a container arrives undamaged. Lumber, pallets, and banding material is used to keep the load from shifting (for more information, see TM 38-230, Volume 2). When stuffing containers, shippers should do the following:

- Distribute the weight of the cargo evenly over the floor of the container.
- Place heavy cargo on the bottom of the container and lighter cargo on top.
- Block and brace the cargo to prevent movement in any direction.
- Fill in the voids between the cargo and the container sides.
- Ensure all liquids are packaged in appropriate containers.
- Use block stowage to protect bagged cargo from shifting.
- Keep the center balance of the cargo as near as possible to the center of the container. If this is not possible, mark the center balance on the container and notify the carrier.
- Never exceed the weight limitations of the container.
- Close and seal container doors carefully. Put serial numbered seals on the container to detect pilferage and tampering.
- Place one copy of the packing list inside and one outside the door.
- Weigh containers before shipment at the origin and record the weight.
- Observe procedures for hazardous cargo.

Lumber must be kiln dried/ heat treated per WPM regulations.

Basic Safety Rules

Ten Basic Safety Rules

1. **Follow instructions; do not take chances or short cuts; if you do not know, ASK.**
2. **Correct or report unsafe conditions.**
3. **Help keep the job site clean and orderly.**
4. **Use the right tools and equipment for the job.**
5. **Report all injuries immediately to your superior no matter how minor. Obtain first aid treatment if necessary.**
6. **Use, adjust, and repair equipment only when authorized.**
7. **Use personal protective equipment; wear safe clothing; keep items in good condition. This is a must with safety glasses and gloves.**
8. **No horseplay. Avoid distracting others.**
9. **When lifting, bend your knees. Get help for heavy loads.**
10. **Comply with all safety rules and signs.**

REMEMBER: DO IT THE SAFE WAY!

COSIS and COSIS Priority Groups

COSIS is a process involving preventative maintenance checks and services (PMCS) whose purpose is to ensure that personnel maintain the material in storage in ready-for-issue condition, preventing deterioration of material.

COSIS Priority Groups. Is an item group that contain items that are at the highest risk for degrading to a non-serviceable condition and should always be prioritized for inspection, mitigation, and packaging remediation during the storage cycle intervals.

COSIS Risk Assessment. Is the process of identifying COSIS priority groups within a given inventory NIIN list for the purposes of prioritizing item selection for COSIS inspections, mitigation, and packaging remediation.

The COSIS Priority Groups:

The first COSIS Priority Group are MOP 50 items because they are hypersensitive to moisture and can easily begin to corrode. If MOP 50 items have compromised packaging, the desiccant becomes saturated and ineffective, the item is no longer properly protected, and corrosion begins. Once corrosion begins, the item's serviceability is no longer "A", it is "F", and requires a technical inspection to know the true condition of the item. By identifying this group through inspection and remediating packaging when needed, costly repair or replacement can be avoided.

Special Marking: MOP 50s

COSIS and COSIS Priority Groups (Cont)

The second COSIS Priority Group is ESDS items because when ESDS packaging is compromised, the item must be downgraded to an "F" condition. Electrostatic damage is invisible, and if an item is contained within a damaged electrostatic barrier (could be just a small hole), the item is immediately exposed to damaging electrical charges. The electrostatic charge exchanged just by touching the bare/exposed item can damage it. By identifying this group, we will primarily avoid mishandling and damaging the critical protective package and avoid item repair or replacement.

