

Naval
Supply Systems
Command

NAVSUP
Publication 484
March 1994 Edition

COG I Stock No.
0530-LP-189-9200

SUPPLY AFLOAT FLEET AND FIELD PACKAGING PROCEDURES



0530LP1899200



**SUPPLY AFLOAT
FLEET AND FIELD -- PACKAGING PROCEDURES
NAVSUP PUBLICATION 484**

Navy Department
Naval Supply Systems Command
1931 Jefferson Davis Highway
Arlington, VA 22241-5360, 10 Mar 1994

This publication, which supersedes NAVSUP Publication 484 of 1 April 1981, was prepared to provide simple, illustrated instructions for packaging Fleet and Field material and unserviceable repairables being shipped to a designated overhaul point. These instructions are for use at the operational level, and include only basic methods and materials available to most ships and shore based units of the fleet having less than full packaging capabilities.

Proper packaging of material is essential to ensure protection for the return of repairables without further damage, to maintain the inventory of repairables, and to maintain Fleet and Field readiness. Lack of adequate protection for returned items invariably results in higher repair costs and increased turn-around time.

R. A. ARCHER
Captain, SC, USN
Deputy Commander
Naval Supply Systems Command

TABLE OF CONTENTS

PARAGRAPH		PAGE
1	PURPOSE	1
2	SCOPE	1
3	INTRODUCTION	1
4	OBJECTIVES	1
5	DEFINITIONS	1
6	PACKAGING INFORMATION	3
6.1	General	3
6.2	The Six Basic Unit Packaging Methods	4
6.3	Cushioning Function	5
6.4	Receipt, Handling, Stowage and Return of RFI Repairable Components	5
6.5	Removal of NRFI Components from Operating Equipment Sites.	8
6.6	Good Housekeeping Procedures	8
6.7	Disposal of Packaging Material	9
7	PREPARATION OF RETROGRADE MATERIAL FOR SHIPMENT	9
7.1	Specific Requirements	9
7.2	Preferred Means of Protection	10
7.3	Packaging Procedures	10
7.3.1	Item Preparation	10
7.3.2	Unit Packaging	11
7.4	Special Packaging for ESD/EM Sensitive Items	11
7.5	Packing	13
7.6	Marking, Closure, and Reinforcement	16
7.6.1	Unit Container Marking	16
7.6.2	Marking of Sensitive Material	16

PARAGRAPH		PAGE
7.6.3	Shipping Container Marking	17
7.6.4	Special Marking	17
7.6.5	Reinforcing Boxes	17
7.6.6	Consolidation Packs	23
7.7	Parcel Post Packaging	24
7.7.1	Parcel Post Packages	24
7.7.2	Closing, Marking, & Shipment of Parcels	24
7.7.3	Packing Lists for Registered Mail	24
7.7.4	Consolidated Parcel Post Packs	25
7.7.5	Parcel Post Shipment of Reusable Metal Shipping Containers	25
7.8	Hazardous Materials	25
8	AFLOAT PACKAGING TECHNIQUES	33
8.1	Reuse of Original Packaging	33
8.1.1	Specialized Reusable Containers	35
8.1.2	Limited Reuse	37
8.1.2a	Metal Drums	38
8.1.2b	Fastpack	39
8.1.2c	Metal-Stayed Container	40
8.2	Use of On-board Stocked Material	41
8.2.1	Cushioning Requirements	41
8.2.2	Cushioning Composition Guide	42
8.2.3	Cushioning Application Techniques	42
8.3	Fire Retardant & Non Plastic Pkg. Materials	42
8.3.1	Supply Items	42
8.3.2	Bulk Packaging Materials	42

TABLE OF CONTENTS - Continued

PARAGRAPH		PAGE
8.4	Specialized On-Board Packaging Techniques	45
8.4.1	Skin Packaging	46
8.4.2	Foam-In-Place	49
8.5	Make-do-Packaging Techniques	52
8.5a	Reuse of metal cans	53
8.5b	Reuse of fiberboard box	54
8.5c	Reuse of fiberboard	55
8.5d	Reuse of fiberboard box with flaps removed	56
8.5e	Reuse of fiberboard pads	57
8.6	Fleet Methods of Packaging NRFI Repairables	58
8.6a	How to package with on-board wrap/cushioning	59
8.6b	How to package with reusable containers (10 to 40 pounds)	60
8.6c	How to package with reusable containers (over 40 pounds)	61
8.6d	How to package items with fragile protrusions	62
8.6e	How to package items with mounting facility	63
8.7	How to Repackage NRFI Electrostatic Discharge Sensitive Items	64
9	RECOMMENDED SHIPBOARD PACKAGING TOOLS AND EQUIPMENT	66
10	RECOMMENDED SHIPBOARD BILL OF MATERIALS	66
11	REFERENCE LIST	74
12	ACRONYMS	75

LIST OF ILLUSTRATIONS

FIGURE		PAGE
1	Climatic Hazards	3
2	Mechanical Hazards	4
3	Functions of Cushioning	6
4	Report of Discrepancy, Standard Form 364	7
5	ESD Sensitive Item Protective Unit Pack	12
6	Box Certificates	14
7	Steps in Fabricating An Open Box	15
8	Identification and Unserviceable Item Labels	16
9	Location of Markings on Unit and Shipping Containers	17
10	Location of Priority Tape on Container	18
11	Military Shipment Label	19
12	Military Shipment Label and Tag Data	20
13	Location/Placement of Military Shipment Labels & Tags	21
14	Reinforcement Patterns for Fiberboard and Wood Boxes	22
15	Marking and Strapping for Palletized Loads	23
16	Marking and Strapping for Consolidated Loads	23
17	Parcel Post Shipments	24
18	Procedure for Safeguarding Bolt Closure Type Drum	25
19	Use and Storage Label for Radioactive Material	26
20	Hazardous Materials Warning Labels	27 & 28
21	NRC Interior/Storage and DOT Radioactive Labels	29
22	Special Hazardous Material Labels	30
23	Labels for Magnetic Materials	31
24	Special Marking Labels	32
25	Afloat Packaging Techniques	34
26	Reusable Container for Fragile or Delicate Items	35
27	Package/Container For Printed Circuit Board Assembly	35
28	Specialized Reusable Container	36
29	Reuse Cartons	37
30	Reuse Boxes	37
31	Reuse of Metal Drums	38
32	Reusable Fastpack Container	39
33	Reusable Fastpack Container	39
34	Metal-Stayed Container	40
35	Cushioning Applications	43
36	Cushioning Wrap Techniques	44
37	Skin Packaging Techniques	46
38	Skinpack	47
39	Skin Packaging Procedure	48
40	Simplified Afloat Foam-In-Place Packaging Procedure	49
41	Reuse of Metal Cans	53
42	Reuse of Fiberboard Box	54
43	Reuse of Fiberboard	55
44	Reuse of Fiberboard Boxes with Flaps Removed	56
45	Fiberboard Pads Used for Blocking and Bracing	57
46	Package with On-board Cushioning Wrap	58 & 59
47	Package with Reusable Containers (10 to 40 Lbs)	60
48	Package with Reusable Containers (over 40 Lbs)	61
49	Package Items with Fragile Protrusions	62
50	Package Items with Mounting Facility	63
51	Repackage NRFI Electrostatic Discharge Sensitive Items	64
52	Sensitive Electronic Device Caution Label	65

LIST OF TABLES

TABLE		PAGE
1	Cushioning Selection	41
2	Stock Numbers For Protective Clothing	50
3	Parameters for Using Grade A or B Foam	51
4	Recommended Shipboard Packaging Tools and Equipment	66
5	Skin Packaging Materials	67
6	Tags, Twine, and Tapes	68
7	Bags and Boxes	69
8	Bubble Wrap and Barrier Material	70
9	ESD Protective Equipment	71
10	ESD Protective Packaging Materials	72 & 73

PACKAGING PROCEDURES FOR FLEET AND FIELD ACTIVITIES

1. **PURPOSE.** This publication establishes minimum packaging and packing procedures for handling, storage and shipment of Navy stock material.

2. SCOPE

a. This publication will provide instructions for packaging procedures for ships or stations that have limited packaging materials, technical references and trained packaging personnel. The procedures will provide the minimum protection needed for handling, stowage and shipment, using materials in the ships' Allowance Equipage List (AEL) and commonly found reusable packaging materials.

b. The packaging procedures specified in this publication apply to all ships' material except where specific packaging instructions are issued by the cognizant Inventory Control Point (ICP), Project Office or Naval Systems Command.

3. INTRODUCTION

a. Reliability of equipment is the key to aircraft and ship readiness. Both consumable and repairable items must be properly protected during shipment and storage. If retrograde repairables are damaged in return shipment, the original failure mode cannot be readily determined. The packaging procedures described in this publication are required to:

- Decrease probability of damage in shipment
- Decrease repair time
- Decrease turnaround time
- Increase recoverability

All these factors contribute to the following two priority Navy goals:

- ENHANCE FLEET READINESS
- REDUCE REPAIR COSTS

b. A key factor in the reliability and availability of repairables required by the Fleet is the prompt and safe shipment of retrograde repairables through the repairable cycle from the ship to the Designated Overhaul Point (DOP) and return.

4. **OBJECTIVES.** The objectives of these guidelines are twofold:

- To expedite the return of repairables
- To minimize damage to material

5. **DEFINITIONS.** For those who may not be familiar with some of the necessary technical terms used, the following definitions are provided.

Blocking and Bracing. The process of supporting and immobilizing an item within a container to prevent damage through movement. Blocking and Bracing allows no movement of the protected item.

Cushioning. Cushioning is the protection given to items against physical and mechanical damage by means of appropriate materials which absorb the energy of shocks and vibrations through gradual but increasing resistance to the movement of the item. The energy from shocks and impacts is absorbed when the cushioning material is compressed, resulting in a damping or minimizing of force to the item. Cushioning allows limited movement of the protected item. Loose fill types of cushioning (i.e., shredded paper, styrofoam "peanuts") are not permitted for Navy items.

Electrostatic Discharge (ESD). The discharge of static electricity (which may not be seen or felt) between two objects. The objects are usually a person and an item being handled or touched by the person.

Electrostatic Discharge Sensitive (ESDS). Items that may be damaged by electrostatic discharge.

Foam-in-Place. A method of packaging wherein an item, placed in a unit or shipping container, is cushioned and immobilized through the use of a combination of polymer chemicals, poured as a liquid which expands to form a foam cushioning medium that conforms to the shape of the item.

Marking. Application of numbers, letters, labels, tags, symbols, or colors for handling or identification during shipment and storage.

Packaging. A general term meaning the processes and procedures used to protect material from deterioration and/or damage. Includes cleaning, drying, preserving, packing, marking, and unitization.

Packing. Assembling of an item or items into a shipping container with blocking, bracing, cushioning, weatherproofing, reinforcement and marking.

Shipping Container. A fiberboard, wood, plastic or metal container, strong enough to protect material during shipment and storage.

Skin Packaging. A packaging process whereby an item is covered by a closely fitting, transparent film. The item is usually placed on a porous, rigid backing sheet; treated film is draped over it and a vacuum is applied to draw the film tightly over the item, onto the backing sheet.

Unit Container. The first container, complete with internal wrapping and cushioning, applied to a single item to form a complete, identifiable package.

Unitization. The assembly of any combination of unit, intermediate or shipping containers into a single load so the load can be handled as a unit. Includes consolidation in a container, placement on a pallet or load base or securely banded together.

6. PACKAGING INFORMATION

6.1 **GENERAL.** Packaging requirements for Ready for Issue (RFI) material have been designed by product engineers and packaging specialists with full knowledge of product requirements and operational needs. Proper packaging is required to protect the item against the environmental and physical hazards depicted in Figures 1 and 2 shown below and on page 4.

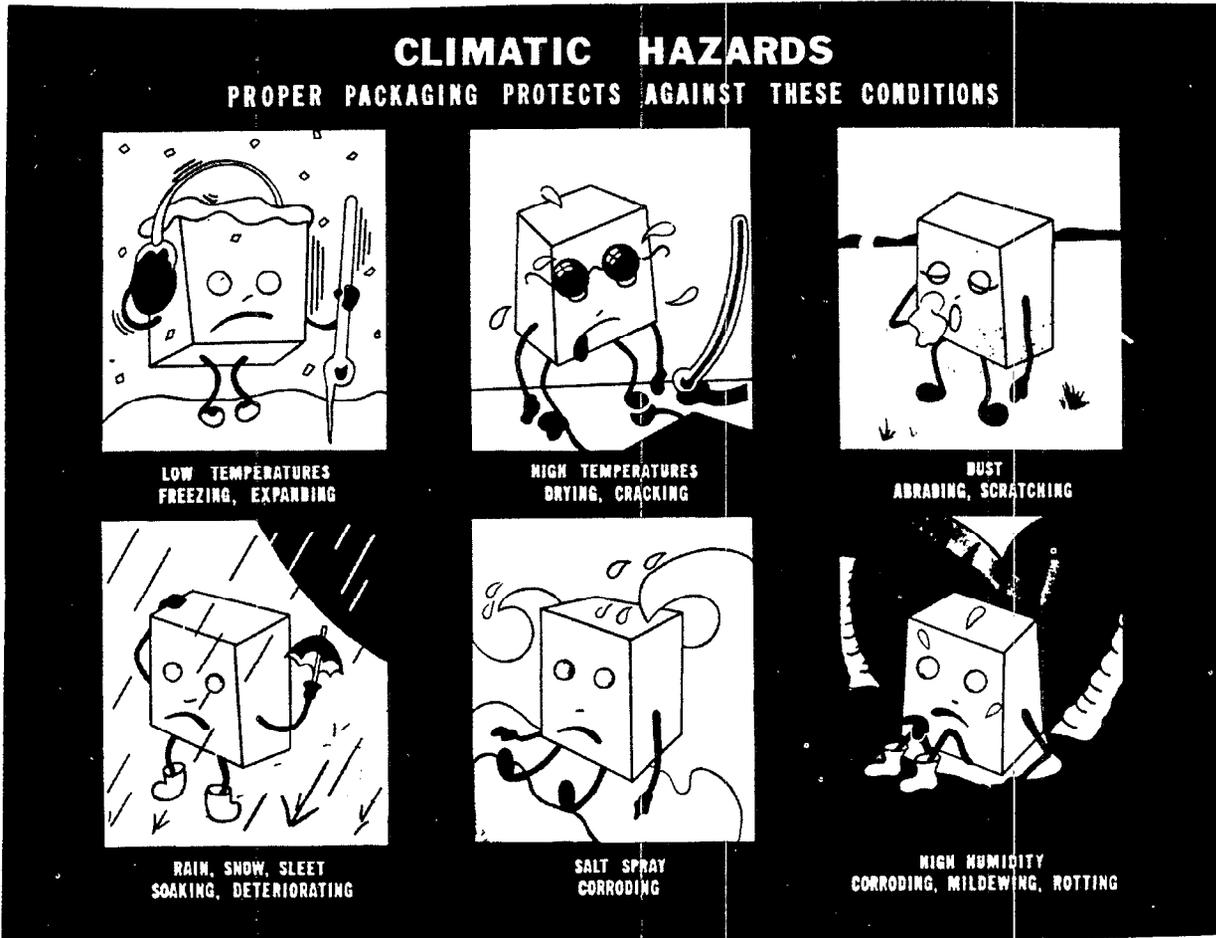


Figure 1
Climatic Hazards

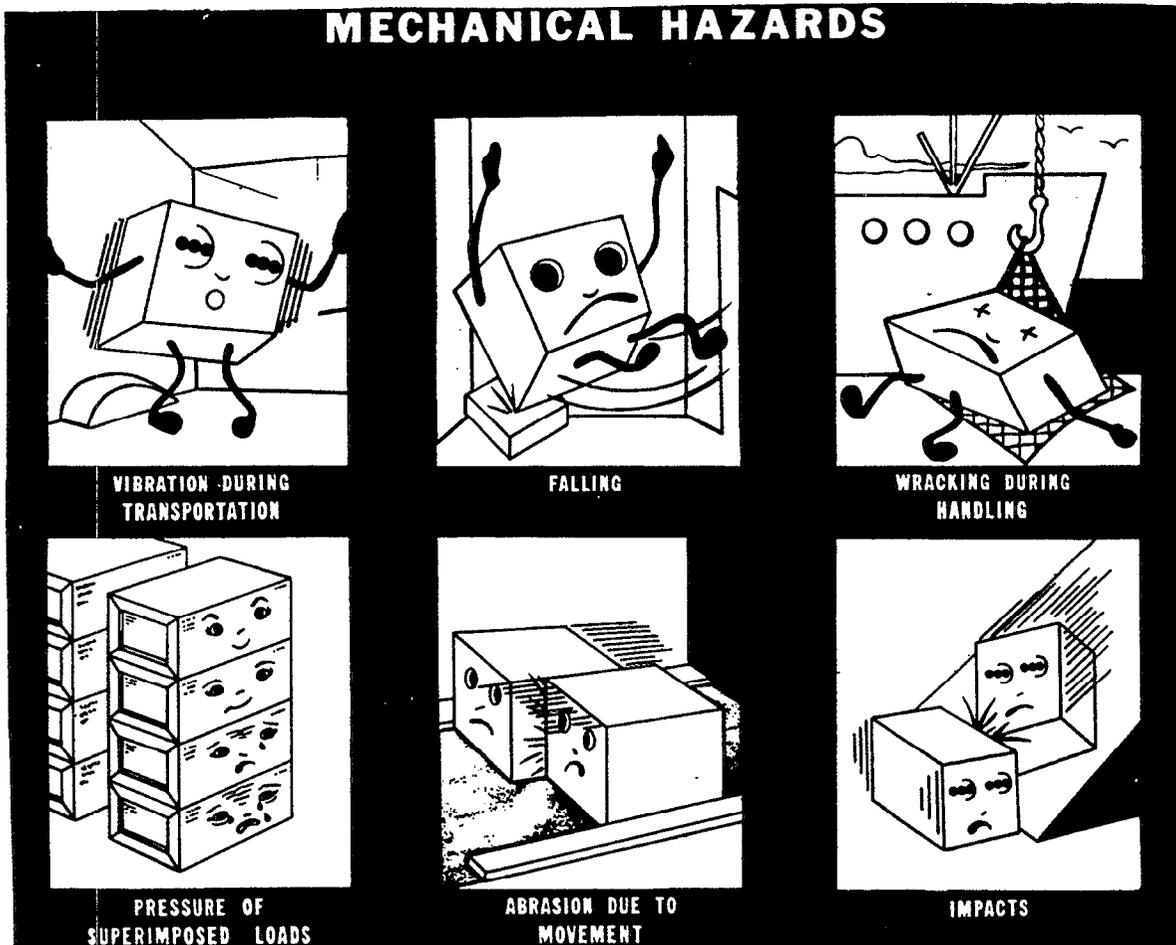


Figure 2
Mechanical Hazards

Although military packaging consists of six basic methods to apply necessary product protection, most repairables being returned for repair will require physical protection only (designated Method III). The other five methods are applied by industrial or governmental facilities using a wide range of material and production type of equipment. However, it is important to be able to recognize the basic methods and to understand the functions of each.

6.2 THE SIX BASIC UNIT PACKAGING METHODS

Method I - Preservative coating with or without a greaseproof wrap.
Purpose: Provides corrosion protection for metal items.

Method IA - Preservative coating, wrap, and cushioning as required, within a heat sealed, watervaporproof barrier bag.

Method IB - Strippable coating.

Purpose: Provides water and watervapor protection for metal items. The coating is suitable for protecting sharp edges on milling cutters, drill bits, chisels, labyrinth seals, etc. This method is no longer listed in MIL-P-116, but has useful application for some Navy items. Provides climatic and physical protection.

Method IC - Preservative coating, wrap, and cushioning, as required, within a heat-sealed, greaseproof-waterproof barrier bag. Purpose: Provides protection from liquid water, oil, fungus growth, insects and decayed organisms.

Method II - Preservative coating, wrap, and cushioning, as required, within a heat-sealed watervaporproof bag with desiccant added. Purpose: Provides a high degree of water-vapor protection for critical mechanical and electrical items.

Method III - Physical and mechanical protection only. Purpose: Provides protection for items not susceptible to corrosion.

6.3 CUSHIONING FUNCTION. Cushioning is essential to both proper unit packaging and packing. The item must be cushioned within the unit package to control movement and prevent damage to the item. Cushioning is essential to protect the item against the shipping hazards depicted in Figure 3 shown on page 6.

6.4 RECEIPT, HANDLING, STORAGE, AND RETURN OF READY FOR ISSUE (RFI) REPAIRABLE COMPONENTS

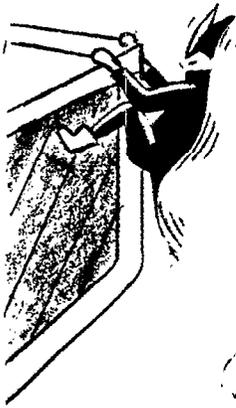
a. The purpose of packaging is to protect the item from shock, vibration, climatic hazards and the effects of electrostatic discharge (ESD) throughout the supply cycle from point of manufacture or repair to point of use. When any portion of the total package is removed, some protection is lost, increasing the probability of damage to the item. Material should be retained in its original package until it is ready to be used.

b. RFI Repairable Material shall be handled and stowed aboard ship in the individual unit package supplied with the item. Cushioning material alone is prohibited for use in the movement and stowage of RFI Repairables unless specially designed cushioned pads, storage bins and cabinets are specifically designed for use as a handling/stowage device. This must be authorized by the Item Manager. As a minimum, the unit package shall consist of the original cushioning material and container, box or folder supplied with the item. In addition, interior wraps or sealed barrier bags, when provided with the item, are intended to provide protection against environmental contamination.

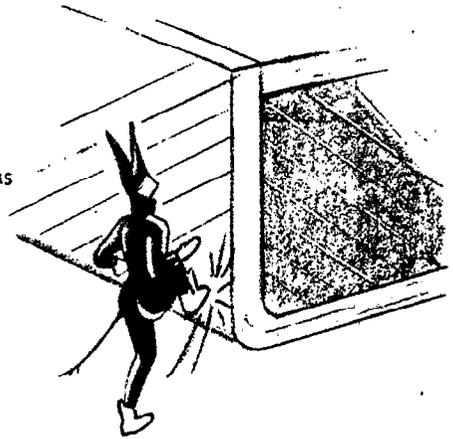
IMPORTANT: Do not staple paperwork to sealed barrier bags. Do not open or remove bag until ready for use.

c. When an RFI item is unpackaged for use, care should be taken in opening the package so that the packaging can be reused for returning the RFI item.

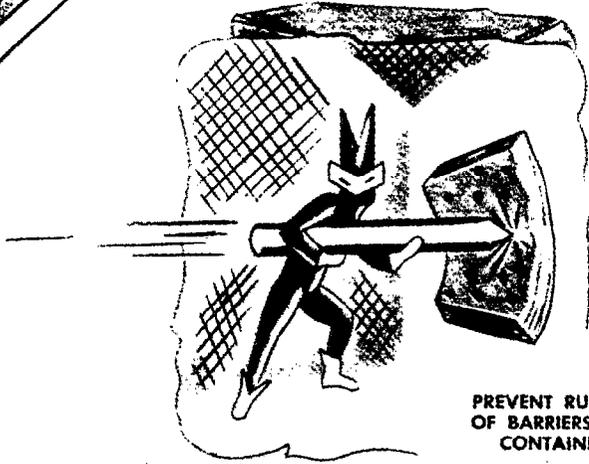
d. When RFI materials are received damaged and such damage can be attributed to inadequate, improper, or insufficient packaging, a Report of Discrepancy (ROD) (SF 364) shall be submitted in accordance with NAVSUP 4440.179, ROD Manual. (See Figure 4 shown on page 7.)