Special Marking: ESDS

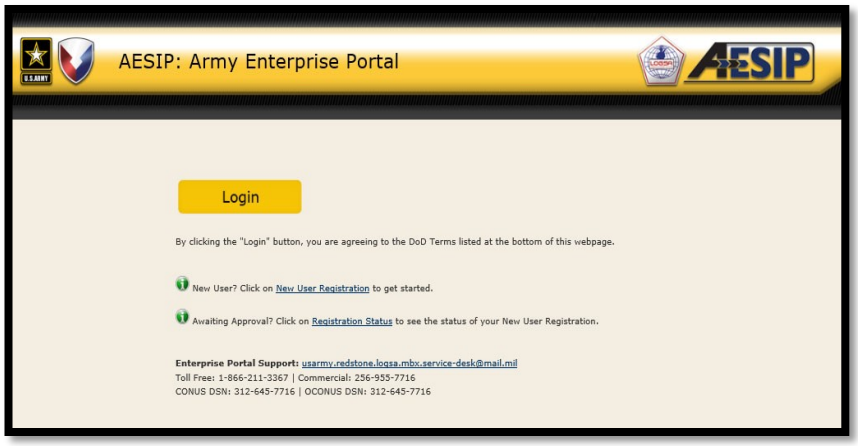
The third COSIS priority group is Shelf-life items because these items have a limited storage time and expired shelf-life items become unserviceable. By recognizing and managing this group, we will be sure to properly identify items that can be extended, such as Type II shelf-life items. We can also recognize items that must be reordered because they are Type I (non-extendable) shelf-life items. This COSIS process is critical to avoiding the possibility of sending unserviceable items downrange and having the items being used and failing.

The fourth COSIS Priority Group is items stored outdoors, especially when the item's type of storage requirement is actually indoors. Packaging and storage are the two requirements for an item's proper preservation and protection. When both the packaging and the storage are less than the requirements or are compromised, the speed of the serviceability degradation is significantly increased. By identifying this group, mitigating steps can be implemented to lessen the outdoor environment's impact on stored stock (for example, using tarps or moving items under overhangs).

The fifth COSIS Priority Group is hazardous material. These items should be identifiable by a variety of hazardous markings. The markings and the proper care and storage of the items are described in TM 38-410, Storage and Handling of Hazardous Materials to ensure the safety and preservation of all stock. .

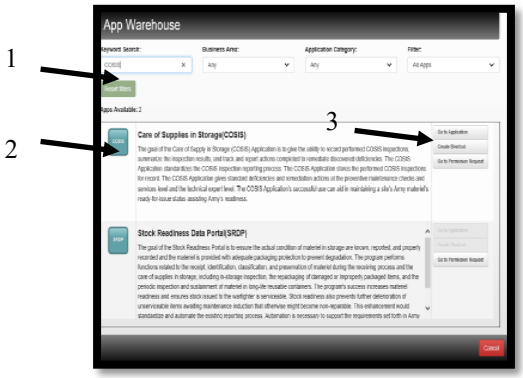
COSIS Application (APP)

The following is an overview of the COSIS APP, which is used for documenting COSIS inspections. The APP allows for tracking of remediation efforts on items as needed. For more information on access to the COSIS APP, please contact the PSCC packaging team.