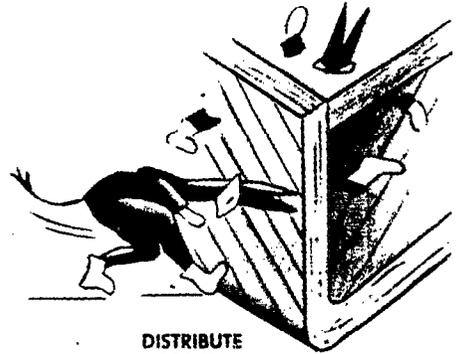
CONTROL MOVEMENT AND VIBRATION



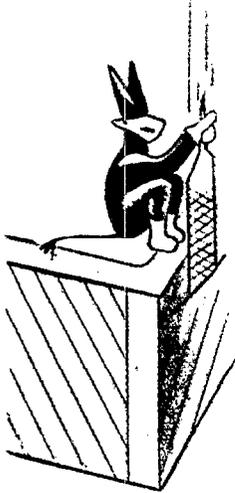
PROTECT FRAGILE ITEMS



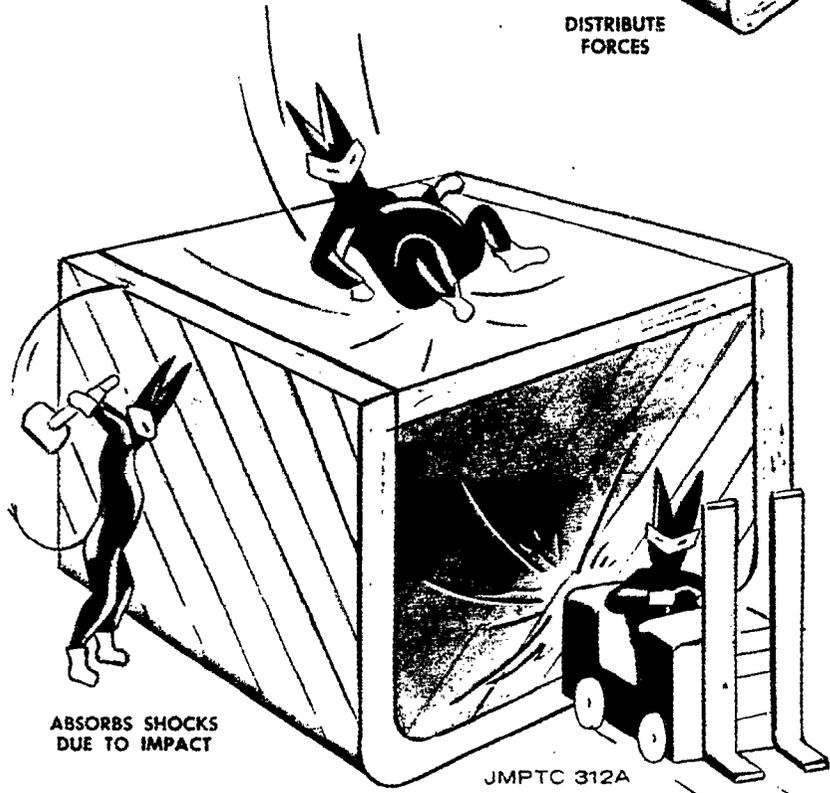
PREVENT RUPTURE OF BARRIERS AND CONTAINERS



DISTRIBUTE FORCES



PREVENT ABRASION



ABSORBS SHOCKS DUE TO IMPACT

JMPTC 312A

Figure 3
Functions of Cushioning

REPORT OF DISCREPANCY (ROD)				1. DATE OF PREPARATION	2. REPORT NUMBER			
<input type="checkbox"/> SHIPPING <input checked="" type="checkbox"/> PACKAGING				14 May XY	001 /XY			
3. TO (Name and address, include ZIP Code) Naval Supply Center (Shipper's Address)				4. FROM (Name and address, include ZIP Code) USS MOBILE BAY CG-53 FPO: City, Zip Code				
5a. SHIPPER'S NAME (Same as Block 3)				5b. NUMBER AND DATE OF INVOICE		6. TRANSPORTATION DOCUMENT NUMBER (GBL, Waybill, TCN, etc.) R21346-0160-2345		
7a. SHIPPER'S NUMBER (Purchase Order/Shipment, Contract, etc.)		7b. OFFICE ADMINISTERING CONTRACT			8. REQUISITIONER'S NUMBER (Requisition, Purchase Request, etc.)			
9. SHIPMENT, BILLING, AND RECEIPT DATA					10. DISCREPANCY DATA			11. AC-2 TION CODE
NSN/PART NUMBER AND NOMENCLATURE (a)		UNIT OF ISSUE (b)	QUANTITY SHIPPED/ BILLED (c)	QUANTITY RECEIVED (d)	QUANTITY (a)	UNIT PRICE (b)	TOTAL COST (c)	CODE ¹ (d)
1H 4820-01-224-4578		EA	2	2	1	1,200	2,400	P1 P2

12. REMARKS (Continue on separate sheet of paper if necessary)

Complete description of incorrect packaging, i.e. 1. No cushioning in box.
2. Heat seal on bag open.

Photos Attached

¹ DISCREPANCY CODES		² ACTION CODES
CONDITION OF MATERIAL C1 - In condition other than that indicated on release/receipt document C2 - Expired shelf life C3 - Damaged parcel post shipment SUPPLY DOCUMENTATION D1 - Not received D2 - Illegible or mutilated D3 - Incomplete improper or without authority (Only when receipt cannot be properly processed) MISDIRECTED MATERIAL M1 - Addressed to wrong activity OVERAGE/DUPLICATE SHIPMENTS O1 - Quantity in excess of that on receipt document O2 - Quantity in excess of that requested (Other than unit of issue pack) O3 - Quantity duplicates shipment PACKAGING DISCREPANCY P1 - Improper preservation P2 - Improper packing P3 - Improper marking P4 - Improper unitization	PRODUCT QUALITY DEFICIENCIES Q1 - Deficient material (Applicable to Grant Aid and FMS shipments only) SHORTAGE OF MATERIAL S1 - Quantity less than that on receipt document S2 - Quantity less than that requested (Other than unit of issue pack) S3 - Non-receipt of parcel post shipments ITEM TECHNICAL DATA MARKINGS (i.e., Name Plates, Log Books, Operating Handbooks, Special Instructions, etc.) T1 - Missing T2 - Illegible or mutilated T3 - Precautionary operational markings missing T4 - Inspection data missing or incomplete T5 - Serviceability operating data missing or incomplete T6 - Warranty data missing WRONG ITEM (Identify requested item as a separate copy in Item 9 above) W1 - Incorrect item received W2 - Unacceptable substitute OTHER DISCREPANCIES Z1 - See remarks	1A - Disposition Instructions requested (Reply on reverse) 1B - Material being retained (See remarks) 1C - Supporting supply documentation requested 1D - Material still required expedite shipment (Not applicable to FMS) 1E - Local purchase material to be returned at supplier's expense unless disposition instructions to the contrary are received within 15 days (Reply on reverse) (Not applicable to FMS) 1F - Replacement shipment requested (Not applicable to FMS) 1G - Reshipment not required. Item to be re-requisitioned. 1H - No action required. Information only 1Z - Other action requested (See remarks)

13. FUNDING AND ACCOUNTING DATA

14a. TYPED OR PRINTED NAME, TITLE, AND PHONE NUMBER OF PREPARING OFFICIAL
John Smith SK1 AV: 227-0826

14b. SIGNATURE

15. DISTRIBUTION ADDRESSEES FOR COPIES

NAVSUP (0611) (with photos)

Figure 4
Report of Discrepancy, Standard Form 364

e. When RFI material is excess and the unit package has not been opened, return as is. When the unit package has been opened and RFI material exposed, package in accordance with this publication and mark package as follows: "NOT PACKAGED FOR STORAGE."

6.5 REMOVAL OF NRFI COMPONENTS FROM OPERATING EQUIPMENT SITES

a. Not Ready for Issue (NRFI) repairables must be readied for retrograde movement (return thru the repair cycle) to the designated overhaul point (DOP) by providing immediate packaging protection in order to prevent additional internal or external physical damage caused by electrostatic discharge.

NOTE: USE ESD PROTECTIVE HANDLING PROCEDURES WHEN HANDLING ESD SENSITIVE ITEMS AND WRAP IMMEDIATELY IN ESD PROTECTIVE BARRIER MATERIAL. (See para. 7.4 on page 12 of this handbook.)

b. When available, the required packaging protection can be best provided by the reuse of specially designed reusable containers equipped with special fixtures or die cut/molded cushion pads as required.

c. When reusable containers are not available, reuse packaging materials and containers supplied with the new or replacement item, and seal the container after placing component inside.

d. When new or replacement item packaging is not available, obtain a corrugated fiberboard box and sufficient cushioning material to protect each surface of the item. Fiberboard should be sealed with strippable, PPP-T-45, Type II, Class 1 tape. (Masking tape is not strong enough for closing boxes.)

IMPORTANT: For maximum insurance against additional damage to the component, the above packaging procedures must be applied at the time of failed item removal. If a container is not available, provide sufficient cushioning material and tape to completely wrap the item at the time the failed item is removed for safe delivery to supply department.

6.6 GOOD HOUSEKEEPING PROCEDURES

a. In an effort to reduce combustible materials aboard ship, the Navy has begun to purchase spares packaged in fire retardant material. Available fire retardant packaging materials are listed elsewhere in this instruction. In addition to the use of fire retardant materials, the following DO'S and DON'TS shall be followed:

DO

- (1) Consolidate packaging materials into authorized stowage areas only.
- (2) Retain needed materials in a compact, organized manner.
- (3) Stow all items in unit packages. Strip and dispose of unnecessary packing on RFI material before stowing. Save all reusable containers.
- (4) Retain protective packaging on ESDS material to repackage items turned in for repair.
- (5) Complain when you get bad packaging. Submit SF 364, ROD (See Figure 4 shown previously on page 7.)
- (6) Keep all packaging and stowage areas clean and organized.
- (7) Pack only boxed items in Triple-Wall Multipacks, each with its own documents and address.

DON'TS

- (1) Do not smoke in packaging material stowage areas.
- (2) Do not store packaging materials or packaged goods against bulkheads or steam pipes. Leave space for ventilation!
- (3) Do not store packaging materials in unauthorized areas.
- (4) Do not store items wrapped in "bubble wrap" or plastic foam in open racks. Either pack them in boxes or store in enclosed cabinets or drawers.
- (5) Do not store hazardous materials in unauthorized areas.

6.7 DISPOSAL OF PACKAGING MATERIAL

**IMPORTANT
DO NOT THROW AWAY
REUSABLE CONTAINERS**

a. Dispose of all loose-fill polystyrene, excelsior, newspaper, or shredded paper used as stuffing or cushioning received with incoming shipments by returning them to proper disposal sites onshore. Plastic materials may be reused or returned. Never dispose of plastics at sea. Public law 100-220 forbids the dumping of non-biodegradable materials into the ocean.

7. PREPARATION OF RETROGRADE MATERIAL FOR SHIPMENT

Retrograde material will be preserved, packaged and packed by the turn-in ship or activity, to provide protection from the effects of electrostatic discharge when required, and to prevent physical damage during shipment and storage, as prescribed herein. Preserved, packaged and packed material will be forwarded to the appropriate Advanced Traceability and Control (ATAC) Hub. After processing, the ATAC Hub will forward the material, preserved, packaged and packed as prescribed, to the appropriate storage site. Items expected to remain at the storage site for extended periods of time (over 18 months) before repair action, may become candidates for upgrading to a high level of protection, based upon direction and funding from the Inventory Control Point.

7.1 SPECIFIC REQUIREMENTS. Specific requirements of the inventory managers, Strategic Systems Project Office (SSPO), the Naval Air Systems Command (NAVAIRSYSCOM), the Aviation Supply Office (ASO), the Ships Parts Control Center (SPCC), etc. shall be followed, e.g.:

- a. SSPO Instruction 4423.39, Fleet Ballistic Missile (FBM) Weapons Systems Repairable Program, Requirements and Procedures.
- b. SPCC Instruction 4030.4, Packaging of FBM Weapons System Repairable Items.
- c. SPCC Instruction 4030.10, Packaging, Packing and Marking of SUBSAFE/Level 1 items.
- d. SPCC Instruction 4030.14 TRIDENT, Packaging, Packing and Marking of Trident Repairable and TRIPER items.
- e. ASO Publication CN-01, Section No. C0030, Packaging Data for ASO and NAVAIR Repairable Assemblies.

7.2 PREFERRED MEANS OF PROTECTION. Adequate protection can be accomplished in one of the following four ways.

a. **PREFERRED METHOD** - Package and return repairable item in assigned, specially designed, reusable container. When a specific reusable container is required, the Master Repairable Item List (MRIL) or ASO Publication CN-01, Section No. C0030 will identify the containers by the stock number. The assigned container is required because cushioning and internal supportive gear have been designed for that specific piece of equipment. In some cases, manufacturers' warranties require their use. When reusable containers are not assigned, Section No. C0030 identifies other packaging requirements such as electrostatic free and electromagnetic field force shielding wraps and pouches which must be used to prevent further damage. SPECIAL HANDLING PROCEDURES FOR ESDS ITEMS ARE OUTLINED IN PARAGRAPH 7.4.

b. **SECOND CHOICE** - Package and return the repairable item in the package supplied with the replacement item.

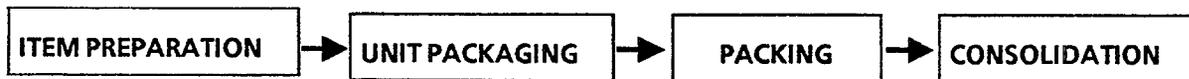
c. **THIRD CHOICE** - Package and return repairables in new general purpose packaging materials or use skin packaging and foam-in-place packaging machines located aboard larger ships.

d. **FOURTH CHOICE** - Package and return repairables in improvised containers, using containers/cushioning materials saved for packaging.

7.3 PACKAGING PROCEDURES

a. Retrograde repairables and new items should be given equal packaging protection.

b. Following the turn-in, screening and documentation of repairables as required in NAVSUP Publication 485, each item should be packaged in a unit container and identified. The normal sequence of packaging operations is:



7.3.1 ITEM PREPARATION

NOTE: SPECIAL HANDLING FOR ESDS ITEMS IS OUTLINED IN PARAGRAPH 7.4

a. Clean the item by wiping or brushing to remove dirt, grime and greases. DO NOT DISASSEMBLE ITEM UNLESS AUTHORIZED.

b. Drain out all flammable and corrosive liquids. Dispose of hazardous materials in accordance with applicable Navy, Federal, State and local regulations.

c. Check instruction manual or consult technical personnel to determine if item should be flushed with solvent or water, blown dry with nitrogen or compressed air, and sealed with caps, plugs, or flange seals. Seal openings of gear motors, transmissions, and hydraulic equipment after draining. If openings cannot be sealed, wrap in greaseproof material and seal in greaseproof bag.

7.3.2 UNIT PACKAGING. Package and identify each item individually. The unit packaging procedure includes: wrapping, cushioning, placing item in unit container, securing and marking. For ships having skin packaging and foam-in-place equipment, see paragraphs 8.4.1 and 8.4.2, respectively.

a. Wrapping. After cleaning, wrap items having internal or surface preservatives in good quality barrier material. Wrap electronic items having solid state component parts with material specified in section 7.4.

b. Wrap each item in cushioning material, place on cushion pads, or enclose in cushioning bag. Items may also be skin packaged or enclosed in foam-in-place.

c. Place Item in Unit Container. Fiberboard boxes will be the most commonly used container if items have not been assigned a reusable container. Boxes should be selected from on-board (new or used fire retardant material when possible) for correct size, weight, and shape of contents. Boxes may also be modified, altered, or cut down as described in paragraph 8.5. To protect the item from mechanical damage, center the cushioned item in the container and place additional cushioning on all sides, top and bottom.

d. Ensure Scheduled Removal Component (SRC) cards are in the unit container when required by the MRIL. In addition, all Depot Level Repairable (DLR) assemblies must be accompanied by a Visual Identification/Maintenance Action Form (VIDS/MAF) OPNAV form 4790/60, which must be placed inside the unit container.

7.4 SPECIAL PACKAGING/HANDLING FOR ESD/EM SENSITIVE ITEMS

a. Many electrostatic discharge sensitive (ESDS) items are identified in supply documentation using a Special Material Content Code (SMCC) of "2" or "3" and/or a Special Material Identification Code (SMIC) of "VN". ESDS items may also be identified by caution markings applied to either the packaging or the item. These items require special packaging and markings as shown in Figure 5 on page 12 and defined below, in addition to protective handling while being packaged. (Note: Although most modern electronic parts and assemblies containing these parts are ESDS, not all of them will be identified with a SMCC, SMIC, or the appropriate caution markings.)

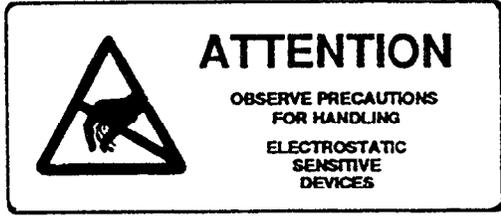
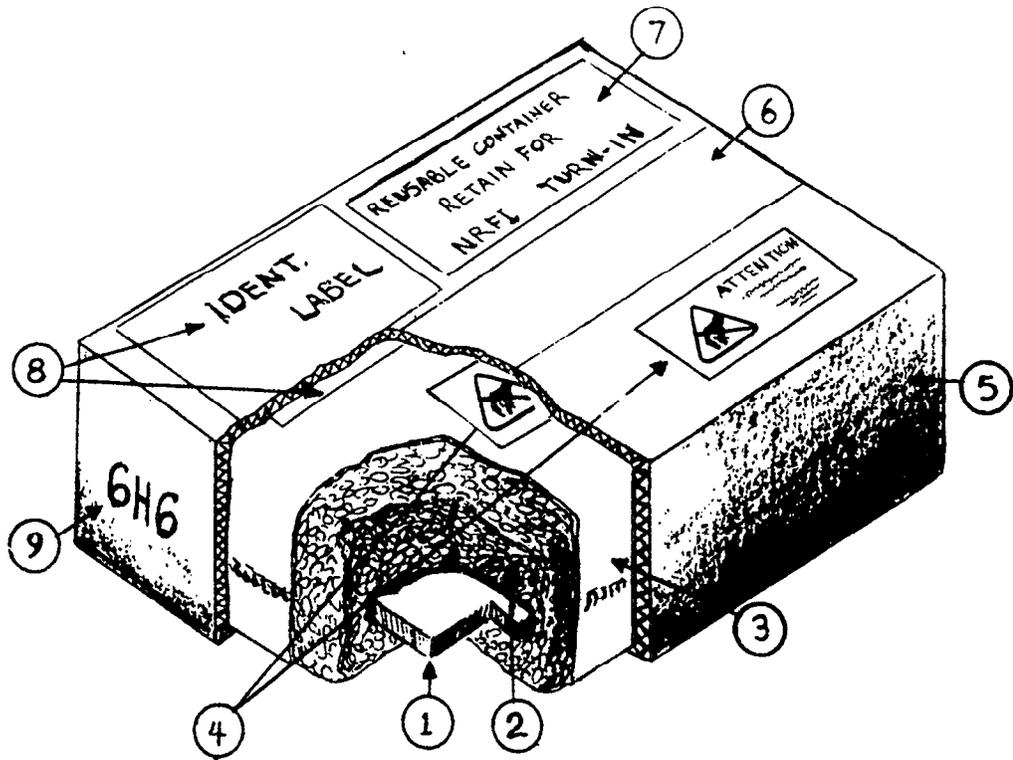
b. ESD damage is not visible to the naked eye. To ensure the protection of ESDS items, they should be packaged as follows:

1. Inner wrap or cushioning - Provide an initial wrap of material conforming to MIL-B-81705, Type II or Type III, Class 1, or cushioning material conforming to PPP-C-795, Class 3, PPP-C-1752, Type VII, Class 1, Grade B; PPP-C-1797, Type II; or PPP-C-1842, Type III, Style A or B. Alternately, reclosable cushioned pouches conforming to MIL-P-81977, Type I or II may be used in lieu of the initial wrap or cushioning.

2. Outer wrap - The item and its initial wrap, cushioning or pouch shall then be unit packaged in bags conforming to MIL-B-117, Type I, Class F, Style 1 (MIL-B-81705, Type I). The bags should be heat sealed.

3. Unit containers - Unit Containers shall be as specified in paragraph 7.3.2.c. Additional cushioning may be included as needed to secure the item within the container.

c. ESDS items should be handled only by trained personnel with the proper equipment and at ESD work stations. ESD protective equipment and materials are listed on page 73 of this handbook. Additional information on ESD and handling procedures is also contained in the Navy ESD training video tape. "ESD - THE INVISIBLE THREAD" (No. 803.784-DN).



1. Item
2. Wrap, cushioning or pouch
 - a. Wrap - Use material in accordance with MIL-B-81705, Type II or Type III, Class 1, or;
 - b. Cushioning - Use material in accordance with PPP-C-795, Class 2; PPP-C-1752, Type VII, Class 1, Grade B; PPP-C-1797, Type II; or PPP-C-1842, Type III, Style A or B, or;
 - c. Pouches - Use pouches fabricated in accordance with MIL-P-81997, Type I or Type II.
3. Sealed bag - In accordance with MIL-B-117, Type I, Class F, Style 1, (Fabricated using MIL-B-81705, Type I material).
4. Label - Sensitive electronic device label
5. Fiberboard box
6. Tape
7. Special markings on box only
8. Contents labels
9. Print NSN or local control number on one end of box.

Figure 5
ESD Sensitive Item Protective Packaging

7.5 PACKING

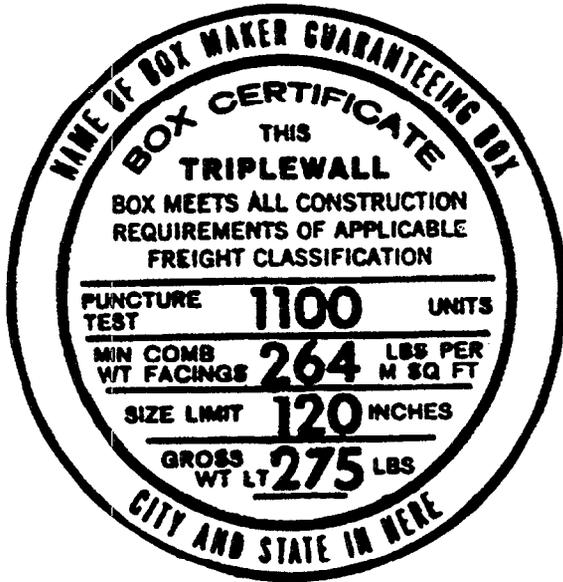
a. **Shipping Container.** Fire Retardant Fiberboard boxes may be used for most items. The box-maker's certificate indicates the maximum weight and dimensions for each kind of box. (See Figure 6 shown on page 14.) "Size limit" means the length, width, and depth added.

<u>Bursting Test</u>	<u>Gross Weight</u>	<u>Size Limit</u>
125	20	40
175	40	60
200	65	75
275	90	90
350	120	100
500	140	110
600	160	120
Puncture Test	(Triple Wall)	
1100	275	120

Anything bigger and heavier must be packed in wood boxes, cleated plywood boxes or crates. Ordinarily fiberboard boxes are not used for items over 65 lbs. net (70 lbs gross). Any box over 200 lbs should have skids or be shipped on a pallet. Fire retardant lumber treated per MIL-L-19140 is available for wood boxes and crates.

b. **Crating and Skidding.** Large, heavy and odd shaped items should be palletized, crated or skidded to permit transfer by materials handling equipment. (See Figure 7 shown on page 15 for open crate construction.) Items such as machines or subassemblies having bolt holes in a part of the article sturdy enough to resist breakage, should be bolted to one face of the shipping container or a base which can be securely fastened by the container or extra pallet. If there are four or more available bolt holes, at least four should be used. When bolted to a wooden base or skid, a large washer shall be used wherever the bolt head or nut is in contact with the wood to prevent the bolt from being pulled through the wood. Additionally, lag bolts shall not be used for securing equipment to wooden bases or skids.

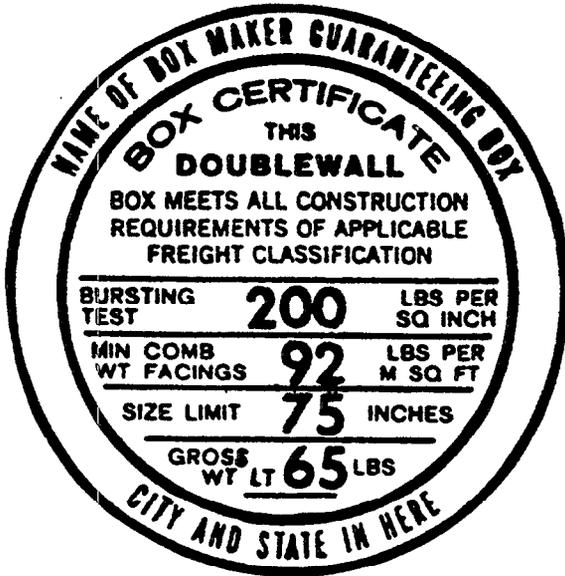
c. **Consolidation.** After repairables are packed and identified, they may be consolidated into larger handling units. This can be done by strapping packages onto a pallet, or packing into larger boxes. If triple-wall boxes are used, they should be strapped or nailed to a pallet. If pallets are not used, the triple-wall box is limited to 275 pounds gross weight and 48" x 32" (120 united inches) by motor freight rules. A practical maximum pallet load weight is 3,000 pounds.



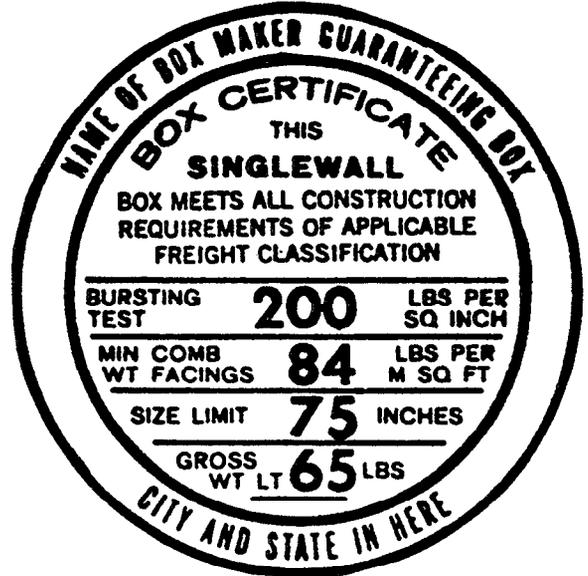
Fire Retardant
Corrugated Fiberboard



Fire Retardant
Corrugated Fiberboard



Fire Retardant
Corrugated Fiberboard



Fire Retardant
Corrugated Fiberboard

Figure 6
Box Certificates

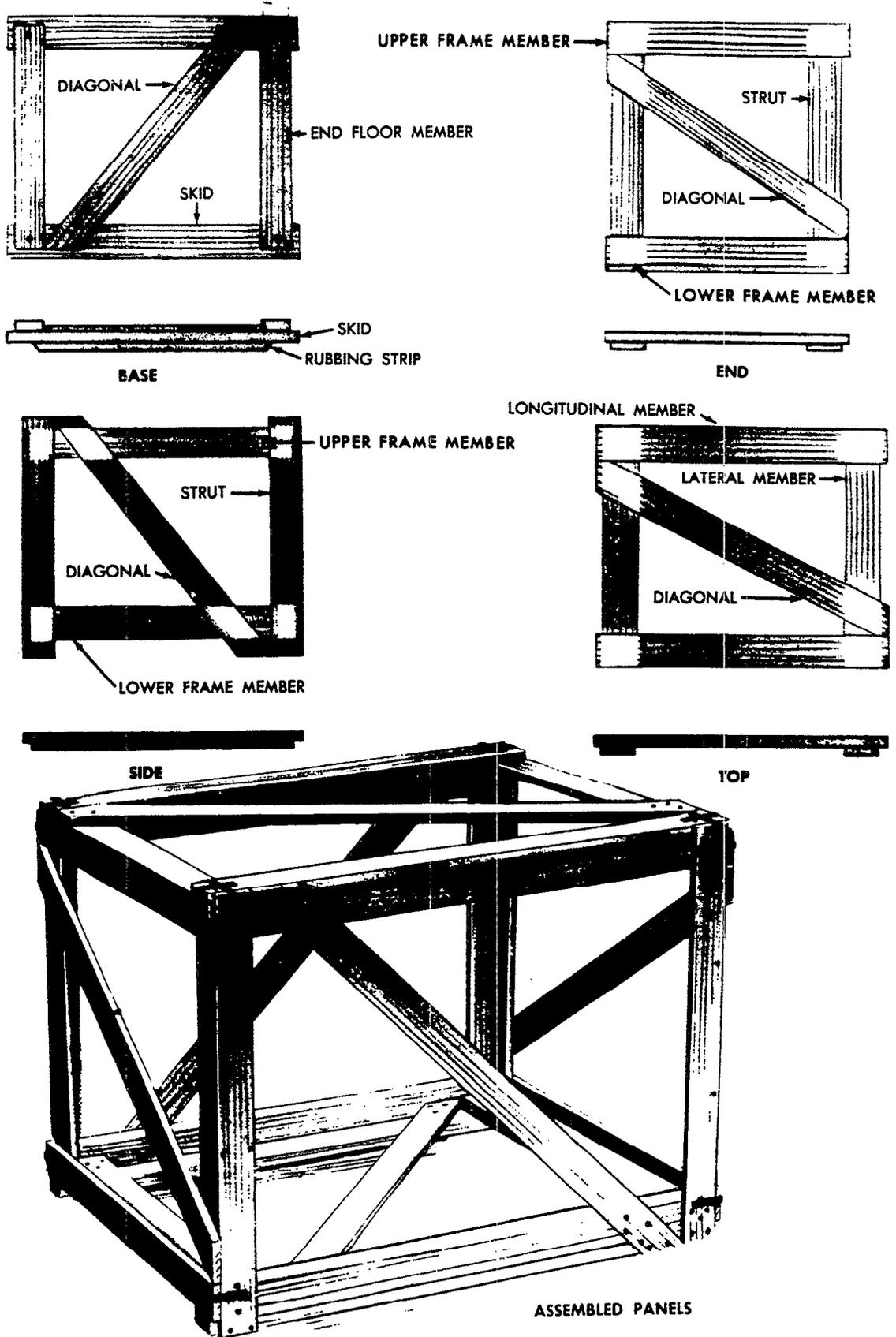


Figure 7
Steps In Fabricating An Open Box

7.6 MARKING, CLOSURE AND REINFORCEMENT

7.6.1 UNIT CONTAINER MARKING. Identify the unit containers with the applicable information in Figure 8 shown below. Printed labels (if available), label reproductions or hand printing may be used. Position the marking or labels as shown in Figure 13 below, under paragraph 7.6.3.

IDENTIFICATION LABEL

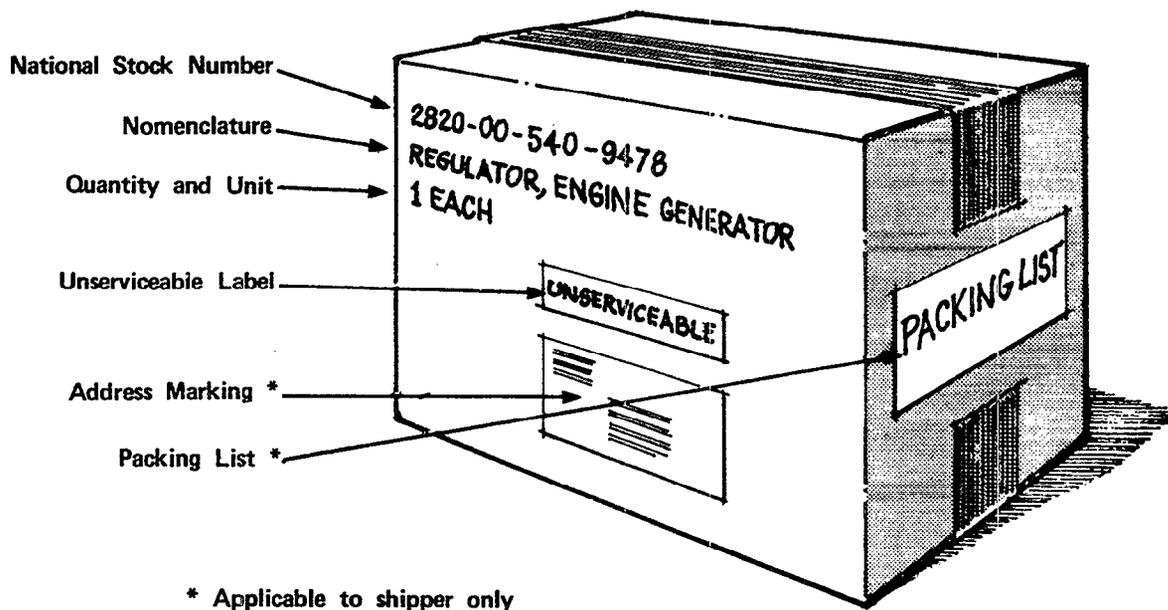
Stock Number (NSN or NICN)	_____
Part Number	_____
Nomenclature	_____
Quantity and Unit of Issue	_____

UNSERVICEABLE ITEM LABEL



Figure 8
Identification and Unserviceable Item Labels

7.6.2 MARKING OF SENSITIVE MATERIAL. Marking of protected material shipments, which include controlled sensitive, classified or pilferable items, shall not reflect the nomenclature on the shipping container. Identity of protected materials shall be provided via a Packing List on the inside of the shipping container.



NOTE: Special handling instructions such as "HANDLE WITH CARE," "DO NOT OPEN UNTIL READY FOR USE," "THIS SIDE UP," "FRAGILE," etc., shall be placed on the identification marked side of the container unless otherwise specified, but shall not interfere with or obscure other markings.

Figure 9
Location of Markings on Unit and Shipping Containers

7.6.3 SHIPPING CONTAINER MARKING. When only one item is packed in a shipping container, mark as a unit package (paragraph 7.6.1 and Figure 8 shown on page 16). Otherwise, mark the shipping container MULTIPACK and use a shipping label (or tag) as shown in Figure 11 on page 19, completed with the information specified in Figures 12 and 13.

7.6.4 SPECIAL MARKING. Paragraph 5093-7 of NAVSUP Publication 485 requires special markings for repairable items, including RED, BLUE and CLAMP labels. Apply the tapes as shown in Figure 10 on page 18.

IMPORTANT. RED AND BLUE PRIORITY DESIGNATOR TAPE IS NOT STRONG ENOUGH TO USE FOR CLOSING OR REINFORCING CONTAINERS.

7.6.5 REINFORCING BOXES. Fiberboard boxes may be closed with adhesive, or with carton sealing tape. After closing, boxes should be reinforced with strapping tape. Wood and plywood boxes should be reinforced with steel or plastic strapping. Figure 14 shows the strapping patterns for all three directions.

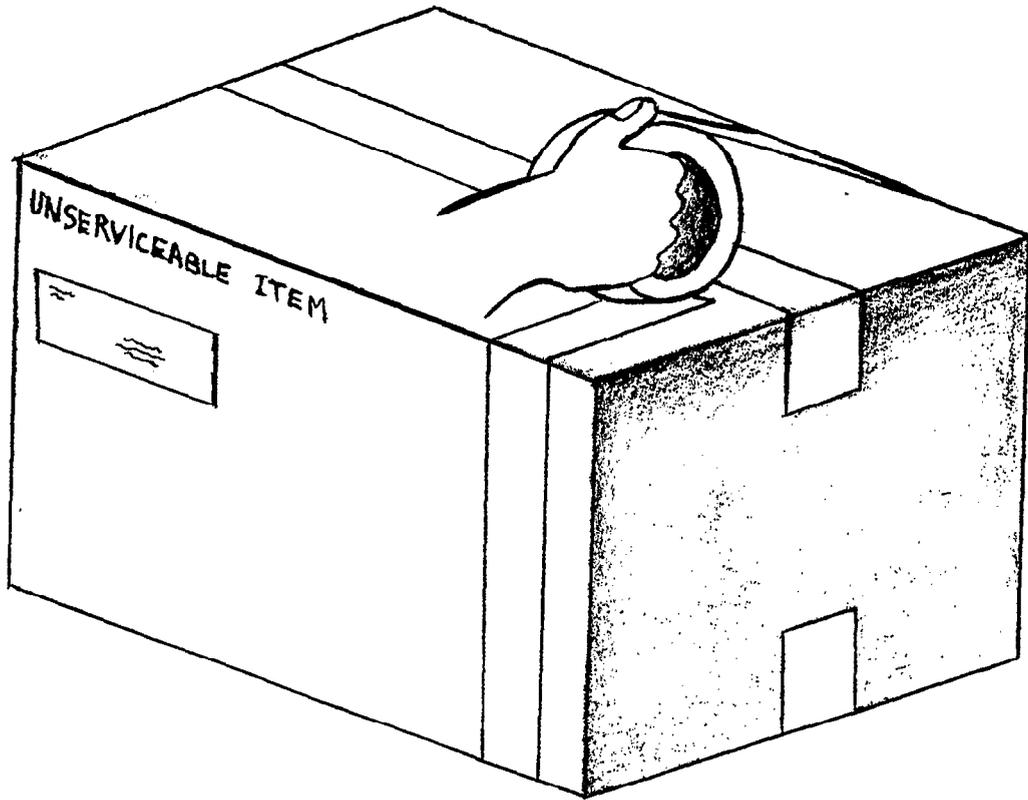
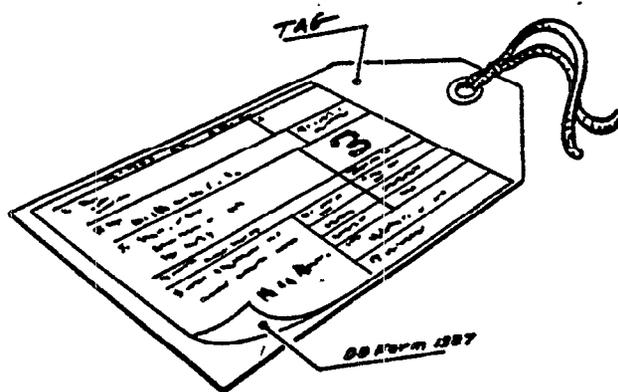


Figure 10
Location of "Priority" Tape on Container



MILITARY SHIPMENT LABEL		Form Approved. OMB No. 0704-0188
1. TRANSPORTATION CONTROL NUMBER		2. POSTAGE DATA
3. FROM		4. TYPE SERVICE
5. SHIP TO / POE		6. TRANS PRIORITY
7. POD		8. PROJECT
9. ULTIMATE CONSIGNEE OR MARK FOR	10. WT. (This piece)	11. RDD
	12. CUBE (This piece)	13. CHARGES
	14. DATE SHIPPED	15. FMS CASE NUMBER
	16. PIECE NUMBER	
	17. TOTAL PIECES	

DD Form 1387, NOV 86

Previous editions are obsolete

GPO : 1987 O - 171-241

Figure 11
Military Shipment Label

SHIPMENT ADDRESS LABEL (Except Parcel Post)

The Military Shipment Label (See Figure 11 shown on page 19.) shall be used to ship material through the Defense Transportation System as follows:

The following data shall be included in address marking as applicable:

- a. Transportation Control Number (TCN). The TCN shall be shown as a continuous 17-character alphanumeric data element: e.g., FB460040019000XXX
- b. RDD or expedited handling code.
- c. Project code, when specified. (Clear project names are not required but may be shown at the option of the service/agency concerned.) When shown, the project name shall be separate and distinct from the address marking, but shall appear on the same side as the address marking.
- d. Consignor (shipping activity).
- e. Transportation priority.
- f. POE/APOE (overseas shipments only).
- g. POD/APOD (overseas shipments only).
- h. Consignee (receiving activity).
- i. Piece Number (not required for shipments of a single commodity in standard pack containers/packaging).
- j. Total pieces.
- k. Weight (each piece).
- l. Cube (each piece).

Figure 12
Military Shipment Label and Tag Data

Place shipment labels and tags on shipping containers and palletized loads as shown below.

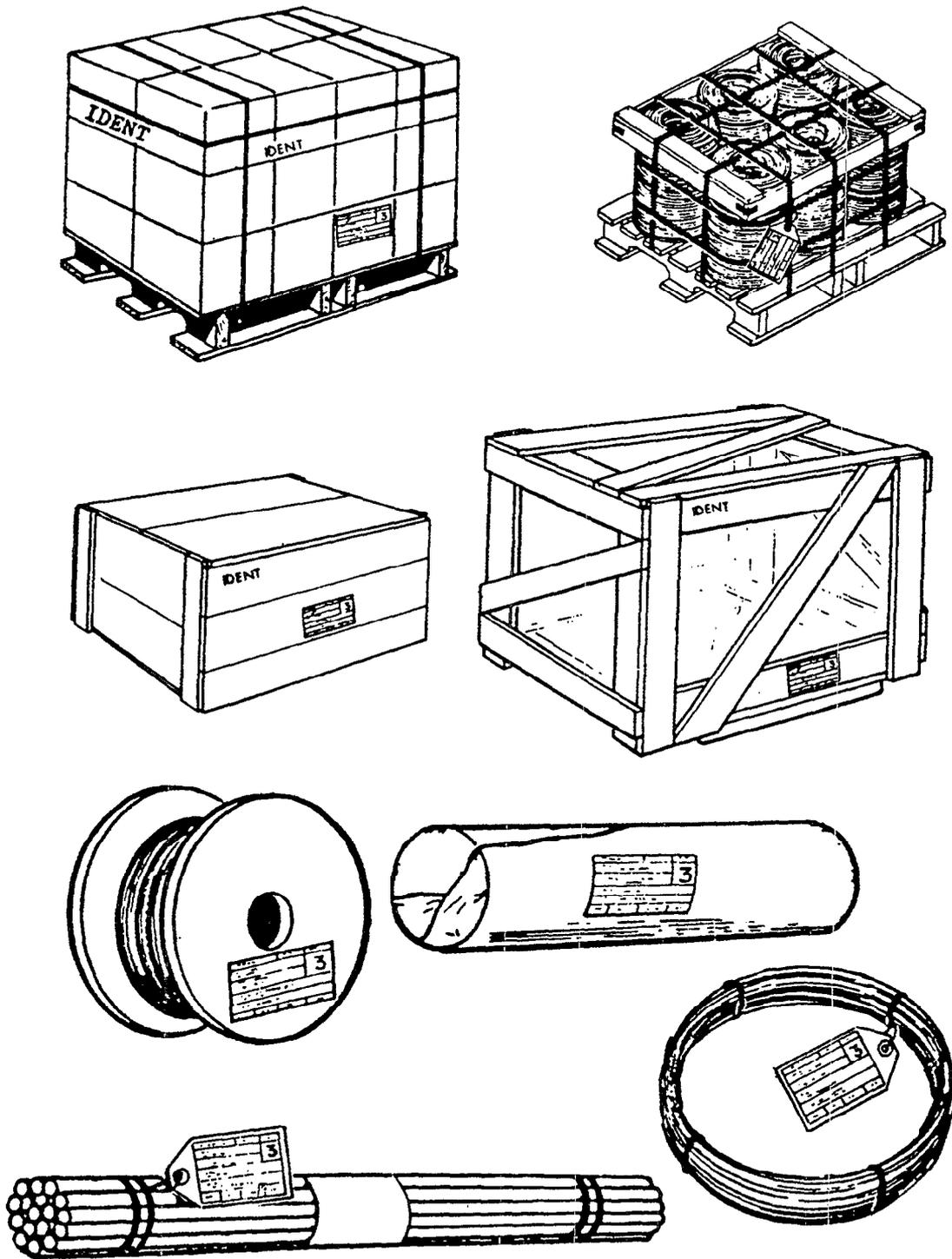
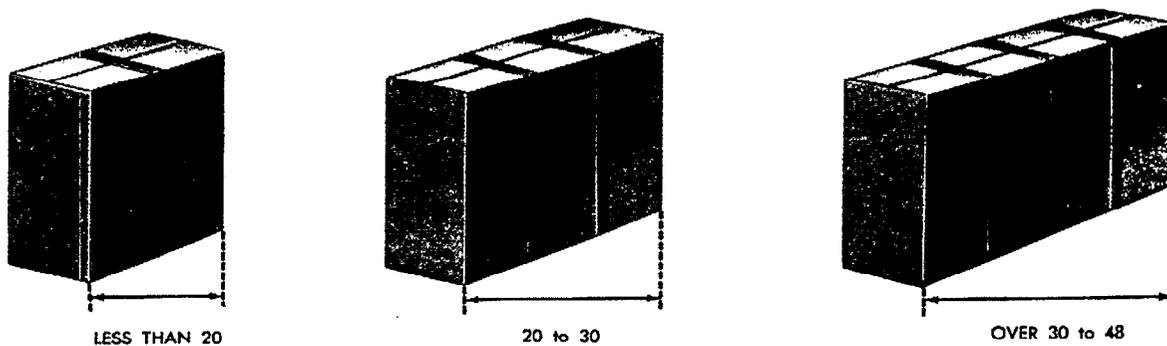


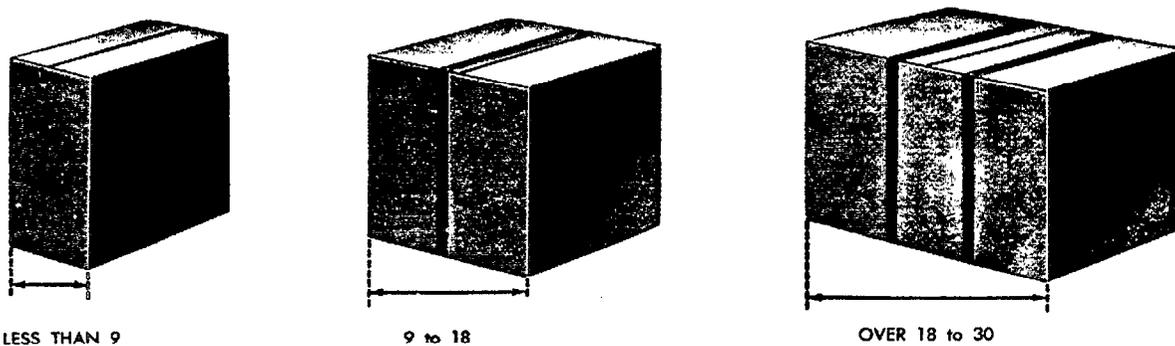
Figure 13
Location and Placement of Military Shipment Labels and Tags

LENGTH OF BOX DETERMINES THE NUMBER OF GIRTHWISE STRAPS



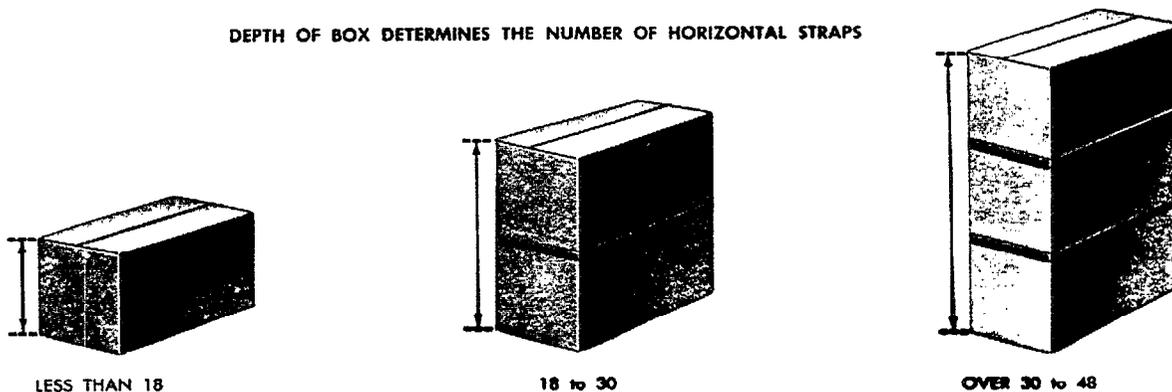
48 to 60—4 STRAPS
OVER 60—STRAP AS REQUIRED

WIDTH OF BOX DETERMINES THE NUMBER OF LENGTHWISE STRAPS



30 to 48—3 STRAPS
OVER 48—STRAP AS SPECIFIED

DEPTH OF BOX DETERMINES THE NUMBER OF HORIZONTAL STRAPS



OVER 48—STRAP AS SPECIFIED

NOTE: ALL MEASUREMENTS SHOWN ARE IN INCHES.

JMPC-PG 221

Figure 14
Reinforcement Patterns for Fiberboard and Wood Boxes

7.6.6 CONSOLIDATION PACKS. Location of marking and strapping for consolidated packs is shown in Figures 15 and 16 shown below.

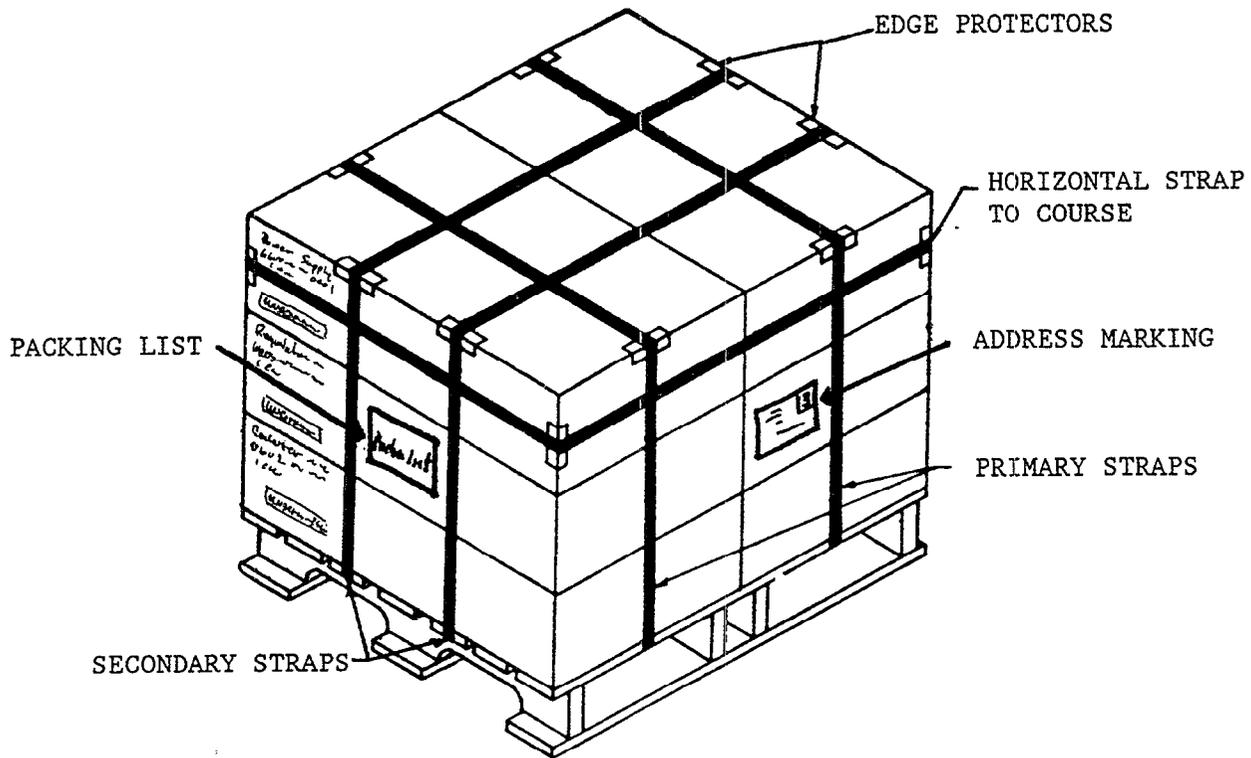


Figure 15
Marking Requirements and Strapping Pattern for Palletized Loads

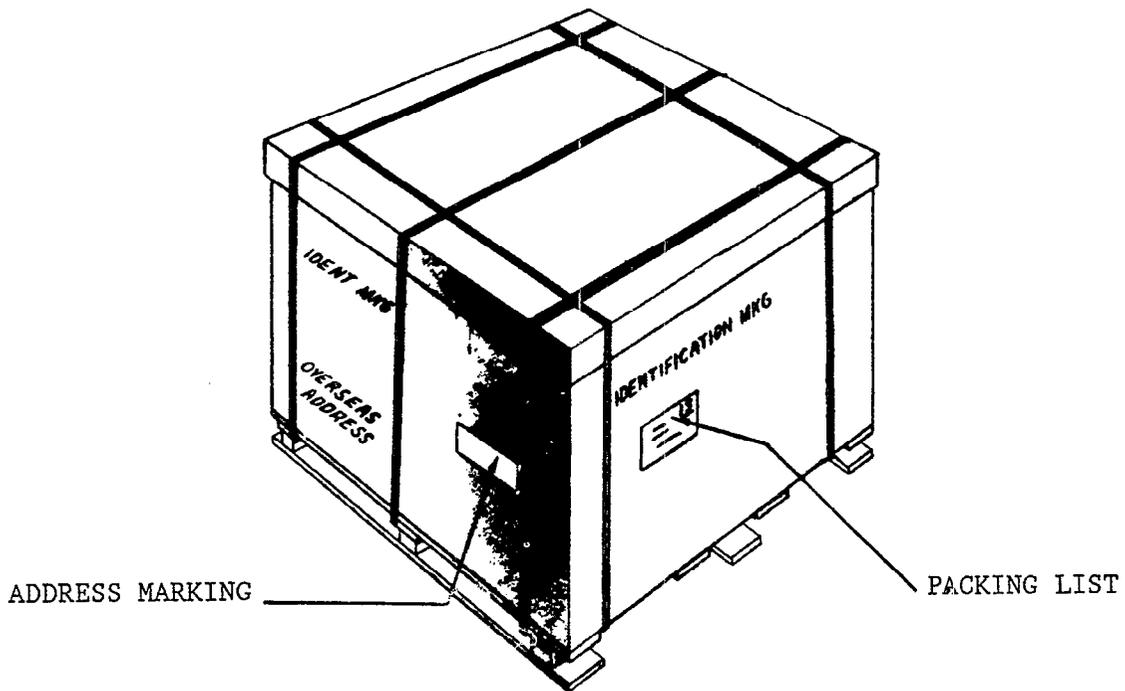


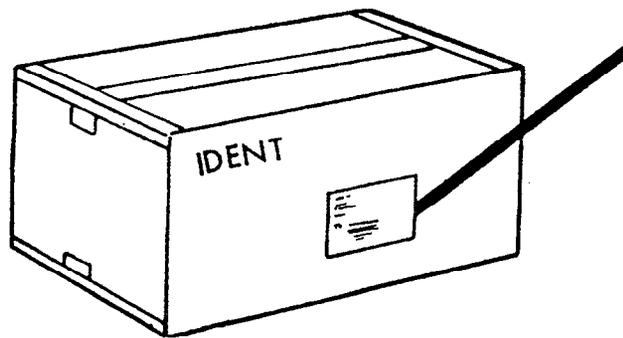
Figure 16
Marking Requirements and Strapping Pattern for Consolidated Loads

7.7 PARCEL POST PACKAGING

7.7.1 PARCEL POST PACKAGES. Parcel post packages (U.S. Mail, Fourth Class) are suitable for shipping small items limited to the U.S. Postal Regulations. Fourth Class includes printed matter and other lightweight items weighing from one pound up to 70 pounds. Parcels are limited to 108 inches in length and girth: Measure the longest side of the parcel to get the length; measure around the thickest part of the parcel to get the girth; add the length and girth. Metal, wood, and fiberboard containers, cartons and bags are acceptable when the type of load is appropriate to the weight limitations of the type of container selected. The U.S. Postal Manual requires that parcels must be packed in boxes or containers of metal, wood or good quality fiberboard.