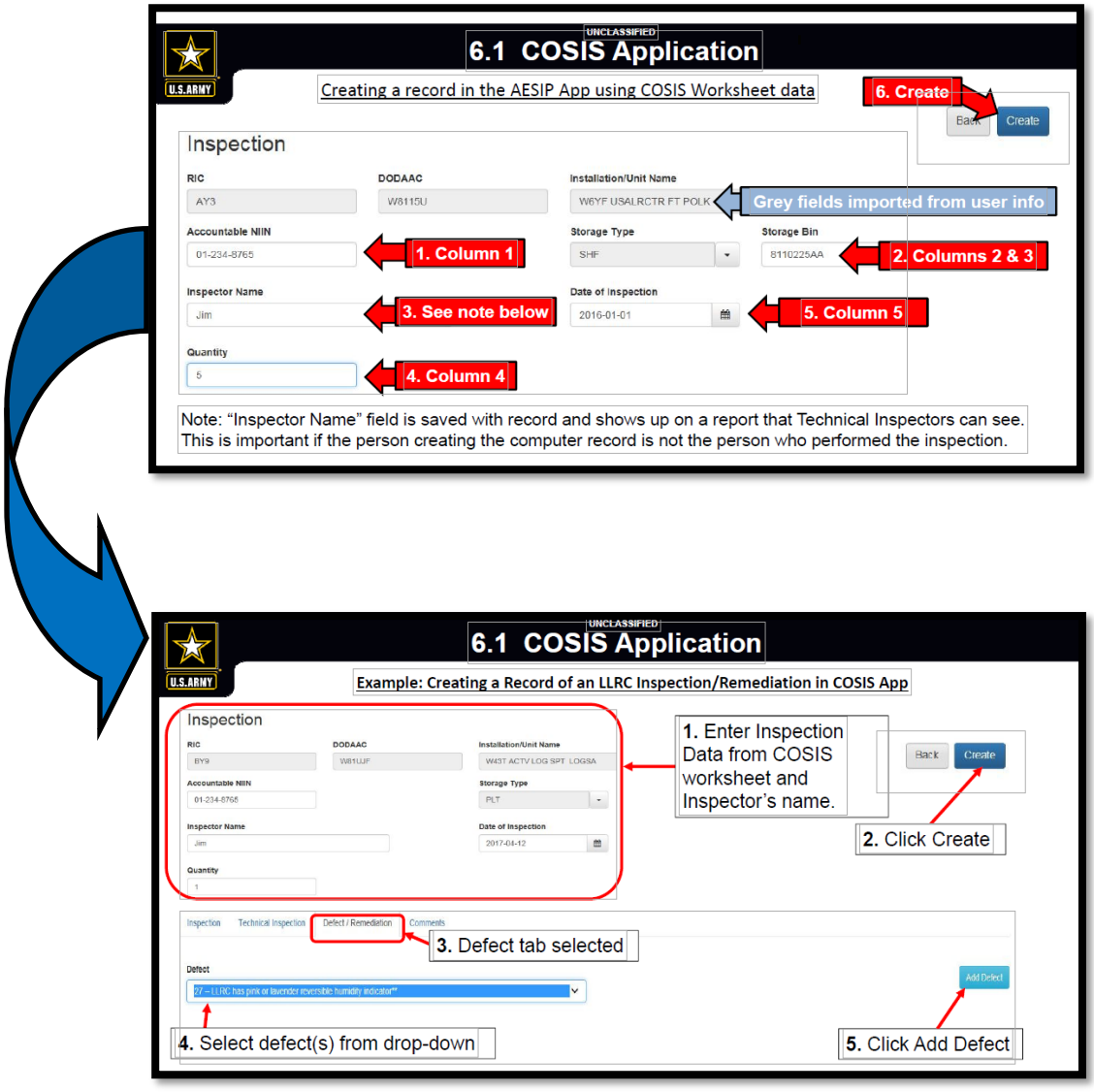
1. Go to: https://idmng.armyerp.army.mil/oamcustomlogin/
2. If you already have access to AESIP, login to the AESIP portal.
3. New Users click on the New User Registration link and follow the guidance.