7.7.2 CLOSING, MARKING, AND SHIPMENT OF PARCELS. The flaps, tops or covers of parcels shall be secured by stapling or taping. Parcel post packages shall be marked in accordance with Figure 17. Unserviceable items having an MPD 03/06 shall be shipped to the DOP by "priority" mail and items with MPD 13 will be shipped by regular parcel post. Boxes should be reinforced with strapping tape. Two special precautions are in order:

- (1) Allow no projecting nails, staples or anything sharp
- (2) Be sure that nothing appears on the address block below the City, State and Zip Code.



DEPARTMENT OF THE NAVY

COMMANDING OFFICER
USS JOHN PAUL JONES
FPO SAN FRANCISCO 96610

OFFICIAL BUSINESS

OPNAV 5216/148 (2-73)
S/N 0107-778-8130

R52192-5098-3055

M/F RECEIVING OFFICER / NRFI /
PRIORITY MAIL

MAILING ADDRESS LABEL. Address labels shall contain the following information:

1. Consignor (Shipping Activity)
2. Consignee (Receiving Activity)
3. Mark for (when specified) (in the lower left corner)

Figure 17
Parcel Post Shipments

7.7.3 PACKING LISTS FOR REGISTERED MAIL. When attaching shipping papers to registered mail packages, place the papers in an envelope and locate the unsealed envelope under the box flaps. The envelope flap shall extend down the box edge and be covered by the tape that seals the box. The words "PAPER HERE" in 1/2-inch high letters shall be placed on the tape directly over the envelope containing the papers.

7.7.4 CONSOLIDATED PARCEL POST PACKS. An additional workload is incurred in opening and sorting the contents of all parcel post consolidated packs. Whenever possible, send a separate package for each requisitioner. Otherwise, mark "MULTIPACK" on the consolidated parcel post shipments containing items for a "ship to" consignee and other adjacent requisitioners.

7.7.5 PARCEL POST SHIPMENT OF REUSABLE METAL SHIPPING CONTAINERS. Reusable metal containers with split-ring bolt closure type cans and drums, when used for shipping commodities by mail, will damage mail bags and other mail unless their projections are cushioned. (See Figure 18 shown below.) When enclosed in mail bags, the projections and bolts cut the canvas or nylon fabric of the bags while the bags are being handled and while in transit. Other mail is also damaged by the container projections and sharp edges. Metal containers are mailable only when adequately cushioned and overpacked. Protrusions and sharp edges of containers; cans, and drums will be wrapped, taped, cushioned, or otherwise securely covered to prevent damage to other mail and postal equipment and to prevent injury to handling personnel. Small metal containers should be overpacked in fiberboard boxes when this extra precaution is considered necessary. When overpacked, containers should be secured within the fiberboard box with fiberboard or other suitable dunnage.

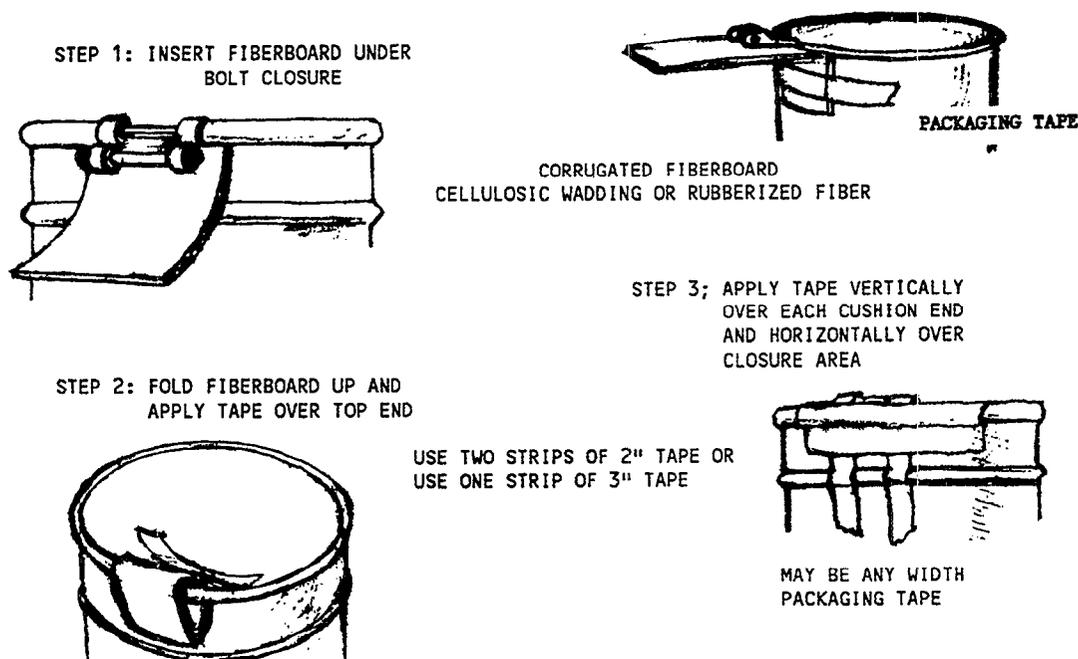


Figure 18
Procedure for Safeguarding Bolt Closure Type Drum

7.8 HAZARDOUS MATERIALS. Hazardous materials packaging is beyond the scope of this publication. However, storekeepers and technicians alike will benefit from an awareness of the requirements for packaging, handling and stowing these materials.

a. "Hazardous material" refers to any material regulated by the Code of Federal Regulations, Titles 29 CFR, 40 CFR and 49 CFR. The International Civil Aviation Organization (ICAO), the IMDG (International Maritime Dangerous Goods) Code lists items requiring specific labeling, marking and shipboard stowage.

b. Shipments of hazardous materials shall be packaged in accordance with the governing document applicable to the mode of transportation for the scheduled shipment. Domestic shipments are regulated by Code of Federal Regulation Title 49 (49 CFR); air shipments are regulated by ICAO rules; water shipments are regulated by the International Maritime Organization (IMO); military air shipments are regulated by NAVSUP Pub 505.

c. Packagings (container and containment components) shall pass all applicable packaging performance tests in accordance with the United Nations' publication entitled "Recommendations on the Transport of Dangerous Goods" as incorporated in 49 CFR, ICAO and IMO regulations. Each package of an acceptable design shall have certificates and test reports denoting performance test compliance and shall be available for inspection by authorized government representatives.

d. NAVSUP Publication 505, Packaging and Materials Handling -- Preparation of Hazardous Materials for Military Air Shipment, provides instructions for preparing, packaging, packing, labeling, and marking explosives and other dangerous materials for safe transportation by military aircraft and may be followed for surface transportation also. It differs from the Department of Transportation and Coast Guard regulations only in the quantity per shipping container permitted for commercial air transportation.

e. Hazardous Material Labels are required for all hazardous materials identified in the manuals listed above in Paragraph 7.8a. Examples of hazardous material labels are contained in Figures 19 through 22.

CAUTION

Yellow

Magenta

RADIOACTIVE MATERIAL

CONTROLLED DISPOSAL REQUIRED

KINDS OF MATERIAL _____

RADIATION LEVELS _____

(Microcuries, Millicuries or Curies)

Date determined _____

(Month, Year)

Figure 19
"Use and Storage Label" For Radioactive Material

HAZARDOUS MATERIALS WARNING LABELS

HAZARDOUS MATERIAL LABELS ARE REQUIRED FOR ALL HAZARDOUS MATERIALS IDENTIFIED IN NAVSUP PUB 505. FOLLOWING ARE THE APPLICABLE NATIONAL STOCK NUMBERS AND FORM NUMBERS FOR THE AUTHORIZED LABEL.

SF 400



NSN 7540-00-118-0032
COLOR - ORANGE

SF 401



NSN 7540-00-118-0083
COLOR - ORANGE

SF 402



NSN 7540-00-118-0113
COLOR - ORANGE

SF 404



NSN 7540-00-118-0231
COLOR - RED

SF 403



NSN 7540-00-118-0156
COLOR - GREEN

SF 405



NSN 7540-00-118-0237
COLOR - RED

SF 406



NSN 7540-00-118-0872
COLOR - RED/WHITE STRIPES

SF 413



NSN 7540-00-118-0583
COLOR - WHITE

SF 414



NSN 7540-00-118-0609
COLOR - YELLOW/WHITE

SF 415



NSN 7540-00-118-0610
COLOR - YELLOW/WHITE

Figure 20
Hazardous Materials Warning Labels

HAZARDOUS MATERIALS WARNING LABELS

SF 411



NSN 7540-00-118-0565
COLOR - WHITE/RED
LETTERS

SF 412



NSN 7540-00-118-0575
COLOR - WHITE

SF 416



NSN 7540-00-118-0611
COLOR - WHITE/BLACK

SF 407



NSN 7540-00-118-0340
COLOR - YELLOW

SF 408



NSN 7540-00-118-0343
COLOR - YELLOW

SF 409



NSN 7540-00-118-0367
COLOR - WHITE

SF 410



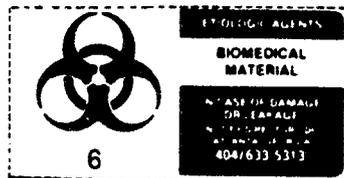
NSN 7540-00-118-0535
COLOR - WHITE

SF 418



NSN 7540-00-118-0614
COLOR - WHITE/RED

SF 420



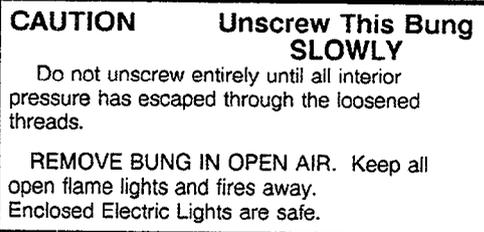
NSN 7540-00-149-0575
COLOR - WHITE/RED

SF 419



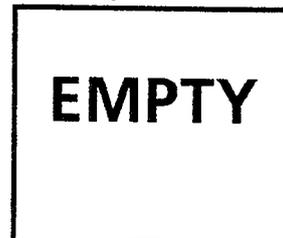
NSN 7540-00-118-0610
COLOR - BLUE

OF 77



NSN 7540-00-139-4761

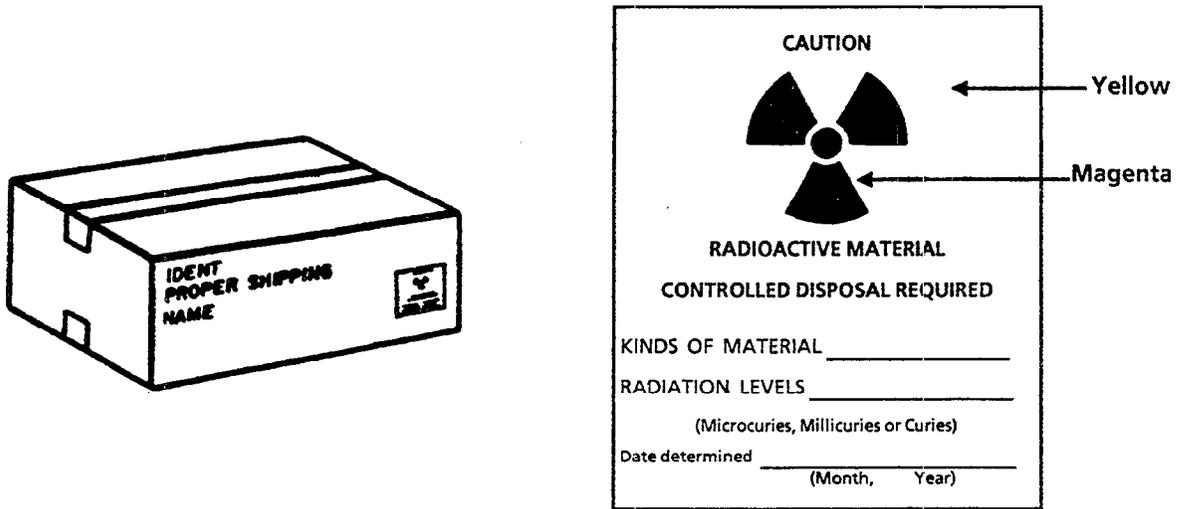
SF 417



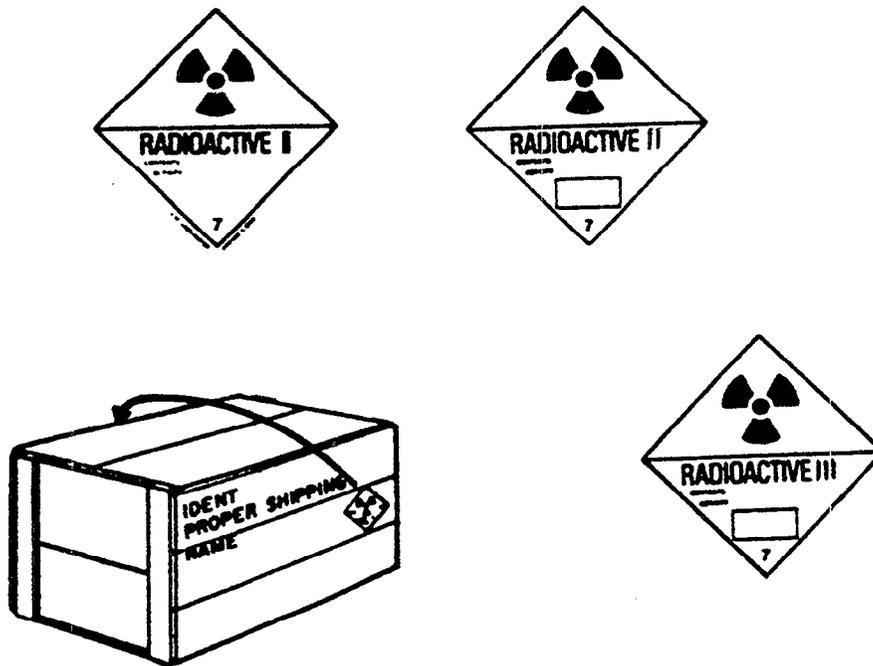
NSN 7540-00-118-0613

Figure 20 - Continued
Hazardous Materials Warning Labels

f. The radioactive material marking, "interior/storage container Label" is shown below in Figure 21, shall be completed and applied to opposite sides of all single unit packaged items. This label shall be removed prior to shipment to preclude any confusion or conflict with the required DOT radioactive label (CFR Title 49) which will be applied to the shipping container.



NRC Interior/Storage Container Label



DOT Radioactive Material Labels

Figure 21
NRC Interior/Storage and DOT Radiative Labels

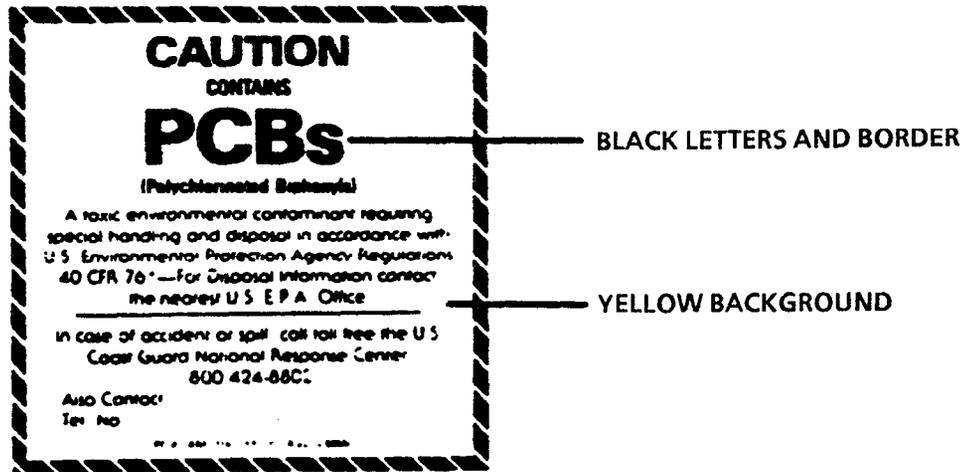
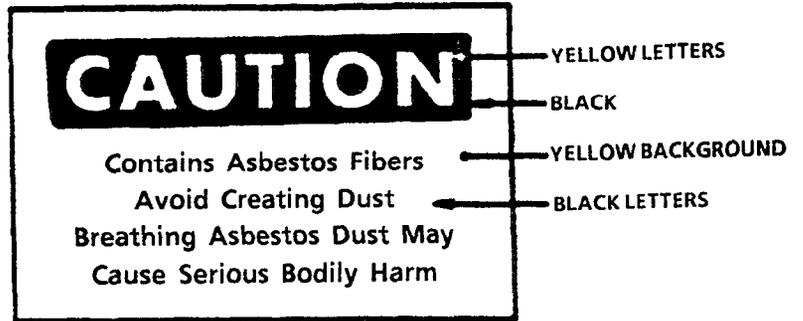
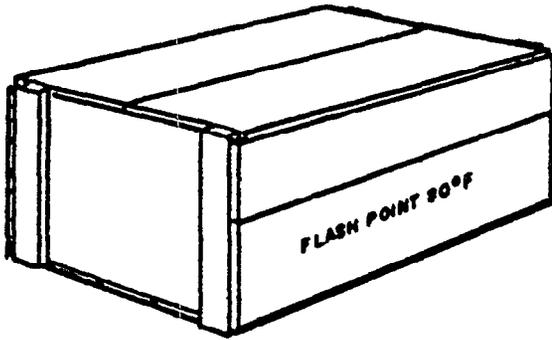
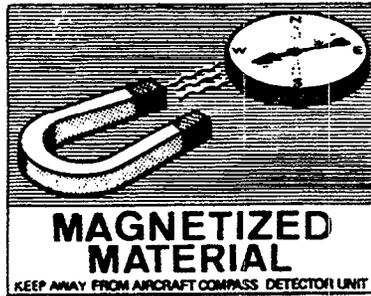


Figure 22
Special Hazardous Material Labels

g. Labels for magnetic materials are contained in Figure 23 shown below. Figure 24 shows other special marking requirements and labels.

Segregation of hazardous materials for transportation, handling and storage shall be accomplished by following the compatibility chart contained in CFR Title 49, beginning with the 1991 edition.

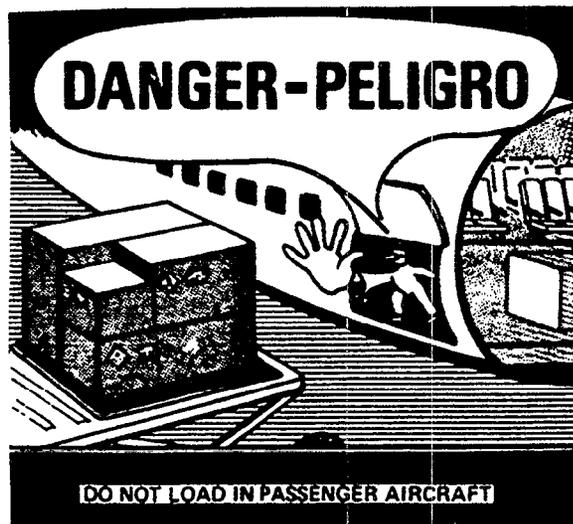


Nomenclature-Magnetized Material (For Surface and Air Shipment)
 This is a blue label, 3-9/16" x 4-5/16", symbols are white
 Stock No - 7540-00-021-7387, Form No - SF 422



Nomenclature - Magnetic (50 foot) 5" x 4"
 Stock No - 7540-00-139-4777
 Form No - OF 78

Magnetic (50 ft) 10" x 8"
 7540-00-139-4784
 Form No - OF 79



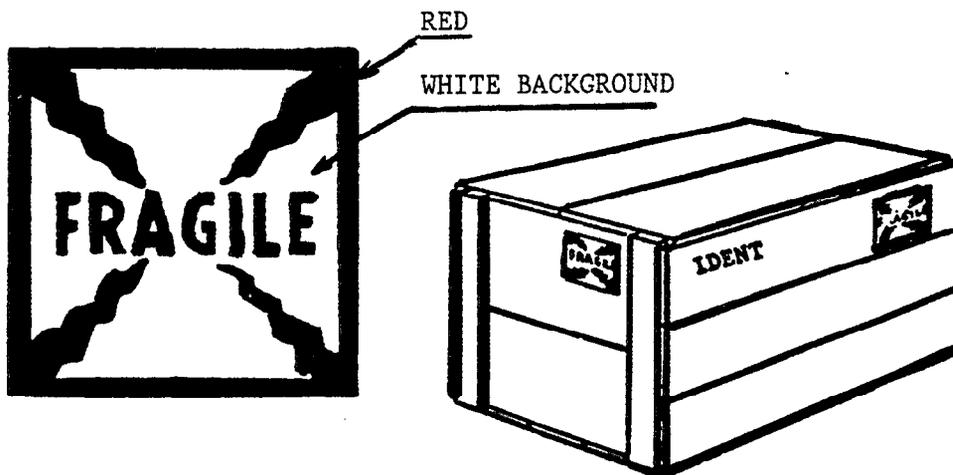
Nomenclature - Cargo Aircraft Only
 This label is printed in black, with black and orange symbols
 Stock No - 7540-01-053-8869 (Adhesive) 7540-01-021-7389 (Nonadhesive)
 Form No - SF 420

Figure 23
 Labels for Magnetic Materials

SPECIAL MARKINGS

Markings such as Top, Up, This Side Up, Glass, Keep Dry, Perishable, Keep Frozen, Fragile or other special marking shall be placed on shipping containers when applicable.

EXAMPLES



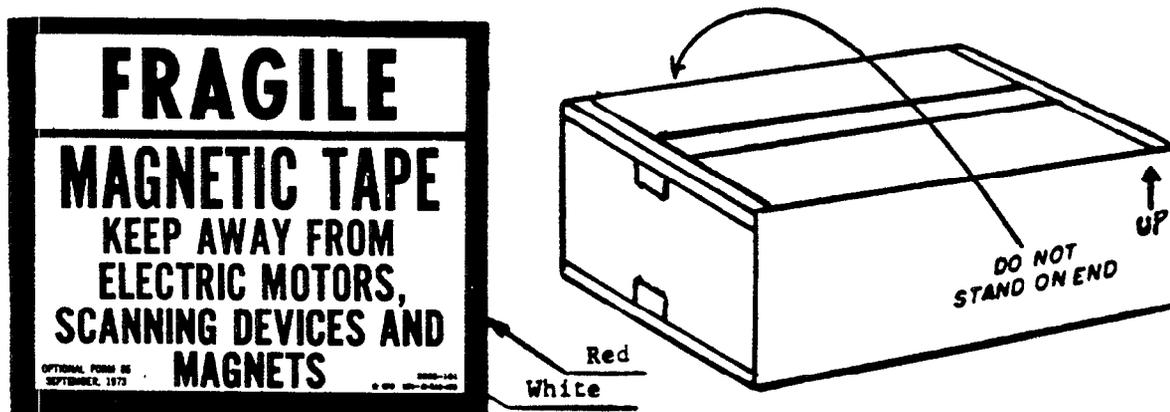
Order Labels as Follows:

Fragile

9Q 7540-00-139-4728 (2-1/2" x 2-1/2")

9Q 7540-00-139-4733 (6" x 6")

9Q 7540-00-139-4734 (4" x 4")



Fragile, Magnetic Tape

9Q 7540-00-133-4312 (4-3/4" x 4")

Magnetic tape with data. The Magnetic tape label shown below shall be applied to shipping containers containing magnetic tape with data. Two labels shall be applied to each container affixed to opposite sides.