Click on App Warehouse icon

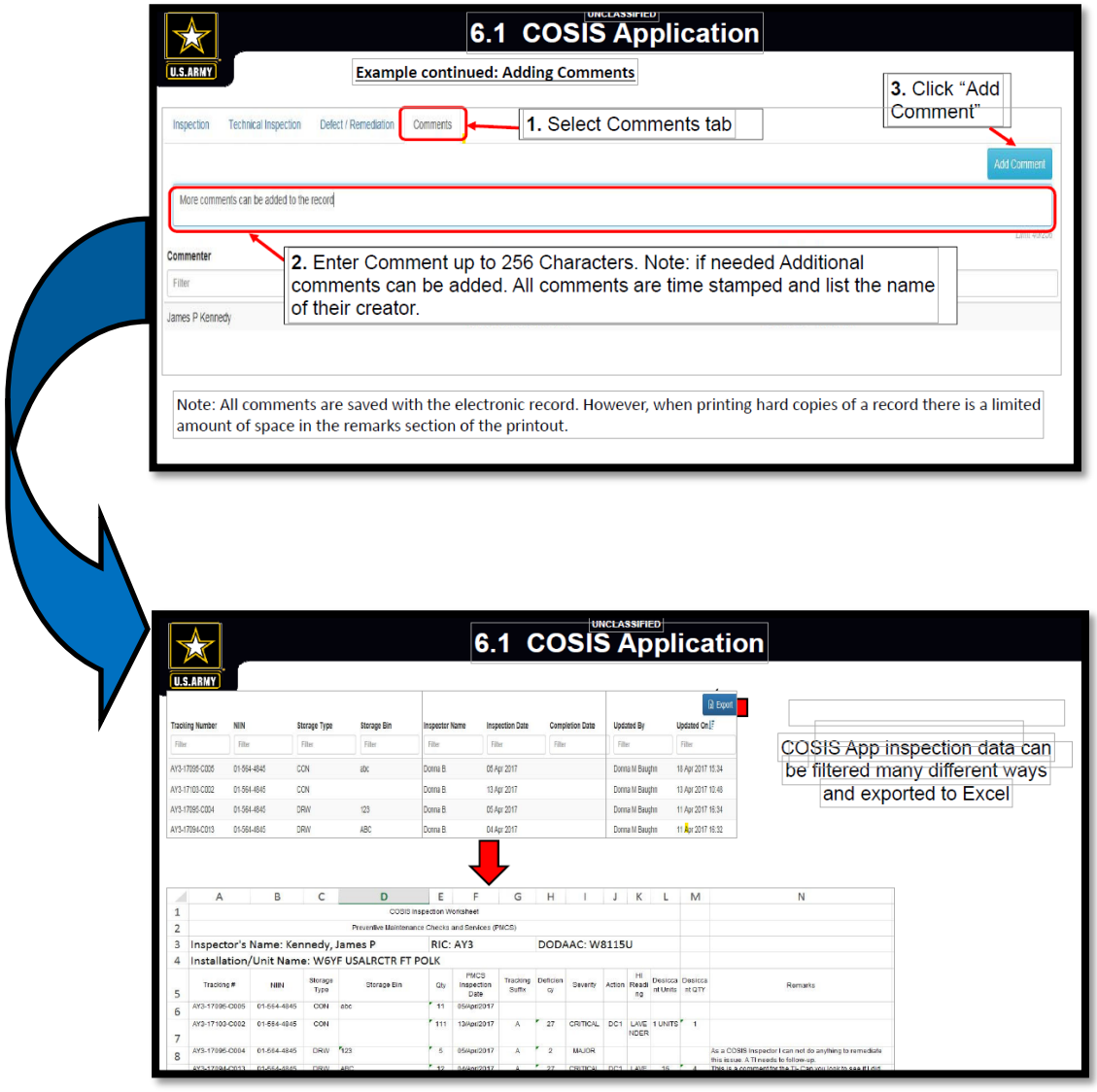


1. Type “COSIS” in the search box.
2. The COSIS App will appear in the search results area.
3. Click on “Create Shortcut” to add this App to your AESIP Desktop.

COSIS Application

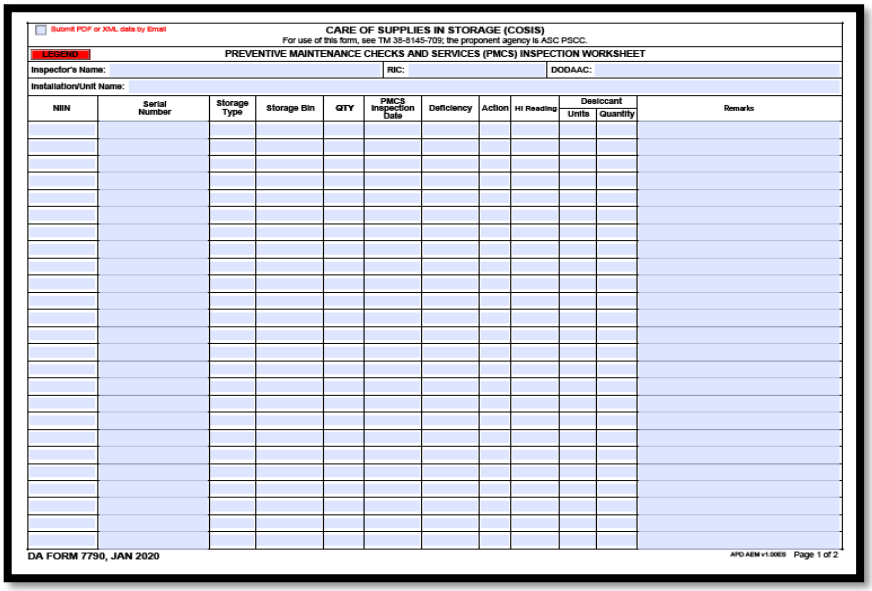


COSIS Application (cont)



PMSC Inspection Worksheet

PMSC Inspection Worksheet is used for daily, weekly, and monthly inspections



Submit PDF or XML data by Email

CARE OF SUPPLIES IN STORAGE (COSIS)
For use of this form, see TM 38-8145-709; the proponent agency is ASC PSCC.

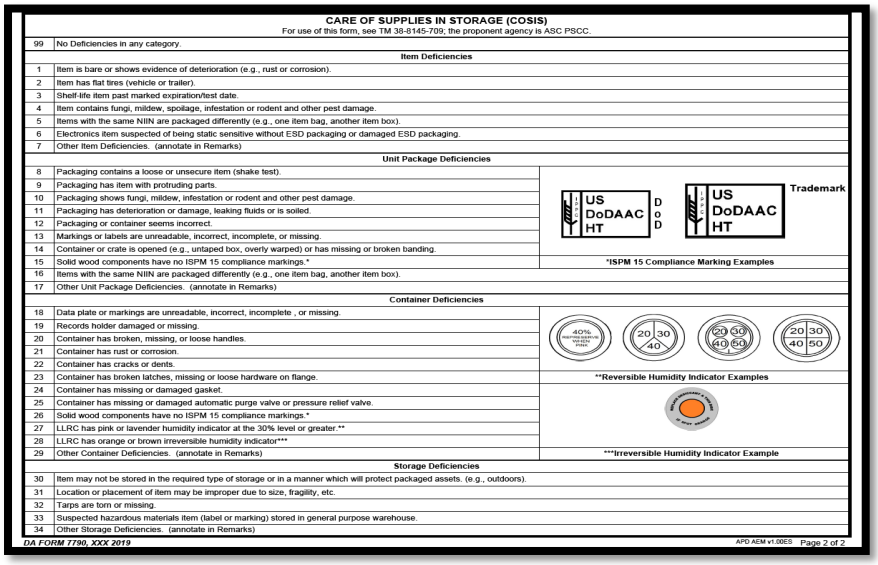
LEGEND — **PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) INSPECTION WORKSHEET**

Inspector's Name: | RIC: | DODAAC:

Installation/Unit Name:

NIIN	Serial Number	Storage Type	Storage Bin	QTY	PMCS Inspection Date	Deficiency	Action	HI Reading	Desiccant Units	Desiccant Quantity	Remarks

DA FORM 7790, JAN 2020 — APD AEM v1.00ES — Page 1 of 2



CARE OF SUPPLIES IN STORAGE (COSIS)
For use of this form, see TM 38-8145-709; the proponent agency is ASC PSCC.