Figure 24
SPECIAL MARKING LABELS

8. AFLOAT PACKAGING TECHNIQUES

8.1 REUSE OF ORIGINAL PACKAGING

a. Always retain and reuse specially designed reusable containers (see 8.1.1) which include the required molded or die-cut cushion pads. These containers are stock numbered and taken up on the Inventory Control Activities stock records in the same manner as the item contained. The packaging purpose can readily be identified by reading the permanent nameplates on the exterior surface. Never dispose, survey or "deep six" these containers. Most of them are designed to satisfactorily withstand 100 trips.

b. Always retain and reuse containers which have reuse capability, such as wood boxes and crates equipped with special blocking, or bracing and reusable containers which incorporate custom cut cushion pads.

c. Most cushioning material can be reused more than once without sacrificing efficiency. Since space limitations restrict the saving of all cushioning material, save that cushioning material that is:

- (1) specially formed or shaped to fit a specific item
- (2) most versatile and can be used for many different applications
- (3) not generally available from normal supply sources (ship and shore)

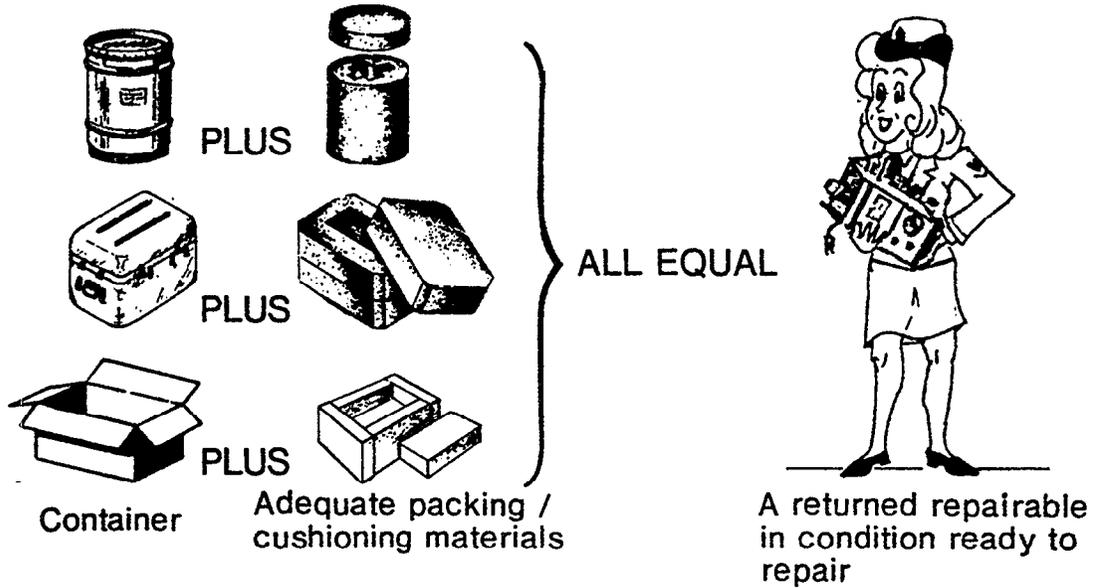
DO'S AND DON'TS ON REUSE OF REUSABLE CONTAINERS (See Figure 25 shown on page 34 for additional examples.)

DO check nameplate on exterior of reusable containers to determine that the container is the correct container for the correct item.

DO remove or obliterate old markings on reusable container.

DON'T place the retrograde component into an oversized cavity of a multipurpose reusable container. Always make sure that the item fits snugly in the cavity by use of additional wrapping or cushioning material.

Some examples of good packaging –



Some examples of bad packaging –

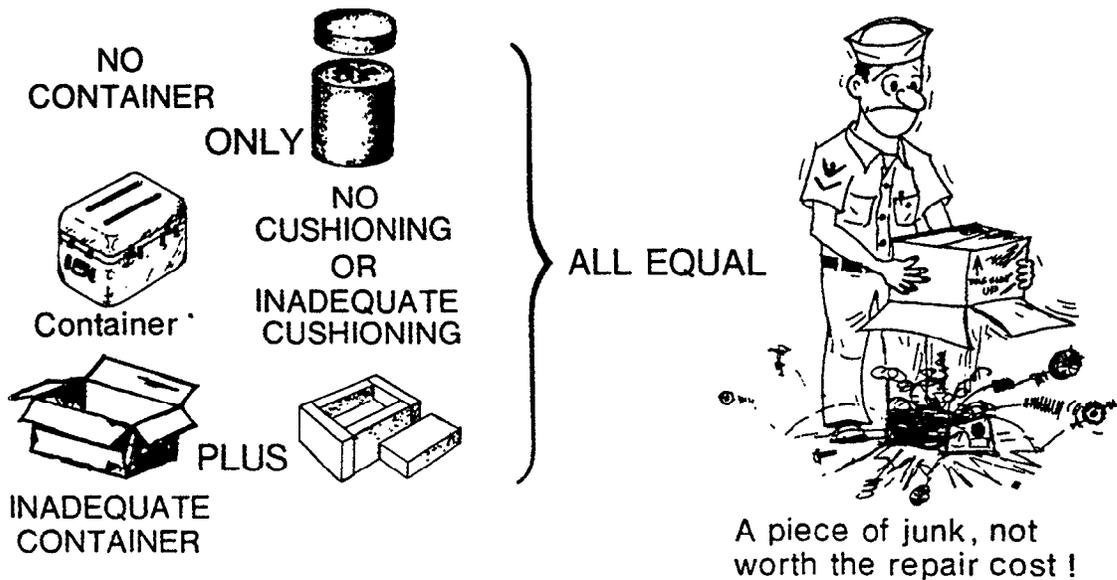


Figure 25
Afloat Packaging Techniques

8.1.1 SPECIALIZED REUSABLE CONTAINERS. High value items of fragile and delicate nature are provided with special containers. Specialized containers vary in type, construction, and use. Figure 26, illustrated below, shows a container with the item strapped to a platform held with shock-mitigating coil spring devices. Figure 27, also shown below, illustrates a package and container for printed circuit board assemblies. This is an excellent container for gyros or other delicate instruments. Figure 28 illustrated on page 36 shows a general purpose container lined with molded foam cushioning material. This is an excellent container for optical or other delicate instruments.

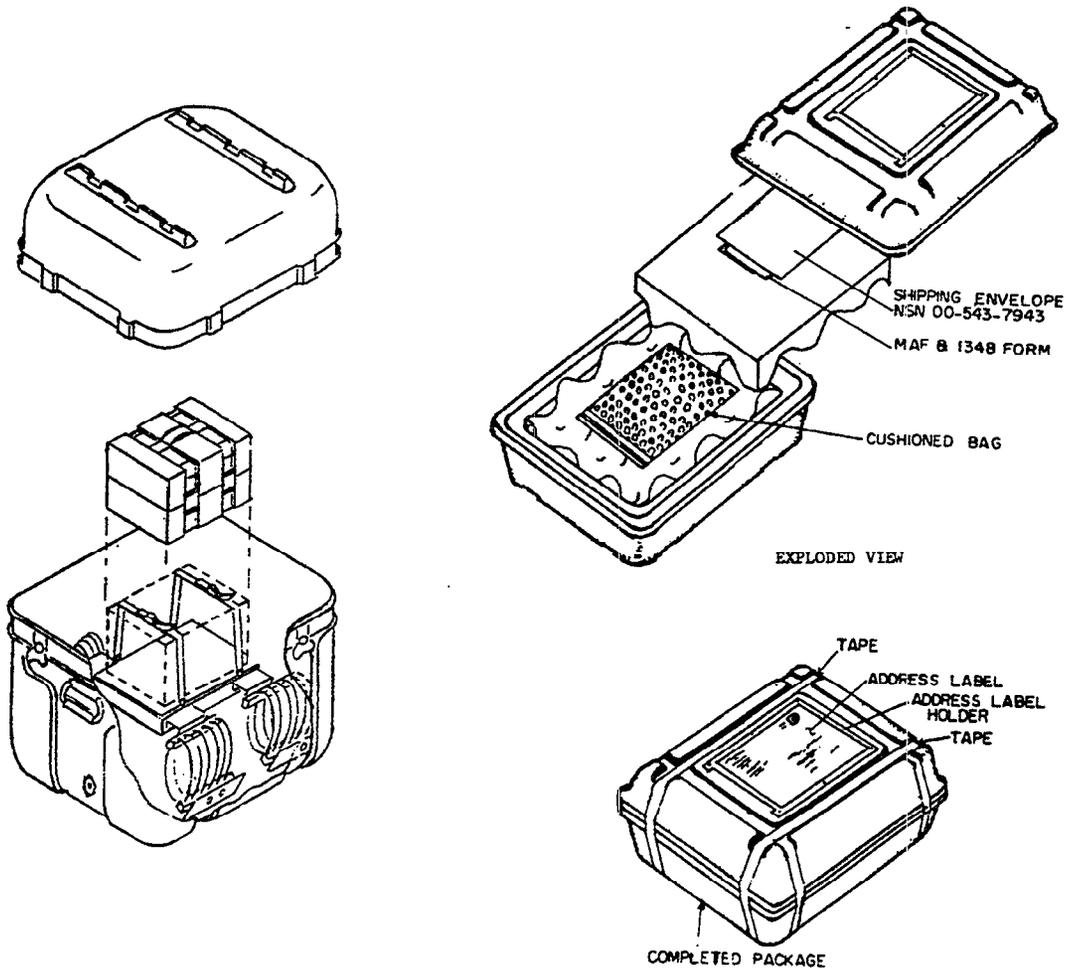


Figure 26
Reusable Container
For Fragile or
Delicate Items

Figure 27
Package and Container
For Printed Circuit
Board Assembly

These reusable containers have been specially engineered and designed for sensitive, fragile items. All items having a special designated container assigned must be in that container when handled, transported, or placed in storage. If an item has been assigned a special container, the National Identification Item Number (NIIN) of the container will be listed in the notes column of the Master Repairable Item List (MRIL) or ASO Publication CN-01, Section No. C0030, Packaging Data for ASO and NAVAIR Repairable Assemblies.

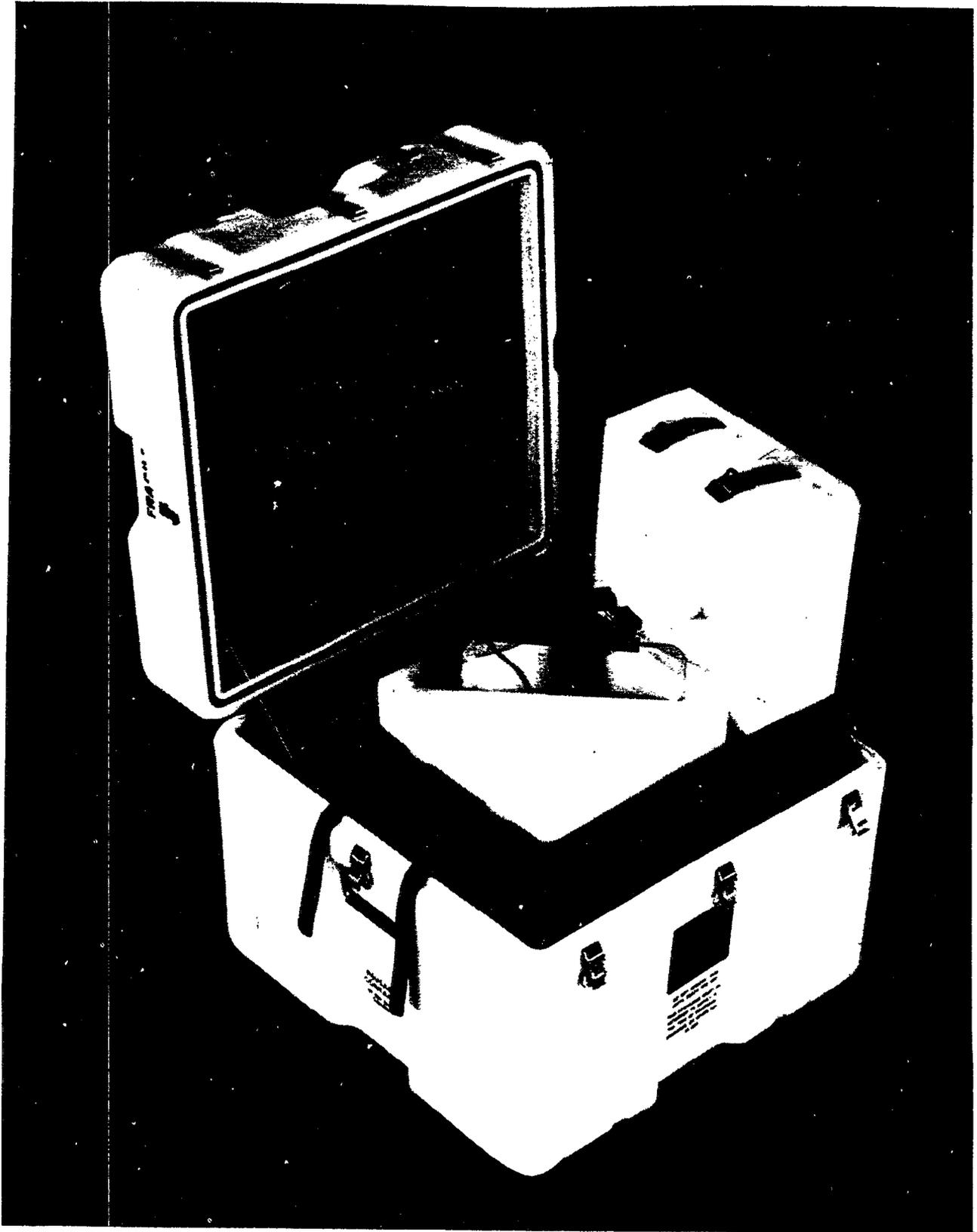


Figure 28
Specialized Reusable Container

8.1.2 LIMITED REUSE. Reusable containers, when properly used, are an important tool in protecting components from handling and shipping damage. One of the best containers available is the original container of a new item. Caution must be exercised in opening the container as shown below in Figure 29 if the container is made from fiberboard. All cushioning, blocking, and bracing material must be retained and used with the item being turned in.

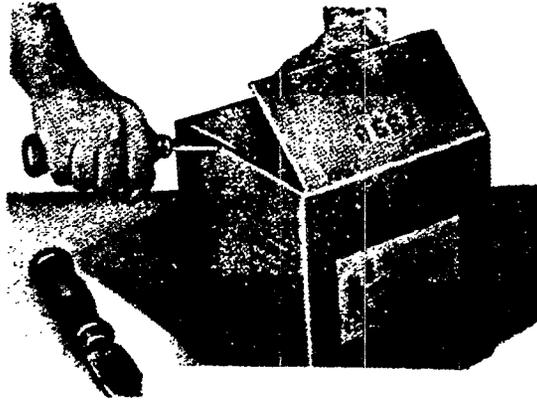


Figure 29
Reuse Cartons

Caution must be exercised when removing nails, bolts, or any attaching hardware from wood containers as shown in Figure 30 below.

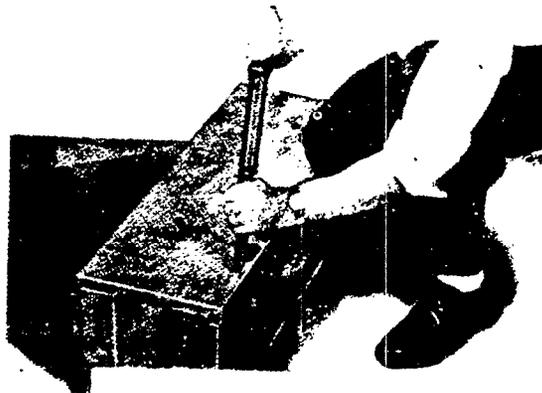


Figure 30
Reuse Boxes

IMPORTANT: All labels not pertaining to the item being repackaged must be removed or obliterated.

8.1.2a. Metal Drums. Metal drums are excellent reusable containers. They are available in various sizes and may be used to pack any number of turn-in repairables. (See Figure 31 shown below.) Give the item maximum physical protection and insure a snug fit at all times. For most applications, a minimum of three (3) inches of cushioning is recommended.

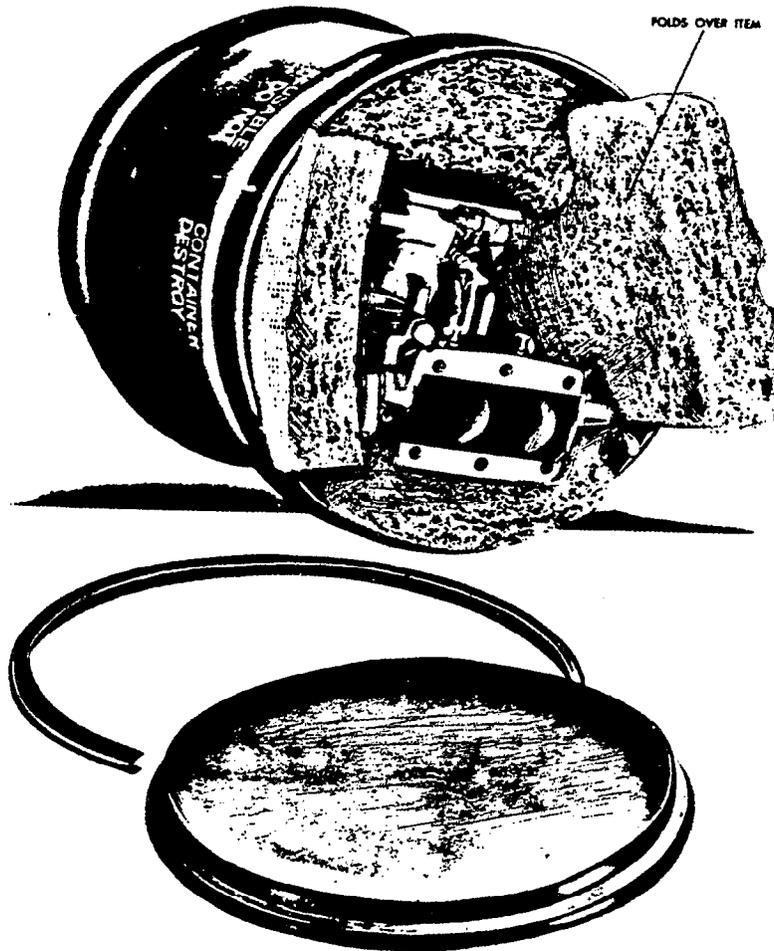


Figure 31
Reuse of Metal Drums

8.1.2b. Fastpack. The containers shown in Figures 32 and 33 illustrated below are examples of excellent reusable containers for relatively small, delicate items. These containers have foam cushioning material fitted to the container. Figure 34 shown on page 40 is an example of one type of reusable container which can be used for ESDS material and other electronic items. Further details of this container and packaging are found in MS-90363.

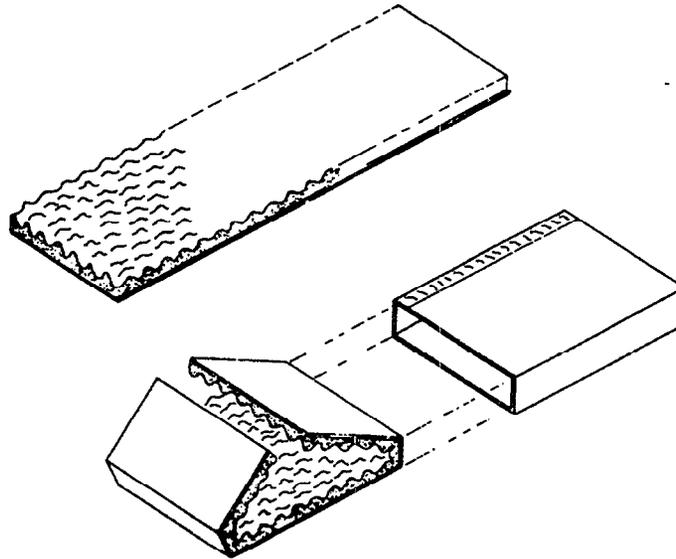


Figure 32
Reusable Fastpack Container

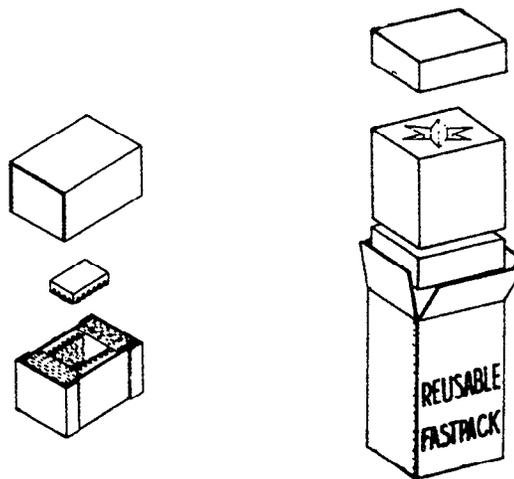
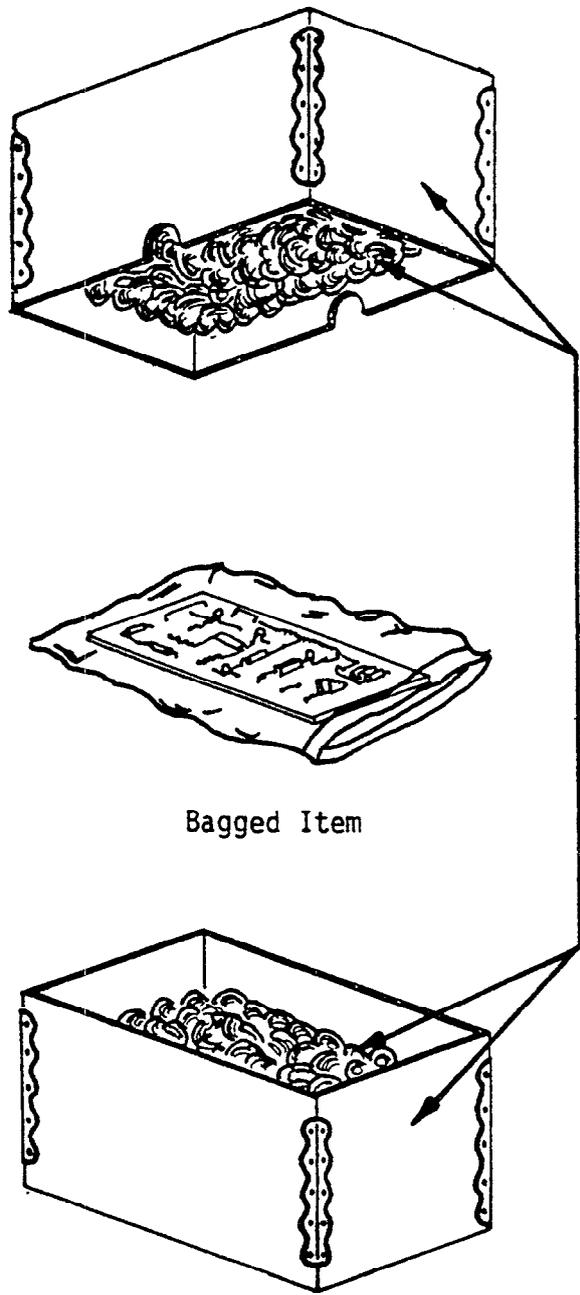


Figure 33
Reusable Fastpack Container

8.1.2c. Metal-Stayed Container. This container should be saved and reused to return unserviceable/repairable items. It is normally used to package electronic repairable items. ESDS items previously packaged in accordance with Figure 5 as shown under paragraph 7.4.c, could be safely stored/shipped in these containers.



Cushioning Choices

Preferred because of Fire Retardant Properties

PPP-C-795 Flexible Cellular Plastic
PPP-C-1120 Uncompressed Bound Fiber

PPP-C-1797 Unicellular Polypropylene Foam

Two-piece, metal stayed, paperboard box (full telescope) with two pieces of convoluted polyurethane foam

Instruction for Reuse

1. Place unserviceable item in bag and close by any suitable manner.
2. Place bagged item in box and secure box halves with pressure sensitive tape.
3. Identify box as shown in marking section.

Figure 34
Metal-Stayed Container

8.2 USE OF ONBOARD STOCKED MATERIAL

8.2.1 CUSHIONING REQUIREMENTS. The application of the proper amount of cushioning is a function of the item weight and bearing surface, item fragility and anticipated shipping hazards. Since the shipboard packer will not have all this information available, the following guidance is provided.

**TABLE I
CUSHIONING SELECTION**

I POLYURETHANE		II RUBBERIZED FIBER	
Item Weight (lbs)	Surface Area (square inches)	Item Weight (lbs)	Surface Area (square inches)
<u>2" Thick</u>		<u>2" Thick</u>	
0.5-1	4-8	0.5-1	8-20
2-3	10-24	2-3	32-60
4-5	18-45	4-5	70-110
6-7	28-60	6-9	100-140
8-9	36-80		
10-12	45-110		<u>3" Thick</u>
14-16	70-140		
18-30	90-140		
<u>3" Thick</u>			
4-6	6-10	2-3	18-28
7-9	12-16	4-5	36-45
10-14	16-24	6-7	50-60
16-20	24-36	8-10	70-90
25-30	40-55	12-16	100-140
35-40	55-70		
<u>4" Thick</u>			<u>4" Thick</u>
3-8	4-8	0.5-1	4-16
9-16	10-18	3-6	20-45
18-25	18-28	7-9	45-70
30-40	28-45	10-12	70-90
		14-16	90-120
		18-20	110-140

I POLYURETHANE Foam can be identified by its soft, spongy, resilient nature

II RUBBERIZED Fiber can be identified by its fibrous appearance.