99	No Deficiencies in any category.
	Item Deficiencies
1	Item is bare or shows evidence of deterioration (e.g., rust or corrosion).
2	Item has flat tires (vehicle or trailer).
3	Shelf-life item past marked expiration/test date.
4	Item contains fungi, mildew, spoilage, infestation or rodent and other pest damage.
5	Items with the same NIIN are packaged differently (e.g., one item bag, another item box).
6	Electronics item suspected of being static sensitive without ESD packaging or damaged ESD packaging.
7	Other Item Deficiencies. (annotate in Remarks)
	Unit Package Deficiencies
8	Packaging contains a loose or unsecure item (shake test).
9	Packaging has item with protruding parts.
10	Packaging shows fungi, mildew, infestation or rodent and other pest damage.
11	Packaging has deterioration or damage, leaking fluids or is soiled.
12	Packaging or container seems incorrect.
13	Markings or labels are unreadable, incorrect, incomplete, or missing.
14	Container or crate is opened (e.g., untaped box, overly warped) or has missing or broken banding.
15	Solid wood components have no ISPM 15 compliance markings.*
16	Items with the same NIIN are packaged differently (e.g., one item bag, another item box).
17	Other Unit Package Deficiencies. (annotate in Remarks)
	Container Deficiencies
18	Data plate or markings are unreadable, incorrect, incomplete , or missing.
19	Records holder damaged or missing.
20	Container has broken, missing, or loose handles.
21	Container has rust or corrosion.
22	Container has cracks or dents.
23	Container has broken latches, missing or loose hardware on flange.
24	Container has missing or damaged gasket.
25	Container has missing or damaged automatic purge valve or pressure relief valve.
26	Solid wood components have no ISPM 15 compliance markings.*
27	LLRC has pink or lavender humidity indicator at the 30% level or greater.**
28	LLRC has orange or brown irreversible humidity indicator***
29	Other Container Deficiencies. (annotate in Remarks)
	Storage Deficiencies
30	Item may not be stored in the required type of storage or in a manner which will protect packaged assets. (e.g., outdoors).
31	Location or placement of item may be improper due to size, fragility, etc.
32	Tarps are torn or missing.
33	Suspected hazardous materials item (label or marking) stored in general purpose warehouse.
34	Other Storage Deficiencies. (annotate in Remarks)

US DoDAAC HT DOD — US DoDAAC HT Trademark

*ISPM 15 Compliance Marking Examples

**Reversible Humidity Indicator Examples

***Irreversible Humidity Indicator Example

DA FORM 7790, XXX 2019 — APD AEM v1.00ES — Page 2 of 2

PSCC LTAD Package Testing

Transportation Testing

Transportation testing is conducted to ensure the integrity of the assets upon arrival at their destination, and the safety of the handling personnel. The stresses on a package will vary depending on the mode of transportation, the package size, weight, shape, and the packaging materials used. Military and commercial specifications such as MIL-STD-810 and ASTM D4169 can be used simulate the possible conditions and stresses a package will encounter. These include high and low temperature cycling, low atmosphere pressure, rough handling, stacking loads, vibration and exposure to rain.
For questions regarding package testing, please contact (usarmy.tyad.usamc.mbx.ltad@mail.mil)

Hazardous Materials Testing

AR 700-143, Packaging of Hazardous Material, establishes the policy for packaging Hazardous Materials (HAZMAT) for safe, efficient, and legal storage, handling, and transportation, to include Department of Transportation Special Permit (DOT-SP), Competent Authority Approval (CAA), Certificate of Equivalency (COE), and Packaging Waivers for Military Air. All HAZMAT packaging is required to be tested and certified prior to commercial or military transportation either in CONUS or OCONUS. The testing required for certification is known as Performance Oriented Packaging (POP) testing. DLA manages the DoD POP program which includes various generic package configuration which are certified for transportation of HAZMAT items. HAZMAT could also be shipped using commercially available packaging that has a United Nations certification for the HAZMAT being transported. Unique or custom packaging configurations require special testing and certification prior to use in transportation.
A list of currently-approved HAZMAT packaging configurations are available in the DLA DoD POP program database.
For questions regarding specific HAZMAT test requirements, please contact (usarmy.tyad.usamc.mbx.ltad@mail.mil).

PSCC LTAD Package Testing (CONT)

PSCC is designated as the lead activity for Testing and Evaluating materials and processes.
The list of other service responsibilities can be found in AR 700-15, Packaging of Materiel. PSCC lead service responsibility can be found in Table 6–2.