USERS GUIDE -- LOCATE ON TABLE

(A) -- Surface Area (Square inch) of item determined by:

Length X Width = top or base area in square inches

Length X Height = side area in square inches

Width X Height = end area in square inches

(B) -- Using smallest square inch area as determined in Step (A) and according to weight of item, select greatest thickness of available material for maximum protection.

NOTE: AN EQUAL THICKNESS OF WRAPPING MATERIAL HAVING EQUIVALENT RESILIENCY MAY BE SUBSTITUTED FOR THE ABOVE.

8.2.2 CUSHIONING COMPOSITION GUIDE. When alternative cushioning materials are available, it is recommended a cushioning wrap such as cellulosic wadding or fire retardant "bubble wrap" be used for a cushioning thickness of one (1) inch or less and that slab material such as "rubberized fiber" be used for a cushioning thickness exceeding an inch. When choice is not available, use any available material, except loosefill materials such as styrofoam peanuts or shredded paper. Cushioning thickness may be increased or decreased based on the following considerations:

a. **Size.** A large item may not require as thick a layer of cushioning as a smaller item of the same weight because there is less weight per square inch applied to the cushioning. This should be kept in mind when an item is irregular in shape -- more cushioning will be required at the small end than at the large end.

b. **Shape.** A regular-shaped item will ordinarily fit snugly into a container with a minimum of cushioning, while an irregular shaped one may require a complicated arrangement of pads and cells or foam-in-place cushioning to bring it to a more regular shape. Light, small items which are irregular in shape can be made regular and at the same time positioned and held in the container merely by a wrap of cushioning material. Large, irregular items may make it impractical to use cushioning materials to make them regular. Blocking and bracing must be used in addition to cushioning to protect such items.

c. **Item Composition.** Fragile items or items sensitive to electrostatic discharge will require maximum protection, but a heavy gear or bar stock will require less protection. There is no substitute for common sense.

8.2.3 CUSHIONING APPLICATIONS AND TECHNIQUES. Typical applications for cushioning materials are shown in Figure 35 (page 43) and "how to" techniques are shown in Figure 36 (page 44). Loosefill materials (i.e., styrofoam "peanuts", shredded paper) are not permitted.

8.3 FIRE RETARDANT AND NONPLASTIC PACKAGING MATERIALS

8.3.1 SUPPLY ITEMS. With the exception of some packaging materials used to protect ESDS and other special items, packaging materials stowed aboard Navy ships shall be both fire retardant and nonplastic in accordance with NAVSUP Instructions 4030.47 and 4030.54. Supply items already packaged at source, need not be repackaged for this purpose alone. However, when repackaging is required, packaging materials should be both fire retardant and non plastic when possible.

8.3.2 BULK PACKAGING MATERIALS. Bulk packaging materials stowed aboard Navy ships for the ship's own use, must be fire retardant, but need not be nonplastic. These materials will be used to protect supply items aboard ship, for handling during offloading to a shore facility, and during shipment to ultimate destination. These materials will not be discharged into the ocean.

LOOSEFILL DUNNAGE SUCH AS STYROFOAM
"PEANUTS" AND SHREDDED PAPER IS NOT
ACCEPTABLE.

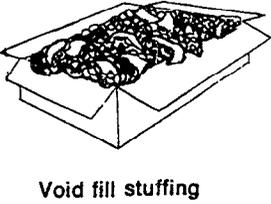
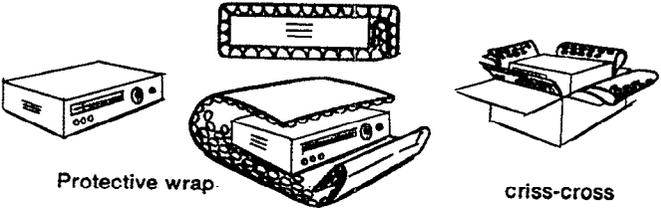
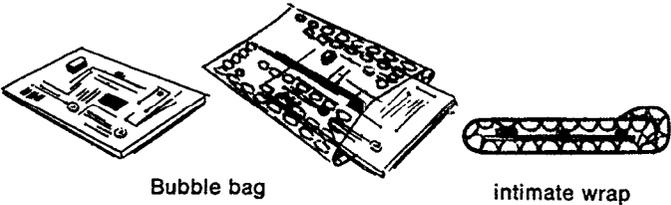


Figure 35
Cushioning Applications

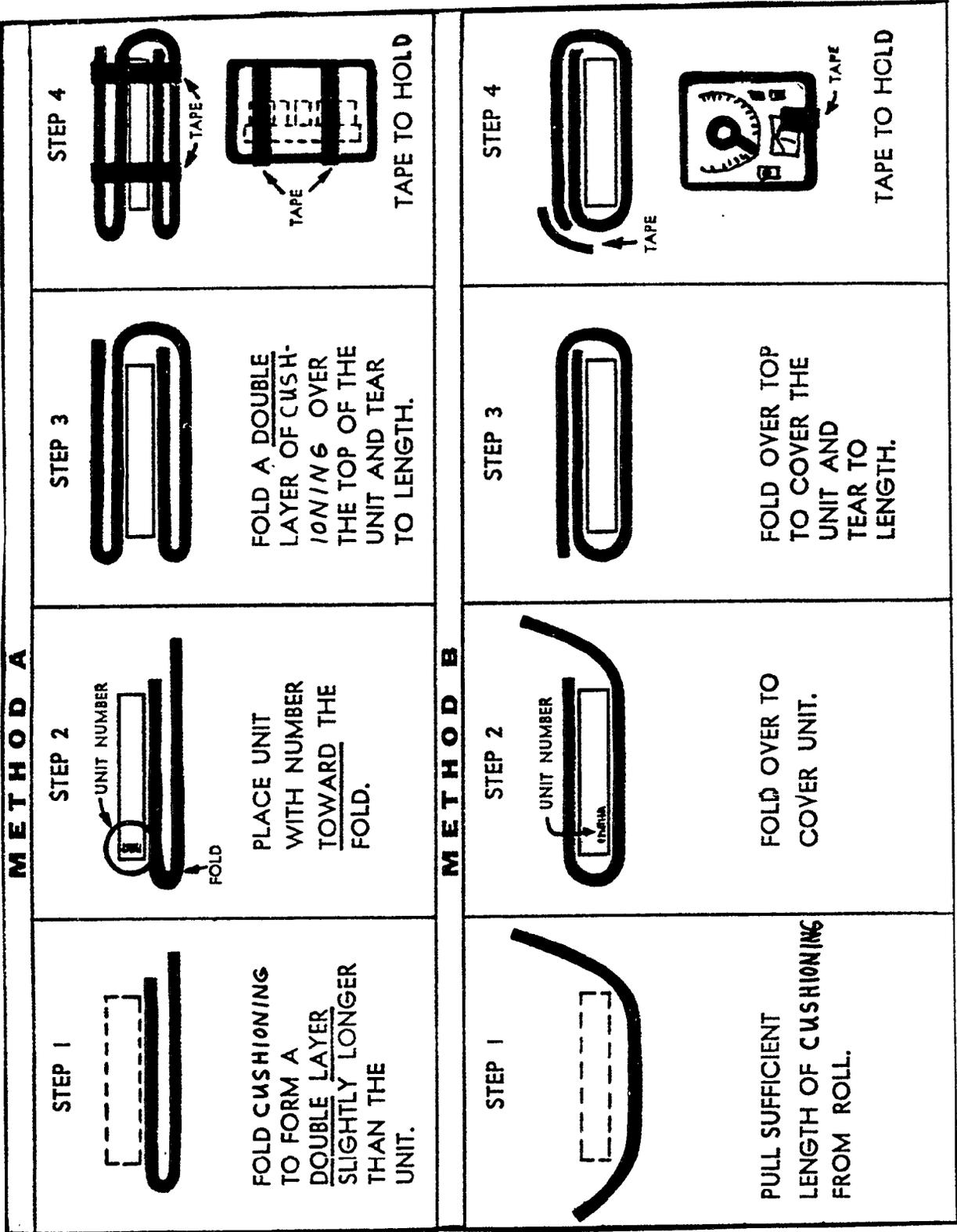


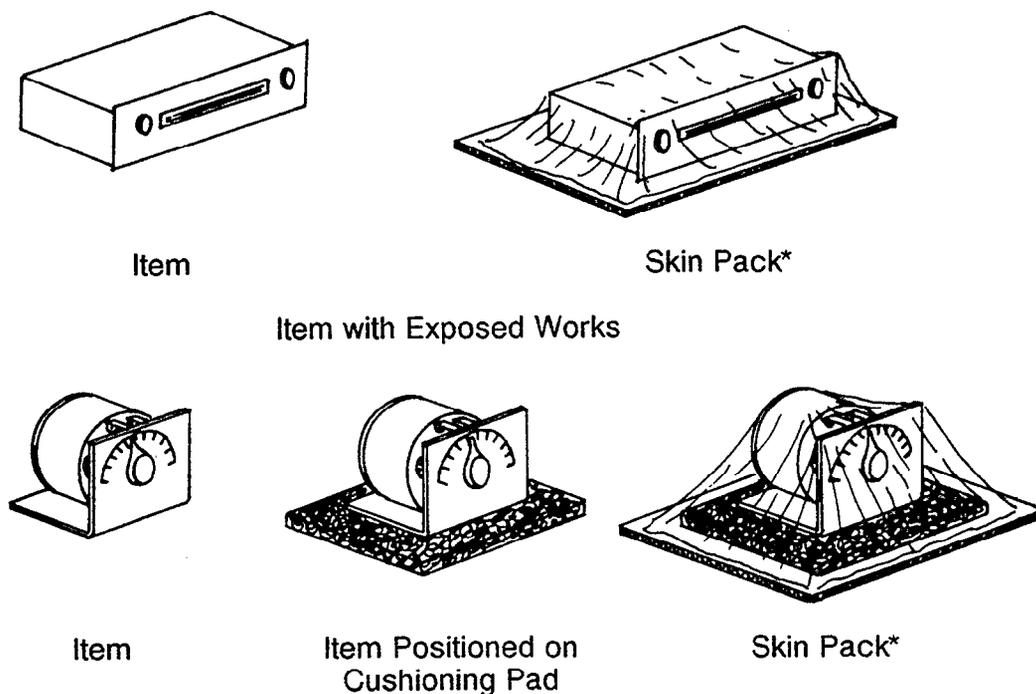
Figure 36
Cushioning Wrap Techniques

8.4 SPECIALIZED ONBOARD PACKAGING TECHNIQUES

An effort is underway to equip larger ships with some new packaging equipment. This equipment is especially suited for shipboard operation because it requires a minimum of working space, is simple and efficient to operate, should reduce volume of onboard stocked materials, and will provide adequate protection to the packaged item when operated properly.

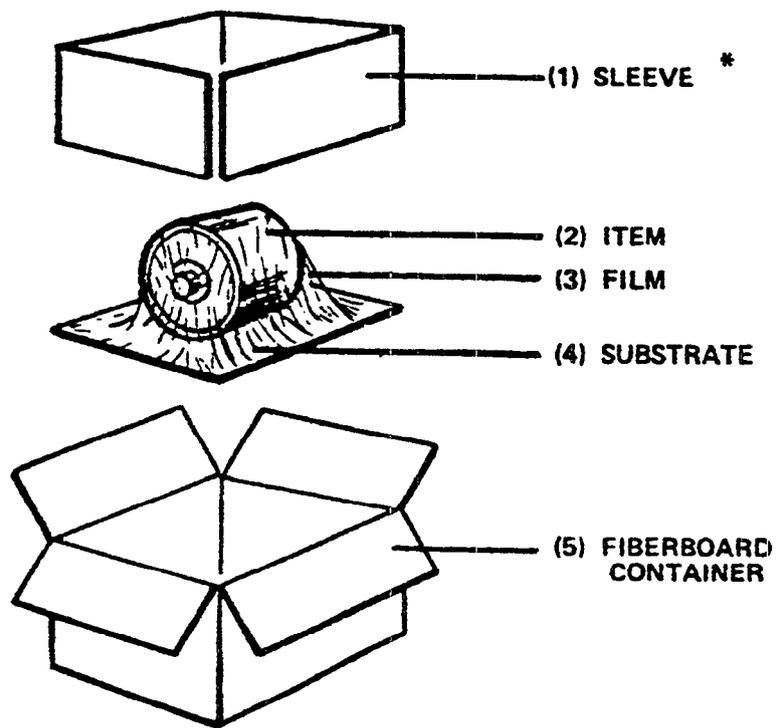
8.4.1 SKIN PACKAGING. This concept uses plastic film and fiberboard cartons manufactured specifically for skin packaging. The equipment consists of a heating element, a platen upon which the work is performed, and a vacuum pump to remove the air from around the item and seal the plastic to the treated fiberboard. The fiberboard cartons are available in six standard sizes. (See paragraph 10.) To perform the packaging operation, one or more cartons, depending on size, are placed on the platen, the item to be packaged is centered on the carton (cushioning may be placed between the item and the carton if required), and the plastic film is locked in the film frame. The rest of the cycle is automatic. The film frame elevates to the heating elements where it is heated to a soft, pliable state; it then descends over the item activating the vacuum pump. The air is drawn from around the item and the plastic is sealed securely to the fiberboard. The item is completely encapsulated in a transparent plastic skin immobilized from contact, abrasion, and shock. After the film is cut, the carton is folded, sealed, labeled, and ready to be mailed. A simplified, step-by-step procedure is shown in Figure 37 below. See Figure 38 (page 47) for recommended skin packaging techniques utilizing the special self-shipper carton (see paragraph 10) and Figure 39 (page 48) for use of the flat-pad technique. Always consult operating manual for detailed instructions.

NOTE: SKIN PACKAGING IS NOT ACCEPTABLE PACKAGING FOR ESDS ITEMS.



* Views show item skin packed to bottom section of folding box.

Figure 37
Skin Packaging Techniques



* Sleeve required to overlap substrate to secure item to bottom of box.

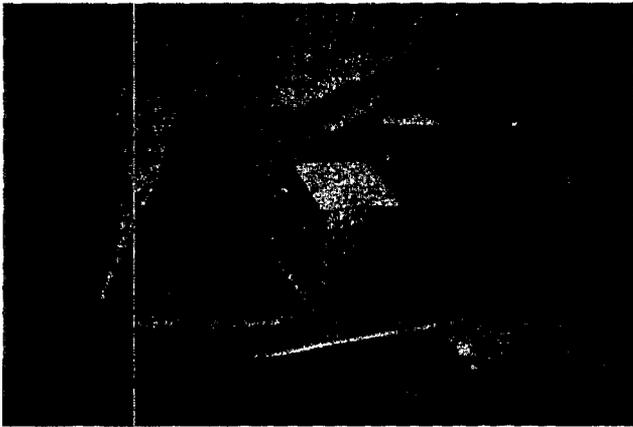
Figure 38
Skinpack



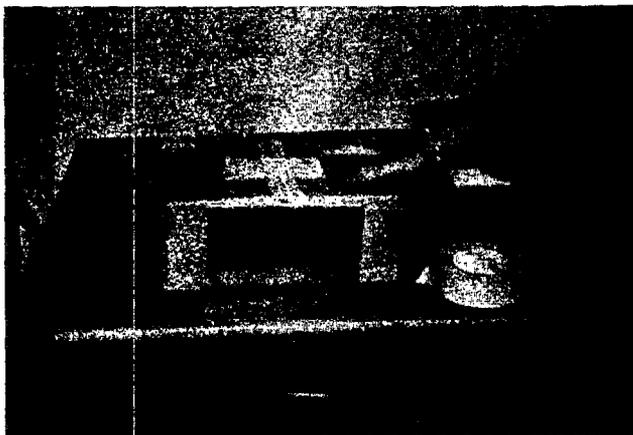
Place carton on machine platen.
Center item to be packaged on
carton base.

Press "start" button...operation
is completely automatic.

Remove completed package - machine
now ready for next cycle.



Insert documentation and close
carton by folding.

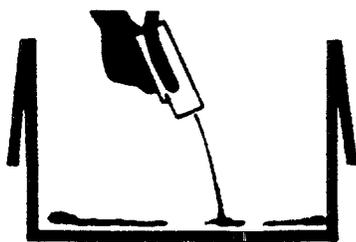


Secure closure by applying tape.

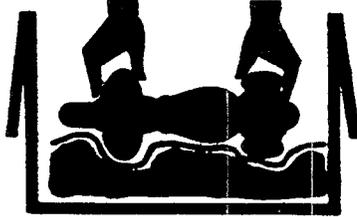
Attach address label and packing
list and package is ready for
shipment.

Figure 39
Skin Packaging Procedure

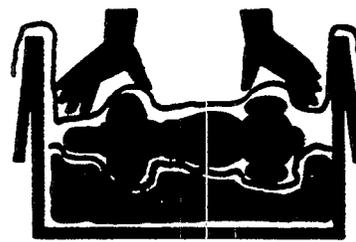
8.4.2 FOAM-IN-PLACE. Foam-in-Place (FIP) may be used to package items too large or too heavy for skin packaging. The equipment consists of two chemicals which are combined under pressure to form a liquid, "Polyurethane Foam." The chemicals will be in nonpressurized containers connected by hoses and a dispensing gun. The system will be activated by air pressure from a built-in compressor or an external source. To perform the packaging operation, select a container of the proper size (See Table 1.) A small amount of liquid is dispensed into the bottom of the container. (See Figure 40, Step 1 shown below.) This begins to expand almost immediately. The exact amount of liquid foam to dispense in a given size container will be determined by experience with the concept. A thin plastic sheet is placed on top of the expanded foam (Step 2) to prevent contact between the foam and the item being packaged. The wrapped item is then placed on the film and another sheet of plastic film is used to cover the item (Step 3). Additional foam is dispensed into the container (Step 4). The top of the box should remain open only long enough to insure that the foam will completely fill all voids. The top should be closed and sealed as soon as this determination is made (Step 5). The container will be labeled or stenciled and shipped to its proper destination. Consult NAVSUP Instruction 4030.34 for detailed techniques, procedures and safety precautions. Table 2 (page 50) lists stock numbers for protective items required when performing foam-in-place operations. Table 3 provides parameters for using Grade A or B Foam.



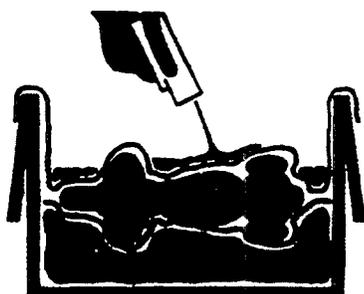
Step 1. Dispense small amount of chemical on case bottom.



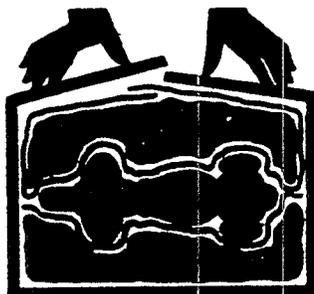
Step 2. As foam expands place sheet of polyethylene film on rising foam and place item on film as foam expands.



Step 3. Place second sheet of film over item.



Step 4. Dispense another small amount of chemical on top sheet.



Step 5. Close case flaps and hold them as foam fills inner sides and top; then seal case.

NOTE: If item has sharp points or projections that could puncture film pad, wrap and cushion item prior to Step 1.

CAUTION: An excessive amount of chemical on top film may cause box flaps to burst open and chemical to burst forth into area of operator. Protective clothing and safety goggles should be worn.

Figure 40
Simplified Afloat Foam-In-Place Packaging Procedure

TABLE 2

STOCK NUMBERS FOR PROTECTIVE CLOTHING

a. FACE SHIELD	9Q 4240-00-542-2048
b. SAFETY GOGGLES	9Q 4240-00-052-3776
c. COVERALLS, DISPOSABLE	
x-Small	9D 8415-00-601-0792
Small	9D 8415-00-601-0793
Medium	9D 8415-00-601-0794
Large	9D 8415-00-601-0797
x-Large	9D 8415-00-601-0801
xx-Large	9D 8415-00-601-0802
d. GLOVES, CHEMICAL AND OIL PROTECTIVE	
Size 9	9D 8415-01-012-9294
Size 10	9D 8415-01-013-7382
Size 11	9D 8415-01-013-7384

NOTE: OPERATE EQUIPMENT IN A WELL-VENTILATED AREA. AVOID EYE AND SKIN CONTACT WITH LIQUID CHEMICALS.

TABLE 3
PARAMETERS FOR USING MIL-F-83671 FOAM

Range 1 2 in. of Foam		Range 2 3 in. of Foam		Range 3 4 in. of Foam		Range 4 5 in. of Foam	
Item	Min Surf						
1	2.5	26	52	51	85	76	110
2	5.0	27	54	52	85	77	110
3	7.5	28	56	53	90	78	110
4	10.0	29	58	54	90	79	115
5	12.5	30	60	55	90	80	115
6	15.0	31	62	56	95	81	115
7	17.5	32	64	57	95	82	115
8	20.0	33	66	58	95	83	120
9	22.5	34	68	59	100	84	120
10	25.0	35	70	60	100	85	120
11	27.5	36	72	61	100	86	125
12	30.0	37	74	62	105	87	125
13	32.5	38	76	63	105	88	125
14	35.0	39	78	64	105	89	125
15	37.5	40	80	65	110	90	130
16	40.0	41	82	66	110	91	130
17	42.5	42	84	67	110	92	130
18	45.0	43	86	68	115	93	135
19	47.5	44	88	69	115	94	135
20	50.0	45	90	70	115	95	135
21	52.5	46	92	71	120	96	135
22	55.0	47	94	72	120	97	140
23	57.5	48	96	73	120	98	140
24	60.0	49	98	74	125	99	140
25	62.5	50	100	75	125	100	140

INSTRUCTIONS FOR USING TABLE. Weight and dimensions are of the item ready for foaming including all wraps, barriers, tapes, pads, adhesive, straps, etc.

1. Item Weight. Determine the total item weight in pounds.
2. Item Bearing Surface Area. Determine the square inches (length X width) of the smallest surface area (bottom, side, or end) of the item.

NOTE: Bearing surface can be increased by affixing item to platform or prepackaging.

3. Compare the item bearing surface area to the minimum surface area required in the table for the item weight. If the item bearing surface equals or exceeds the minimum surface area required for the item weight, use foam thickness shown at top of column.

EXAMPLE: A 15 pound item measures 12 x 8 x 6 inches. Smallest bearing surface is 8 x 6 inches = 48 square inches. Minimum surface area required for 15 pound item = 37.5 sq. inches; therefore, 2 inches of 9.5 pound density foam is required.

8.5 MAKE-DO PACKAGING TECHNIQUES

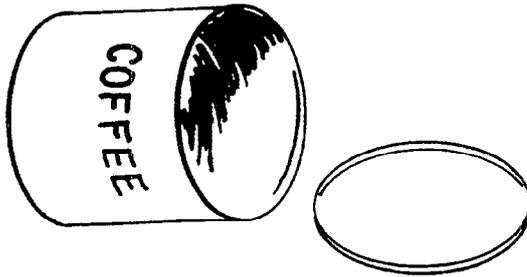
The greatest single source of packaging material is from salvaged reusable containers and packaging materials received with the RFI assets. Save as much as possible, use the deep storage areas, and retrieve when needed. The Ship's Stores area and the galley are good sources for reusable packaging material. A pocket knife and a roll of pressure-sensitive tape can convert a discarded corrugated box into a suitable package by cutting down the scrap box to the size needed and securing the new joints with tape. Make the box of sufficient size to allow for the required thickness of cushioning. (See paragraph 8.2.1.)

REMINDER! Loose-fill materials used as stuffing or cushioning should be returned to proper disposal sites onshore. These materials should not be stowed aboard ship or used in packaging.

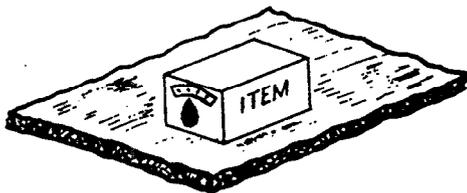
Due to the prohibition of dumping plastics at sea, plastic materials should be saved and reused as wraps/cushioning for packaging material forwarded or returned from ships. ESDS items should not be packaged or cushioned with common plastics. See paragraph 7.4 and Figure 51 as shown under paragraph 8.7 for guidance on the proper repackaging of ESDS material.

The following figures are examples of practical packaging techniques:

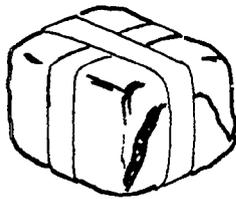
8.5.a. Empty food cans of the appropriate size will provide excellent make-do containers for small repairable items. (See Figure 41 shown below.)



Clean and dry can



Completely wrap item in enough cushioning material to form a snug fit in the can



Secure cushioning

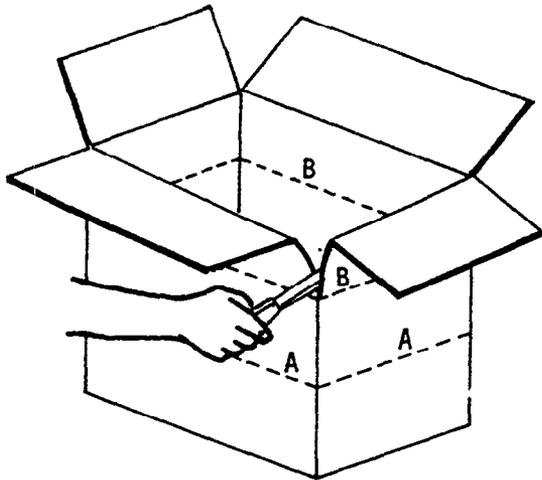


Use the plastic lid or make a lid from fiberboard
Secure with pressure sensitive tape.

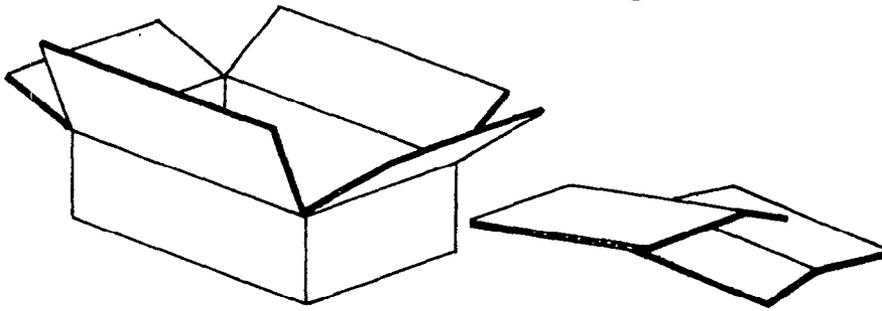
Mark

Figure 41
Reuse of Metal Cans

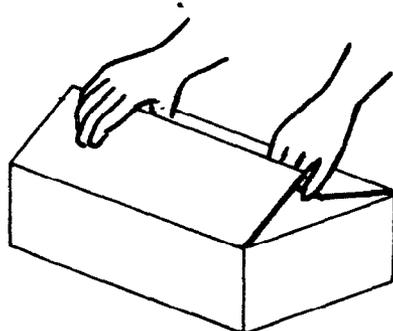
8.5.b. When the correct size container is not available, find a container larger than required and cut to size. Figure 42 shown below illustrates a good method of cutting a fiberboard box to the desired size.



① Mark desired height of box (A). Determine size of top flaps and make second line (B). Split corners to (A).



② Cut along line (B).



③ Fold along line (A).

Figure 42
Reuse of fiberboard box

8.5.c. Fiberboard box liners, as shown in Figure 43 below, are an excellent method of reinforcing a fiberboard container when packing a heavy item. This liner is simple and easy to cut from a piece of fiberboard.

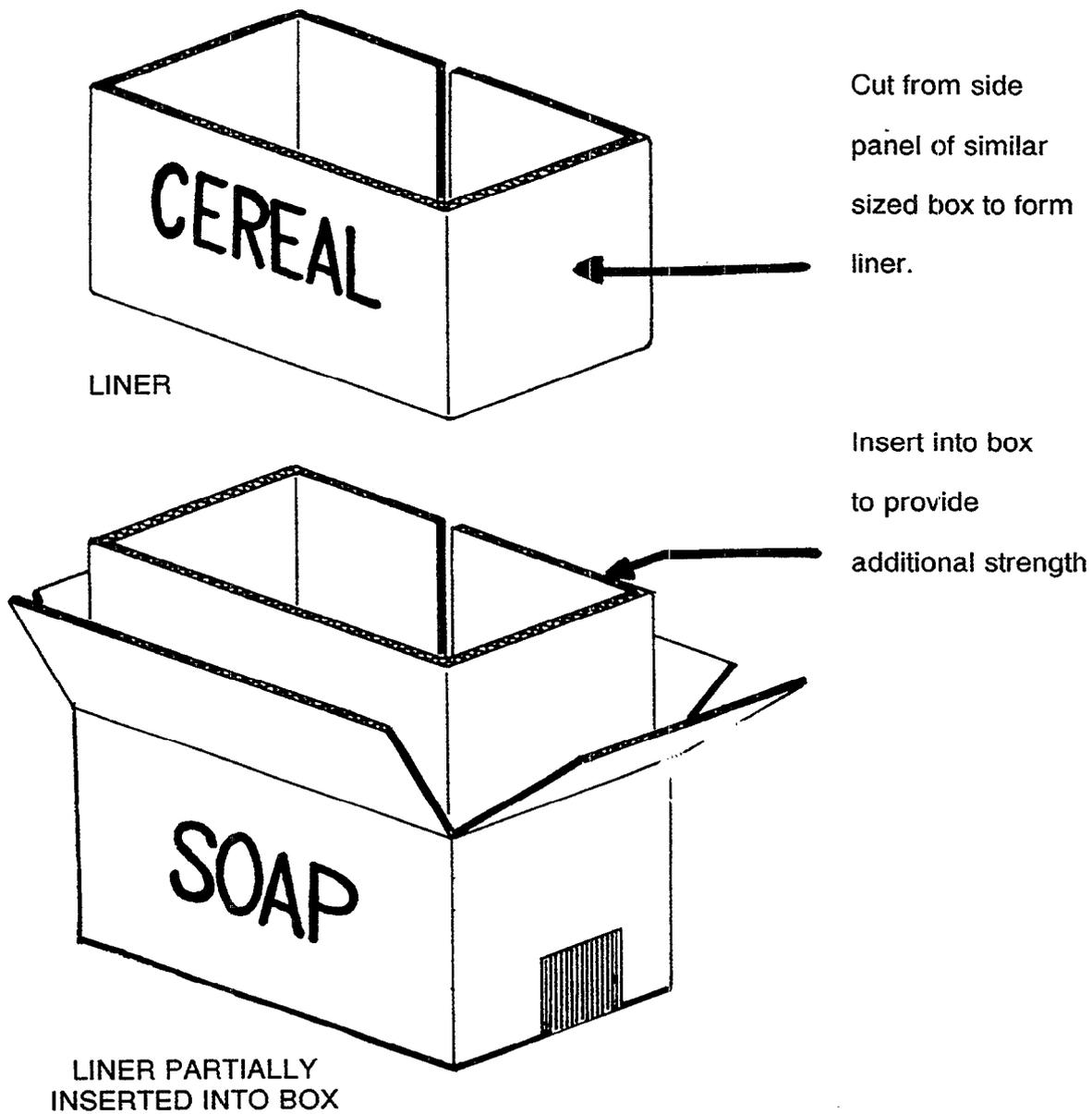


Figure 43
Reuse of Fiberboard

8.5.d. Two different sizes of fiberboard boxes with the flaps removed will fit one over the other as illustrated in Figure 44 below. This makes an excellent container for fragile items.

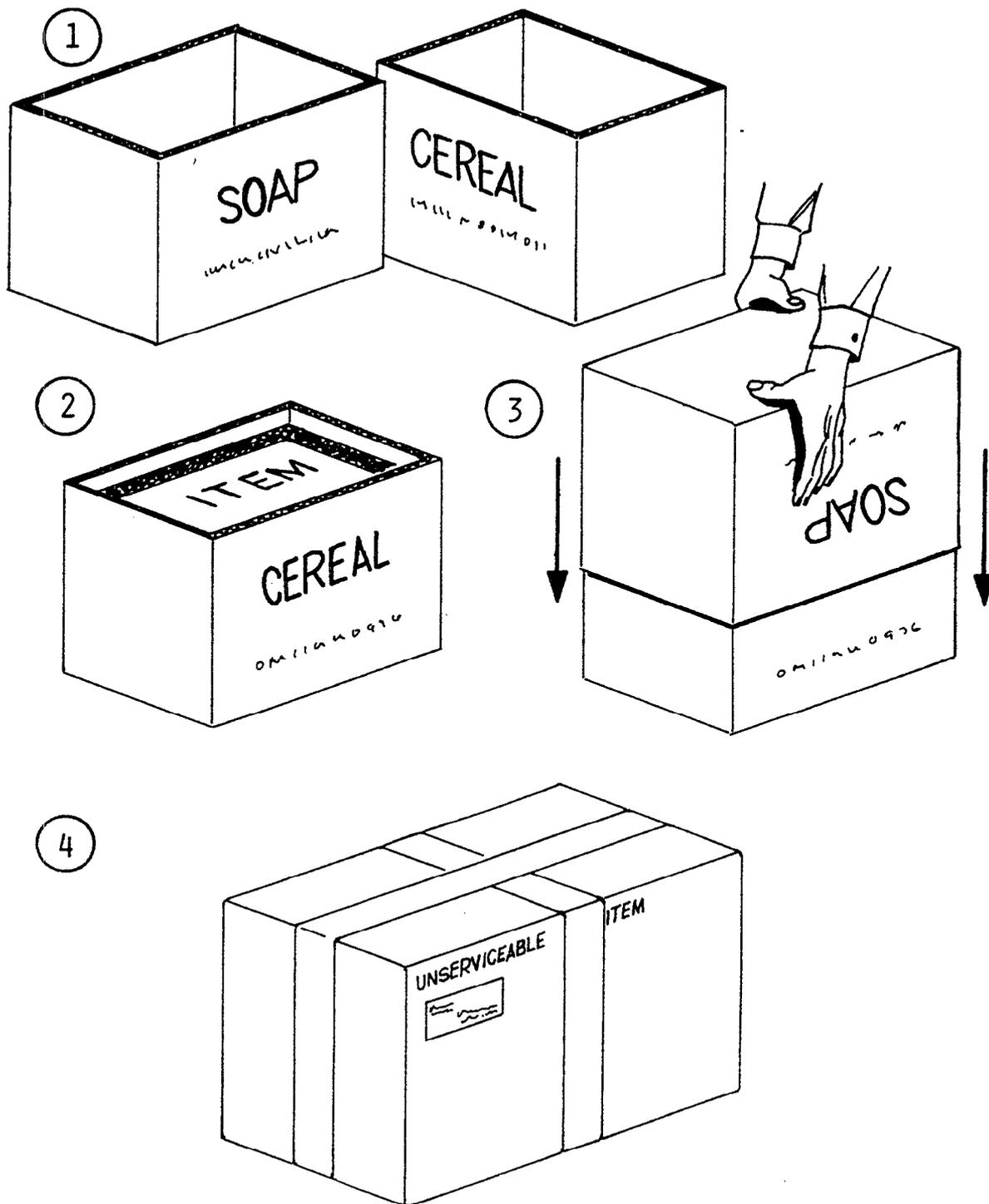


Figure 44
Reuse of Fiberboard Boxes with Flaps Removed

8.5.e. A container alone is not sufficient; cushioning, and blocking and bracing material are also required. The ship's stores and galley are a good place to start looking. Many items are shipped in fiberboard boxes with fiberboard separators. These separators may be formed into excellent pads and cells for blocking and bracing. Figure 45 shown below illustrates many shapes, forms and sizes of cells and pads that may be constructed or reused.

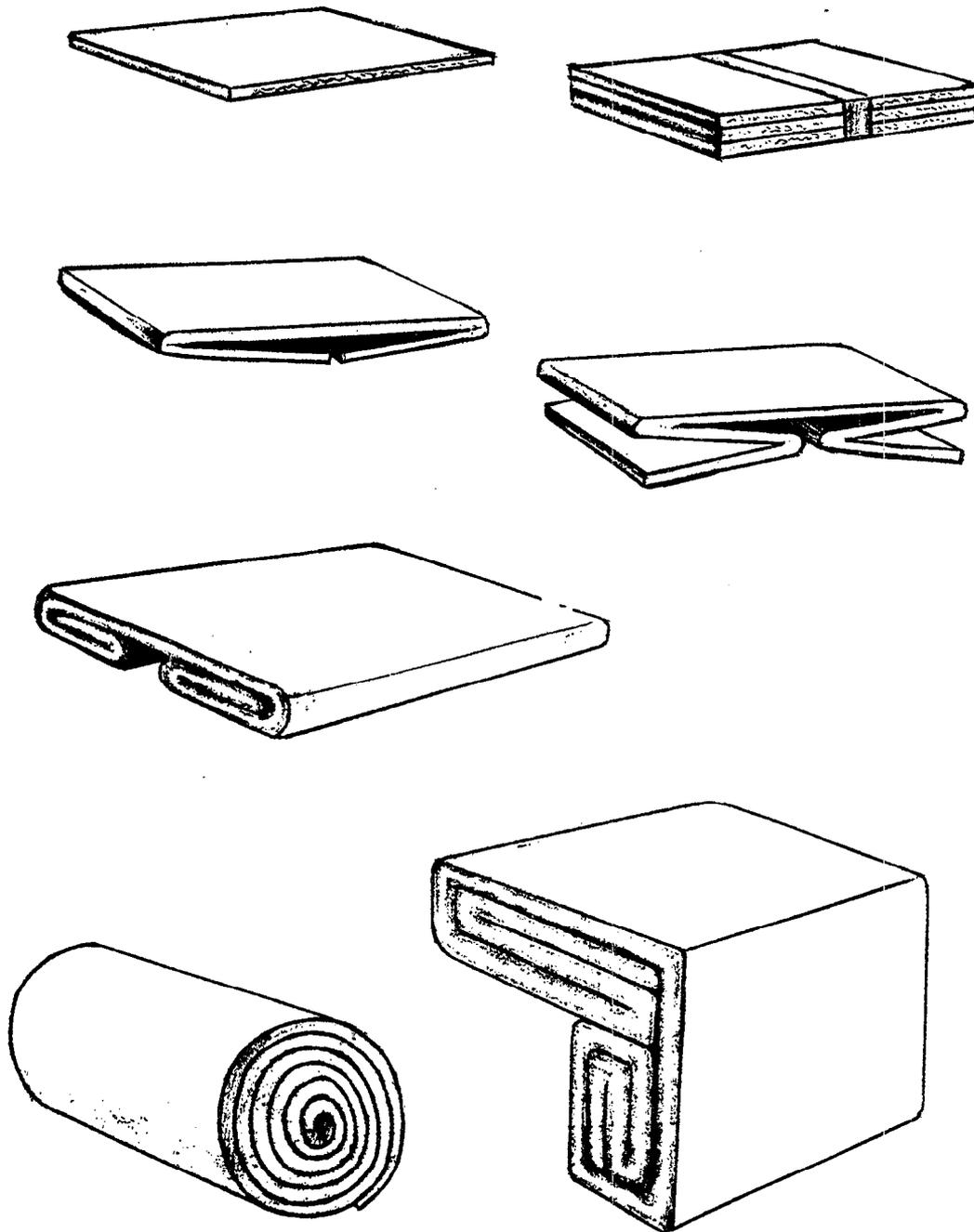
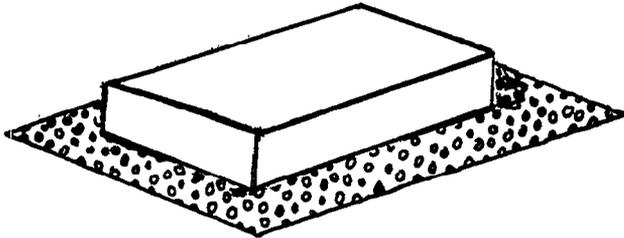


Figure 45
Fiberboard Pads Used for Blocking and Bracing

8.6 FLEET METHOD OF PACKAGING NRFI REPAIRABLES. THIS MAY NOT BE USED FOR ESDS MATERIAL.

8.6.a. How to package with onboard cushioning wrap

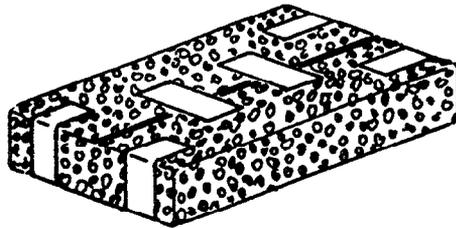
STEP #1



Cut cushioning material to a size which will provide adequate protection to prevent damage.

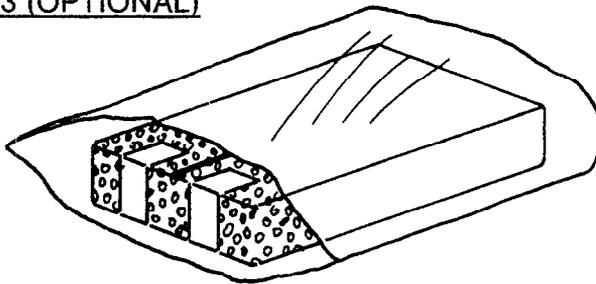
Note: Dry and clean cushioning materials from incoming shipments may be used.

STEP #2



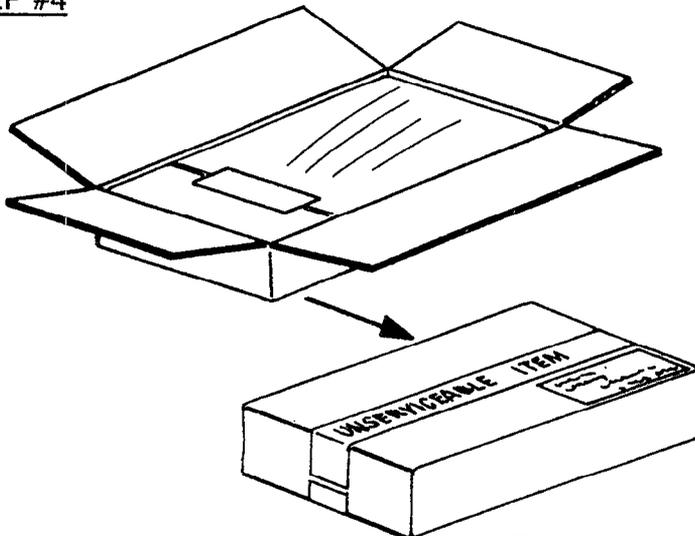
Wrap item in cushioning material to cover all surfaces and secure with pressure sensitive tape if needed to hold cushioning in place.

STEP #3 (OPTIONAL)



Place cushioned item in a water-resistant bag and close by heat sealing or taping to prevent direct entry of water and dirt. Alternately, a water-resistant paper or plastic film wrap secured with pressure sensitive tape may be used.

STEP #4



Cushioned and bagged or wrapped item shall then be further packaged in an individual box and all voids shall be filled with cushioning material. Close box with pressure sensitive tape and attach identification label to box.

Figure 46
Package With On-Board Cushioning Wrap

8.6.a. FLEET METHOD OF PACKAGING NRFI REPAIRABLES (Continued)

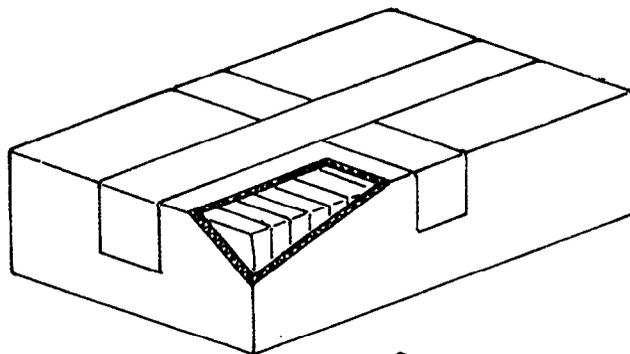
"HOW TO"

STEP #5

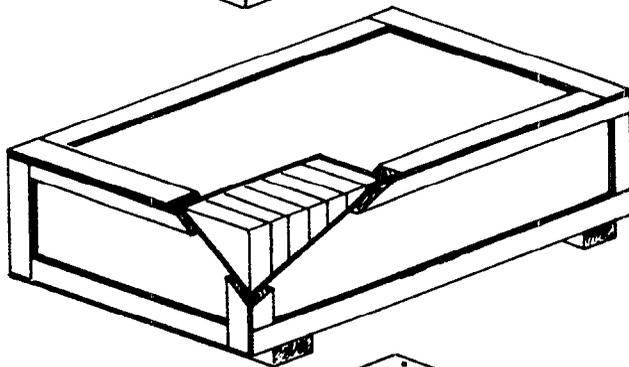
Consolidate unit packages in fiberboard boxes (do not exceed 70 pounds), or wood and cleated plywood (do not exceed 200 pounds). Fill all voids with clean and dry dunnage to assure a compact nonshifting load. Close by banding.

IMPORTANT: Always pack the heaviest items on bottom of box and light or fragile items on top.

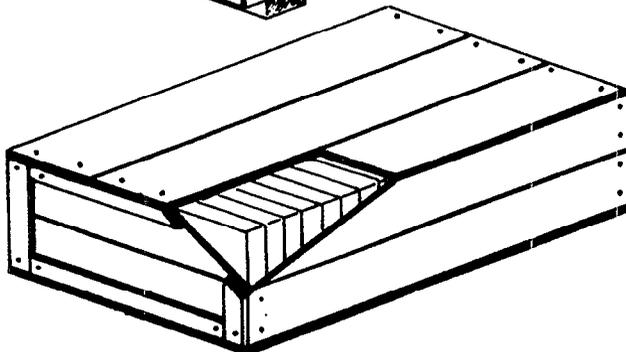
Special Markings: When required, apply caution labels or direct markings such as Glass, Fragile, This Side Up, etc.



Fiberboard Box



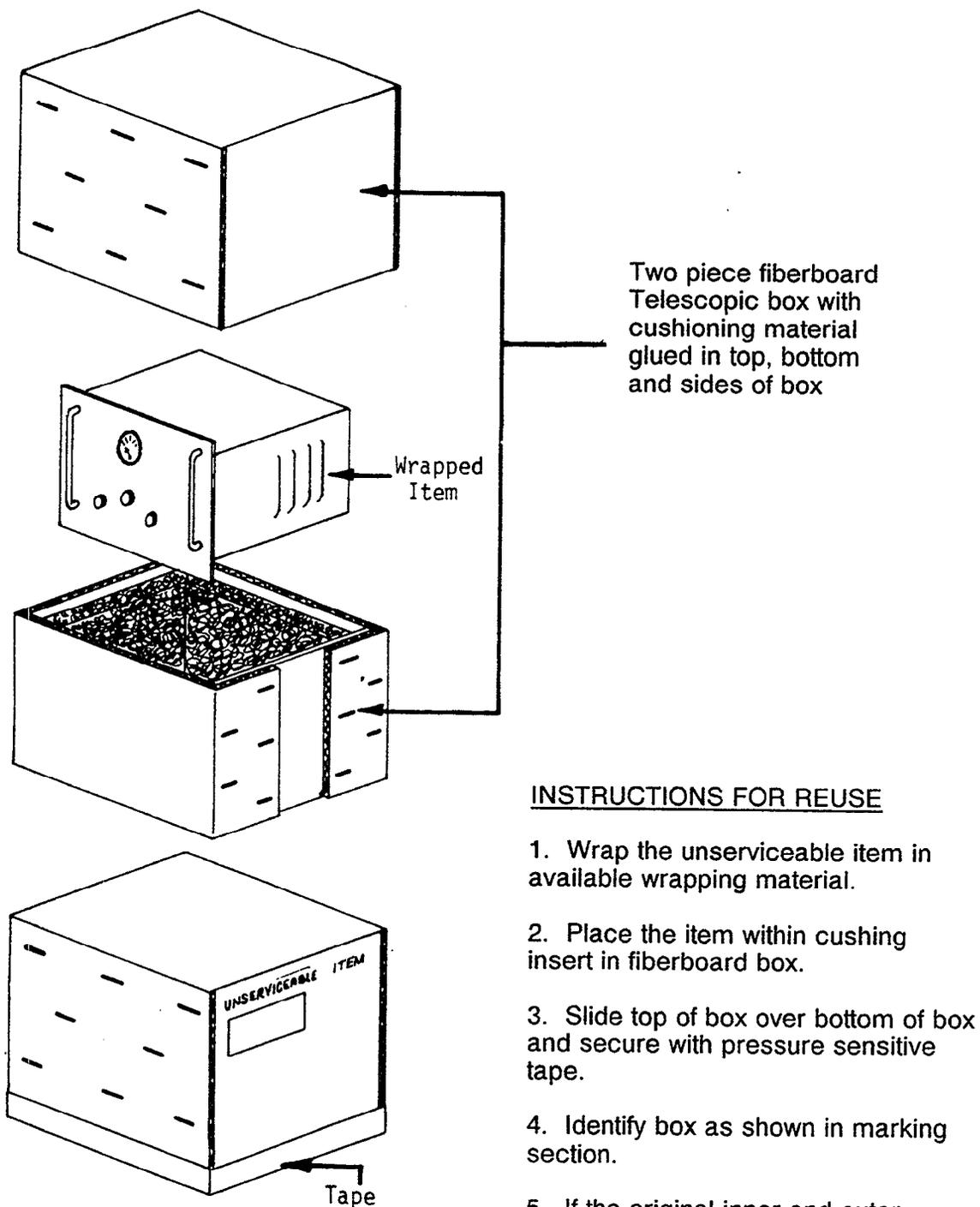
Cleated Plywood Box



Nailed Wood Box

Figure 46 (Continued)
Package With On-Board Cushioning Wrap

8.6.b. How to package with reusable containers (10 to 40 pounds)



INSTRUCTIONS FOR REUSE

1. Wrap the unserviceable item in available wrapping material.
2. Place the item within cushioning insert in fiberboard box.
3. Slide top of box over bottom of box and secure with pressure sensitive tape.
4. Identify box as shown in marking section.
5. If the original inner and outer containers are available use them both to pack the item for return shipment.