Table 6–2
AMC LOGSA PSCC lead service responsibilities

Materials	Processes
Adhesives	Unitization Systems (MIL–HDBK–773)
Preservation materials	Stretch Wrap Systems
Barrier materials	Shrink Wrap Systems
Boxes, wood and wire bound	Marking and Labeling Systems
Boxes and sheet stock, fiberboard	Vacuum Formed Thermoplastic Systems
Pallets, other that metal	Cold-seal Packaging Systems
Tapes	Dehumidification Systems
Marking and labeling materials	Plastic Wrap System
Desiccant materials	Plastic Bag/Package Forming Systems
Tags, document protectors, packing lists	
Bags and Sacks	

Table : 6-2, AR 700-15

Contacts, Support, and Training

PSCC General e-mail: usarmy.tyad.usamc.mbx.pscc@mail.mil

Wood Packaging Material (WPM) Program: usarmy.tyad.usamc.mbx.pscc@mail.mil

Army Shelf-life: https://www.shelflife.dla.mil/

Army Stock Readiness Program: usarmy.tyad.usamc.mbx.sr@mail.mil

Training websites:

DAC - http://www.dactces.org/

WPM- https://tarp.navsisa.navy.mil/

Shelf-life - Army Shelf-life POC – 570-615-7685, DSN 795-7685

Shelf-life Website: https://www.shelflife.dla.mil/

Army Corrosion Web Site: https://www.corrdefense.org/Default.aspx

For technical and equipment publications: (TMs, TBs, MWOs, Los, SCs, and some SBs) except for engineering and medical: https://www.logsa.army.mil

Department of Transportation (DOT): The Office of Hazardous Materials Safety, which is within the United States DOT's Research and Special Programs Administration, is responsible for coordinating a national safety program for the transportation of hazardous materials by air, rail, highway, and water: http://phmsa.dot.gov/hazmat

PS Magazine: PS Magazine is published by the USAMC ASC. To contact PS Magazine, please send e-mail to: usarmy.redstone.logsa.mbx.psmag@mail.mil

For administrative departmental publications and forms (ARs, Cirs, Pams, Ofs, SFs, DD & DA Forms): http://www.apd.army.mil

For doctrinal and training publications (FMs PBs, TCs & STPs) except engineering and medical: http://armypubs.army.mil/

For all engineering publications (except administrative): http://www.usace.army.mil/

For all medical publications (except administrative): http://www.armymedicine.army.mil/

DA Forms: http://www.apd.army.mil/USAPA_PUB_formrange_f.asp

DD Forms: http://www.dtic.mil/whs/directives/infomgt/forms/formsprogram.htm

Contacts, Support, and Training (cont.)

ASC PSCC offers a series of COSIS videos that are set in modules which provide guidance and instruction on various packaging techniques and principles.

The link can be found in YouTube:
https://www.youtube.com/playlist?list=PL9hNyopBeuXUKsPXkRlxzqEdwvk8M_kkL

COSIS Module 1: Care of Long Life Reusable Containers (LLRCs)
Introduction to Module 1: This video explains how to conduct required monthly COSIS inspections of LLRCs and perform minor remediation. Physical inspection criteria, interpreting humidity indicators, and the use of desiccant are thoroughly covered.

COSIS Module 2: Determining Preservation Requirements
Introduction to Module 2: This video explains the 12-character packaging code, special packaging instructions (SPIs), relevant doctrine, and the most commonly used packaging materials to determine an item's preservation requirements.

COSIS Module 3: Preservation Requirements Walkthrough
Introduction to Module 3: In this step-by-step walkthrough, the viewer will learn how to use an item's NIIN to develop a list of all the materials and processes required to remediate an item. This includes determining the correct method of preservation, preservative coating, cleaning method, wrap and barrier materials, cushioning and dunnage, and unit container. Prerequisite: Module 2

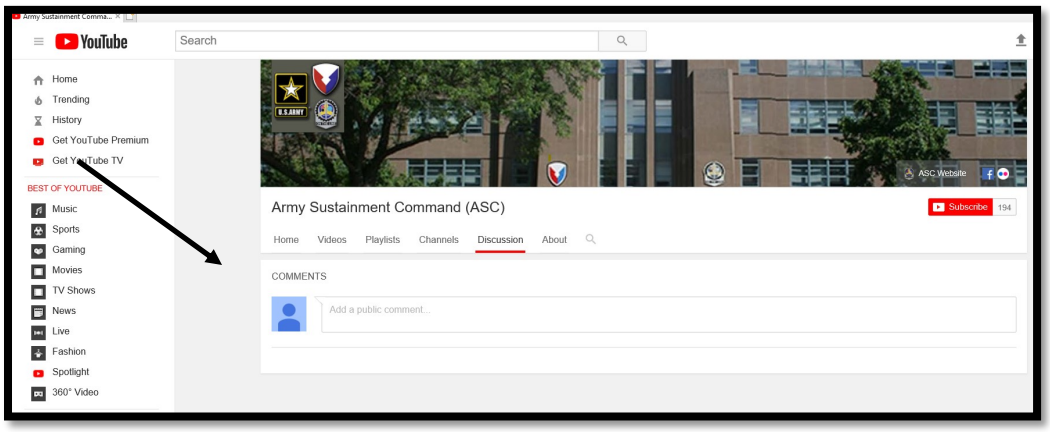
Contacts, Support, and Training (cont.)

COSIS Module 4: This video describes the tools, materials, and layout of an effective packaging remediation work area and steps through the physical remediation of the MOP 41 item we researched in Module 3.

COSIS Module 5: Unit Pack Marking Requirements**.** This video describes missing or incorrect markings, unit pack identification, Method 50 and ESDS markings.

COSIS Module 6: Remediation of Electrostatic Discharge Sensitive Items. This *module is currently under development.*

Please check the YouTube link as more COSIS videos are being developed.



ASC's YouTube Page

MILITARY PACKAGING SCHOOL

Military Packaging School
Defense Ammunition Center
McAlester, OK
http://ammo.okstate.edu.

PACK-1A-DL Defense Basic Preservation and Packaging
(Phase 1) (8A-F63/551-F55 (DL))

Description: This course is a certification course in accordance with AR 700-15, Packaging Of Hazardous Materials , and a prerequisite for 8A-F61/551-F53 (PACK-1B). It is designed to teach military packaging and preservation methods. This course provides in-depth training in the application of military packaging policy criteria and packaging specifications and standards to real-world scenarios. The course focuses on military packaging and preservation methods that include cleaning and drying processes, preservation materials and application, cushioning, unit and intermediate packing methods, military marking and labeling, outer packing procedures, palletized and unitized loads, containerization, and blocking and bracing.

- Length: Approximately 26 hours (self-paced learning)

Special Information: This course is provided as a web-based course. Students must have web access, a CAC card, and an AKO account. Students must register through ATRRS for course credit. It is recommended that you have a high-speed Internet connection in order to view the course.

- Prerequisites: None.
- Course Topics:
    - Preservation
    - Packing

PACK-1B Military Preservation and Packaging for Storage and Shipment
(Phase 2) (8A-F61/551-F53)

Description: This course is designed to provide hands-on, performance-based training for uniformed military, civil service, and DoD contractor personnel in basic and intermediate military preservation, packaging, and unitization procedures.

Length: 80 hours

Prerequisites: Successful completion of PACK-1A-DL. Students who have successfully completed Defense Basic Preservation and Packing, 822-F13 instructor lead or correspondence courses offered by the Defense Ammunition Center or School of Military Packaging Technology (SMPT) will also meet this prerequisite.

The proponent agency of this pamphlet is the U.S. Army Materiel Command, Army Sustainment Command Packaging, Storage, and Containerization Center (PSCC). Users are invited to send comments to:

Chief, ASC PSCC
ATTN: AMAS-SPS-P
11 Hap Arnold Blvd.
Tobyhanna, PA 18466-5097

or e-mail **usarmy.tyad.usamc.mbx.pt@mail.mil**.

Call the Packaging, Storage, and Containerization Center (PSCC) for all your packaging needs!

ASC PSCC
ATTN: AMAS-SPS-P
11 Hap Arnold Blvd.
Building 2, Bay 5
Tobyhanna, PA 18466-5097

usarmy.tyad.usamc.mbx.pt@mail.mil

(570) 615-7257