COMPLETED PACKAGE

Figure 47
Package With Reusable Containers (10 to 40 Lbs)

8.6.c. How to package with reusable containers (over 40 pounds)

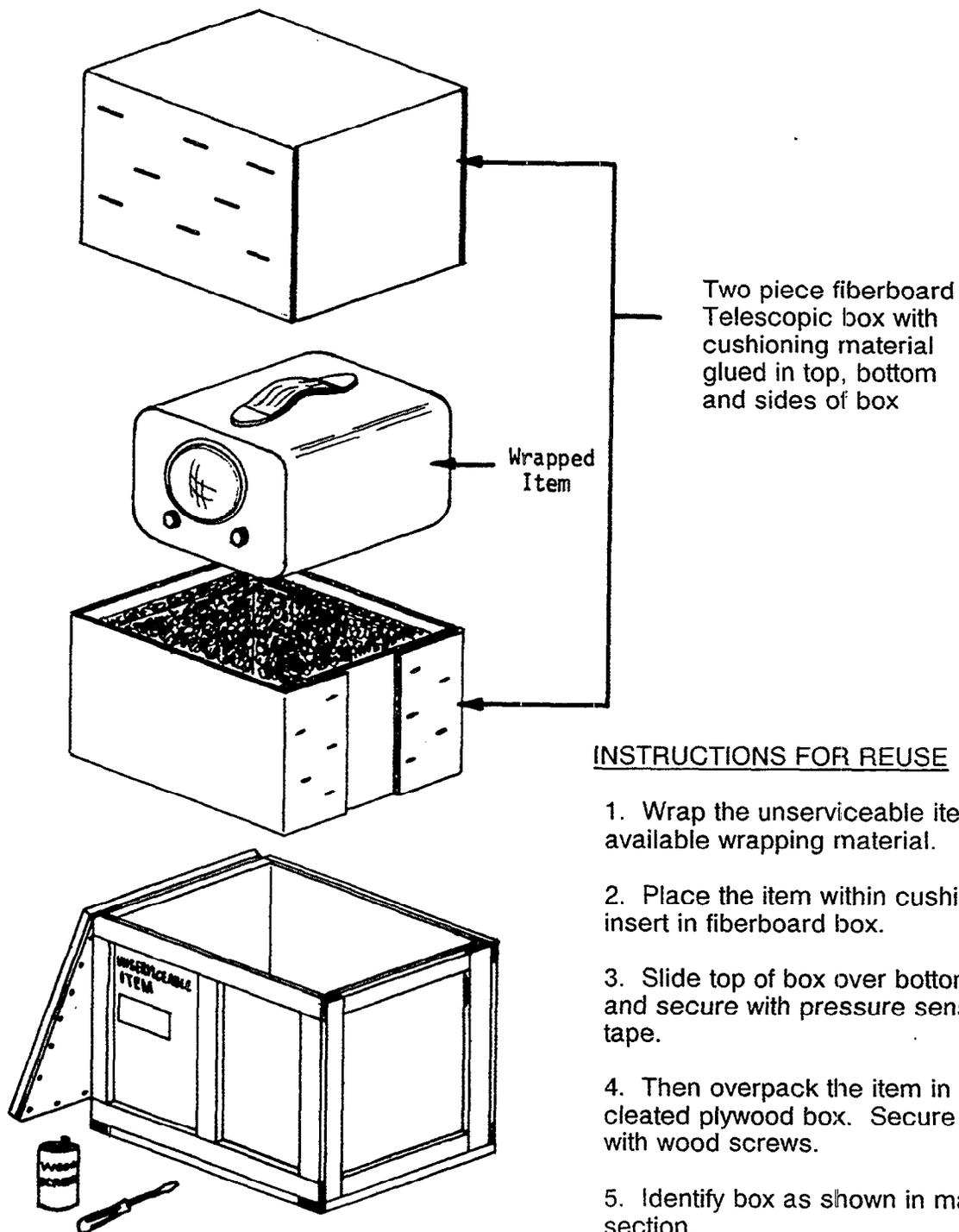
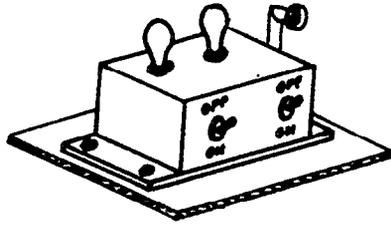
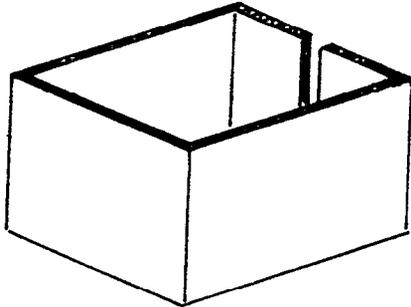


Figure 48
Package With Reusable Containers (over 40 Lbs)

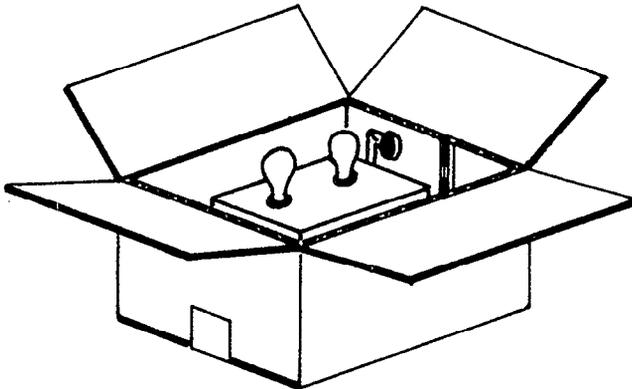
8.6.d. How to package items with fragile protrusions



Item with fragile protrusions mounted on plywood base. Cut plywood the same size as the bottom of the box.

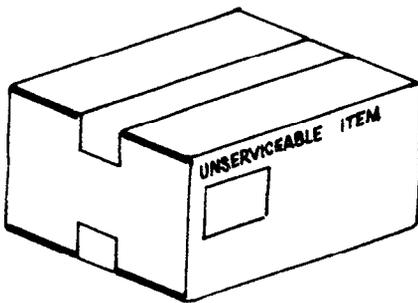


Fiberboard liner. Cut liner the same height as the box less the thickness of the plywood base.



Item placed in box with fiberboard liner holding base in place

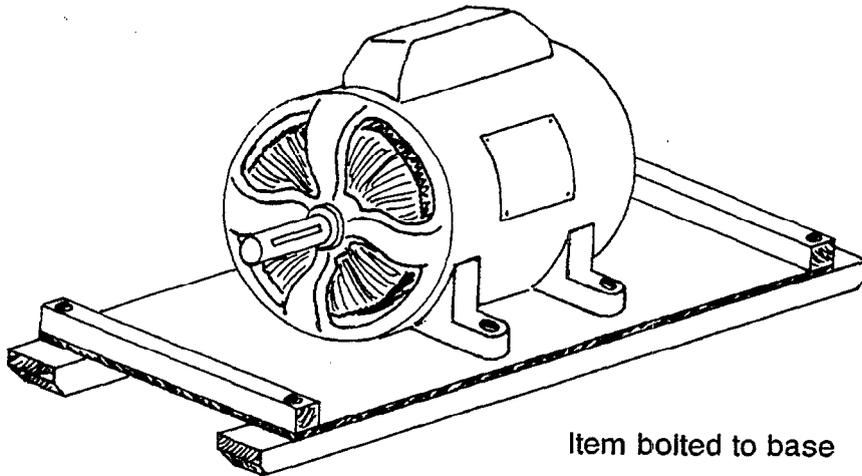
NOTE: Protrusions are not touching sides or top of box.



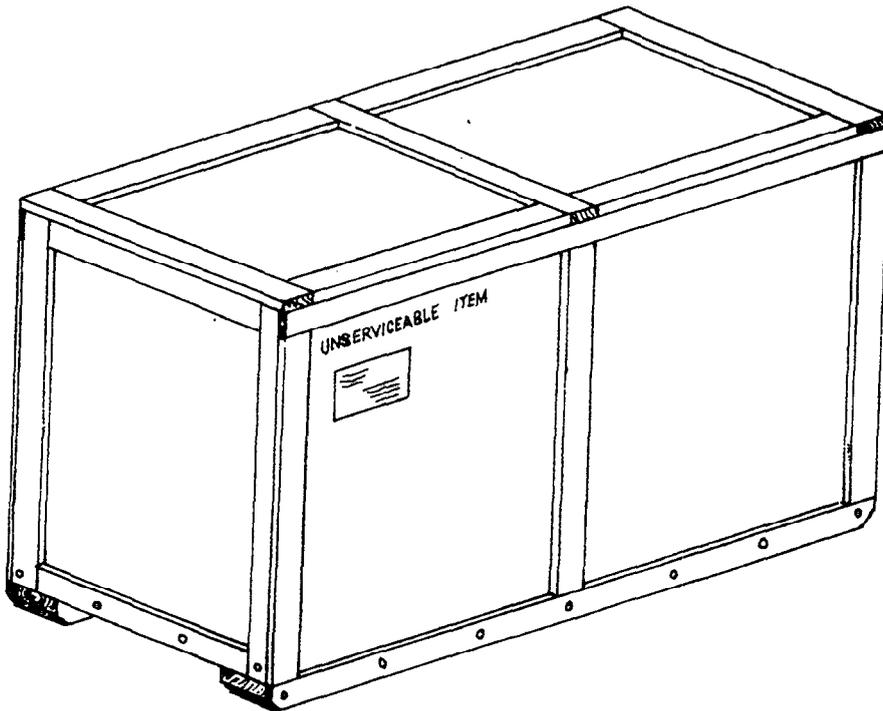
Seal top with tape and mark.

Figure 49
Package Items With Fragile Protrusions

8.6.e. How to package items with mounting facility



Item bolted to base



Fasten box to base with either wood or lag screws around the bottom of box. Mark in accordance with marking section.

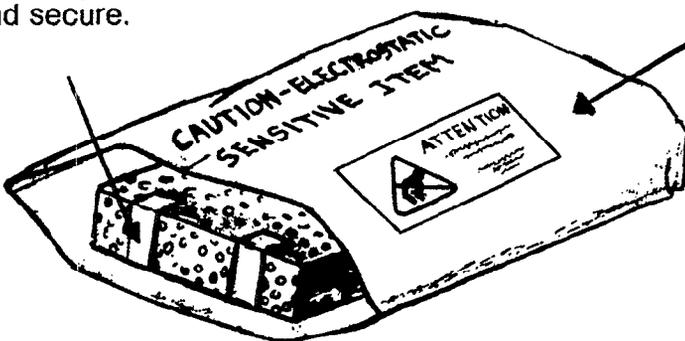
Figure 50
Package Items With Mounting Facility

8.7. HOW TO REPACKAGE NRFI ELECTROSTATIC DISCHARGE SENSITIVE ITEMS

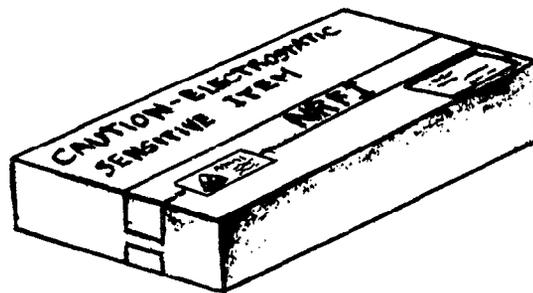
Most circuit boards and electronic modules contain electrostatic discharge sensitive components. (See Figure 51 shown below.) An Equipment Technician, using proper ESD procedures shall package the unserviceable repairable ESDS item in the packaging material received with the replacement item prior to turnover to supply personnel.

1. Completely wrap item in original cushioning/wrapping material and secure.

2. Insert cushioned item in original bag and secure bag openings.



3. Place cushioned and bagged item in original box and close box with pressure sensitive tape.



4. Mark and Label the Box Per MIL-STD-129

Figure 51
Repackage NRFI Electrostatic Discharge Sensitive Items

ATTN: EQUIPMENT TECHNICIAN

A. If packaging materials from the replacement item are not available, use the materials stated in paragraph 7.4 for proper packaging.

B. If box for packaging and marking is not available, place unit pack label on exterior of cushioning or wrap. If no labels are available, fabricate a facsimile of the proper label and place it on the box.

C. DO NOT MOVE, HANDLE, STOW, SHIP OR RELEASE ESDS items to supply personnel until proper electrostatic protective packaging and caution markings have been completed.



WARNING LABEL FOR ESDS DEVICES - UNIT PACKS



WARNING LABEL FOR ESDS DEVICES -
INTERMEDIATE AND EXTERIOR CONTAINERS

Figure 52
Sensitive Electronic Device Caution Labels

9. RECOMMENDED SHIPBOARD PACKAGING TOOLS AND EQUIPMENT. The following list identifies, for ordering purposes, general packaging tools and equipment required to perform shipboard packaging operations. Should additional supplies be required, consult NAVSUP Publication 4400, Afloat Shopping Guide.

TABLE 4

<u>QTY*</u>	<u>DESCRIPTION</u>	<u>SIZE</u>	<u>NSN</u>
1	Paper Holder/Cutter Rack Table Type	24"W	9Q 7290-00-298-6913
1	Tape Dispenser, Gen Use, for T-42 Tape	1"	9Q 7520-00-240-2417
1	Tape Dispenser, Carton Sealing, T-76 Tape	2"	9Q 7520-00-285-1772
1	Tape Dispenser, Filament, T-97 Tape	1"	9Q 7520-00-579-9053
1	Stapler, Bag, Hand	1/2"	9Q 3540-00-724-0556
1	Staple Remover, Pliers		9Q 7520-00-257-5006
1	Knife, Packing, W/Blades		9Q 5110-00-892-5071
1	Knife, Hawkbill, Cutter		9Q 5110-00-293-0388
1	Opener, Carton		9Q 5110-00-345-5289
1	Pliers, Slip-Joint, Wire Cutter	10"L	9Q 5120-00-223-7398
1	Nail Puller, Box-Joint	18"L	9Q 5120-00-542-4828
1	Cutter, Steel Strapping		9Q 5110-00-223-6281
1	Tool Box Steel	19"x7"x7"	9Q 5140-00-331-5496
1	Shears, Sailmakers	12"L	9Q 5110-00-223-6370
1	Label Laminator, Tape Dispenser	6"	9Q 7520-00-890-7841
1	Marker, Felt Tip		9Q 7520-00-973-1059

* Recommended quantities apply to one shipboard general purpose packaging area. For multiple packaging areas, increase quantities as required.

10. RECOMMENDED SHIPBOARD BILL OF MATERIAL

Each ship should have a supply of new packaging materials for use in packaging retrograde supplies. The following tables provide a list of suggested materials. Consult NAVSUP PUB 4400, Afloat Shopping Guide, for additional available materials.

TABLE 5

**SHIPS HAVING SKIN PACKAGING MACHINES WILL REQUIRE
THE FOLLOWING SKIN PACKAGING MATERIALS:**

9Q 8135-01-293-0800	Sheets, Fiberboard Domestic	60" X 80"
9Q 8135-01-293-5631	Sheets, Fiberboard Weather Resistant	60" X 80"
9Q 8135-00-434-5976	Plastic Sheet	452' X 20"
9Q 8115-00-467-2405	Fiberboard Box	9" X 6" X 3" U/I contains 50 each
9Q 8115-00-501-5634	Fiberboard Box	12" X 8" X 5" U/I contains 50 each
9Q 8115-00-467-2407	Fiberboard Box	12" X 10" X 4" U/I contains 50 each
9Q 8115-00-467-2408	Fiberboard Box	18" X 10" X 7" U/I contains 25 each
9Q 8115-00-467-2410	Fiberboard Box	18" X 12" X 6" U/I contains 25 each
9Q 8115-00-507-6165	Fiberboard Box	18" X 14" X 5" U/I contains 25 each

TABLE 6

TAGS AND LABELS

<u>NSN</u>	<u>DESCRIPTION</u>	<u>U/I</u>
9Q 7690-00-888-7536	Unserviceable Item Label	RO (100)
9Q 8105-00-857-2247	Envelope, Packing List, Polyethylene (4-3/4" X 7")	PKG (100)

TWINE

<u>NSN</u>	<u>DESCRIPTION</u>	<u>U/I</u>
9Q 4020-00-782-5572	Twine Jute #0	BALL, 3,000 FT

PACKAGING TAPE

<u>NSN</u>	<u>DESCRIPTION</u>	<u>U/I</u>
9Q 7510-00-582-4772	Tape, Pressure sensitive adhesive 1" wide	RO 60 YDS
9Q 7510-00-297-6655	Tape, Pressure sensitive water resistant, 2" wide	RO 120 YDS
9Q 7510-00-266-6710	Tape, masking, 2" wide Pressure sensitive	RO 60 YDS
9Q 7510-00-073-6096	Tape, pressure sensitive, transparent, 6" wide for label waterproofing	RO 72 YDS

PRIORITY DESIGNATOR TAPE

<u>NSN</u>	<u>DESCRIPTION</u>	<u>U/I</u>
9Q 7510-00-634-2941	Tape, Red, Pressure Sensitive	RO, 36 YDS
9Q 7510-00-634-2943	Tape, Blue	RO, 36 YDS

TABLE 7**FIRE RETARDANT PPP-B-636 BOXES**

<u>NSN</u>	<u>SIZE</u>	<u>CLASS</u>
9Q 8115-01-287-8562	6 X 6 X 6	Weather Resistant
9Q 8115-01-288-0178	8 x 8 x 8	Weather Resistant
9Q 8115-01-289-1009	10 x 8 x 6	Weather Resistant
9Q 8115-01-289-4499	12 x 12 x 12	Weather Resistant

FIRE RETARDANT FIBERBOARD SHEET (PPP-F-320)

<u>NSN</u>	<u>SIZE</u>	<u>CLASS</u>
9Q 8135-01-293-0800	60" X 80"	Domestic
9Q 8135-01-293-5631	60" X 80"	Weather Resistant

PLASTIC BAGS INTERLOCKING SEAL (PPP-B-26)

<u>NSN</u>	<u>DESCRIPTION</u>	<u>U/I</u>
9Q 8105-00-837-7753	4" x 4" size	MX
9Q 8105-00-837-7754	6" x 6" size	MX
9Q 8105-00-837-7755	8" x 8" size	MX
9Q 8105-00-837-7756	10" x 10" size	BX
9Q 8105-00-837-7757	12" x 12" size	BX

BAGS, TRANSPARENT, HEAT SEALABLE (MIL-B-22191, TYPE I)

Watervaporproof, waterproof, greaseproof, (200 per Bundle)

<u>NSN</u>	<u>DESCRIPTION</u>		<u>U/I</u>
	W	L	
9Q 8105-00-935-9783	2-1/2" w	X 3" L	BN (200)
9Q 8105-00-935-9786	4" w	X 8" L	BN (200)
9Q 8105-00-935-9792	6-1/2" w	X 12" L	BN (200)
9Q 8105-00-926-2279	8" w	X 12" L	BN (200)
9Q 8105-00-035-9791	10-1/2" w	X 16-1/2" L	BN (200)

TABLE 8**"BUBBLE WRAP"**

Cellular Plastic Film PPP-C-795, Class 2, static dissipative.

<u>NSN</u>	<u>DESCRIPTION</u>	<u>U/I</u>
9Q 8135-00-142-9004	1/2" X 46" X 250'	Roll
9Q 8135-00-142-9008	3/16" X 16" X 500'	Roll
9Q 8135-00-142-9005	3/16" X 12" X 500'	Roll
9Q 8135-00-142-9016	3/16" X 24" X 500'	Roll
9Q 8135-00-142-9021	3/16" X 48" X 500'	Roll

ALUMINUM FOIL

<u>NSN</u>	<u>DESCRIPTION</u>	<u>U/I</u>
9Q 8135-00-724-0551	18" wide 0.0010" thick x 475'	Roll

BARRIER MATERIAL

<u>NSN</u>	<u>DESCRIPTION</u>	<u>SIZE</u>	<u>U/I</u>
9Q 8135-00-233-387	1MIL-B-121, Type 1, Grade A, Greaseproof, waterproof, flexible barrier material heavy duty	36" X 200 YDS	RO
9Q 8135-00-079-2415	MIL-B-22191, Type I, watervaporproof, grease- proof, heat-sealable, transparent	36" X 200 YDS	RO
9Q 8135-00-282-0565	MIL-B-131, Type I, Class 1, Watervapor- proof, noncorrosive, heat-sealable, oil resistant	36" X 200 YDS	RO
9Q 8135-01-015-2810	MIL-B-131, Type I, Class 3, Scrim Back, Watervaporproof, oil resistant. heat-sealable, noncorrosive	36" X 200 YDS	RO

TABLE 9

ESD PROTECTIVE EQUIPMENT AND MATERIALS

<u>PROTECTIVE EQUIPMENT DESCRIPTION</u>	<u>NSN</u>	<u>UI</u>
Work Station, Static Control (Complete ESD Protective Work Station Consisting of: 1 Static Dissipative Work Surface, 2 x 4 feet; 1 Personnel wrist strap w/adjustable cuff and 5 foot coiled cord; 1 Common Ground Point System).	9C 4940-01-250-4236	EA
Work Station, Static Control, Portable (Complete Portable ESD Protective Work Station Consisting of: 1 Static Dissipative Work Surface 20 x 24 Inches with two built-in Pouches; 1 Personnel Wrist Strap w/adjustable cuff and 5 foot coiled cord; 1 common ground point system).	9C 4940-01-250-4237	EA
Static Control Worksurface (Replacement Static Dissipative Worksurface 2 x 4 feet)	9C 4940-01-269-0444	EA
Static Control Worksurface, Portable, (Replacement Static Dissipative Portable Worksurface 20 x 24 Inches with two built-in pouches).	9C 4940-01-269-0445	EA
Personnel Wrist Strap w/adjustable cuff and 5 foot coiled cord	9C 4940-01-270-0442	EA
Personnel Wrist Strap w/adjustable cuff and 10 foot coiled cord	9C 4940-01-187-2267	EA
Wrist Strap Adjustable Cuff	9C 4940-01-274-0485	EA
Wrist Strap Cord, 5 foot	9C 4940-01-274-0486	EA
Wrist Strap Cord, 10 foot	9C 4940-01-274-0487	EA
Common Point Ground System	9C 4940-01-270-5875	EA

- NOTES: (1) All items listed above are in compliance with Military Specification MIL-W-87893(30)
(2) All items listed above are also listed in Allowance Equipage List 2-670034075.
(3) The listing above allows ordering of either complete static control work stations or individual components (for unique applications or as replacements).

TABLE 10

ESD Protective Material

Barrier Material, EMI/STATIC SHIELD, Flexible, Heat Sealable, Watervaporproof, Greaseproof, Electrostatic Protective and Electromagnetic Shielding MIL-B-81705, Type I:

<u>NSN</u>	<u>Description</u>	<u>U/I</u>
9Q 8135-00-092-3220	36" x 200 Yd	RO

Barrier Material, STATIC DISSIPATIVE, Flexible, Electrostatic-Free, Heat Sealable, Transparent, Waterproof, Electrostatic Protective, MIL-B-81705, Type II.

<u>NSN</u>	<u>Description</u>	<u>U/I</u>
9Q 8135-01-163-3486	36" x 24" Sheet	EA
9Q 8135-01-158-7786	48" x 48" Sheet	EA
9Q 8135-01-197-2997	36" x 36" Sheet	EA

Cushioning Material, Plastic, Open Cell, PPP-C-1842, Type III, Style A (Hexagonal, Electrostatic Free Without Top Laminate):

<u>NSN</u>	<u>Description</u>	<u>U/I</u>
9Q 8135-01-057-3605	1/4" x 6" x 500 ft. (8 rolls per bundle)	BD
9Q 8135-01-087-3507	1/4" x 48" x 500 ft.	RO
9Q 8135-01-087-3599	1/4" x 48" x 500 ft.	BD
9Q 8135-01-088-3845	1.8" x 48" x 625 ft.	BD
9Q 8135-01-088-3846	1/8" x 24" x 625 ft.	BD
9Q 8135-01-088-3847	1/8" x 12" X 625 ft.	BD
9Q 8135-01-088-3848	1/8" x 6" x 625 ft.	BD
9Q 8135-01-088-3849	1/4" x 12" x 500 ft.	BD

TABLE 10 (Continued)

ESD Protective Material

Cushioning Material, PPP-C-1842, Plastic, Open Cell, Type III, Style B (Hexagonal, Electrostatic Free with top laminate).

<u>NSN</u>	<u>SIZE</u>	<u>U/I</u>
9Q 8135-01-087-3602	1/4" X 24" X 375"	BD
9Q 8135-01-087-3603	1/4" X 12" X 375"	BD
9Q 8135-01-088-3850	1/4" X 48" X 375"	BD
9Q 8135-01-088-3851	1/4" X 6" X 375"	BD

Cushioning material, Resilient, Low Density, Unicellular, Polypropylene Foam, PPP-C-1797, Type II (For electrostatic protective cushioning applications)

<u>NSN</u>	<u>SIZE</u>	<u>U/I</u>
9Q 8135-00-300-4904	1/8" X 12" X 450"	RO
9Q 8135-00-300-4905	1/4" x 30" x 225"	RO

Pouch, Cushioned, Flexible, Electrostatic-Free, Reclosable, Transparent, MIL-P-81997, Type I, (Three-ply wall: Two outerplies - Barrier, Electrostatic protective, Transparent Inner Ply - Cushioning).

<u>NSN</u>	<u>SIZE</u>	<u>U/I</u>
9Q 8105-01-216-7804	SZ 9	EA
9Q 8105-01-197-7846	SZ 11	EA
9Q 8105-01-197-2965	SZ 13	EA
9Q 8105-01-205-0207	Assorted	MX

11. REFERENCE LIST

ASO Publication CN-01, Section No. C0030, Packaging Data for ASO and NAVAIR Repairable Assemblies

MIL-HDBK-263, Electrostatic Discharge Control Handbook For Protection of Electrical and Electronic Parts, Assemblies and Equipment

MIL-STD-1686, Electrostatic Discharge Control Program For Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices) (Metric)

MIL-STD-726, Packaging Requirement Codes

MIL-STD-794, Parts and Equipment, Procedures For Packaging of

MIL-STD-2073-1, DOD Materiel Procedures for Development and Application of Packaging Requirements

MIL-STD-2073-2, Packaging Requirement Codes

NAVSUP PUB 485, Afloat Supply Procedures S/N 0530-LP-485-0074

NAVSUP PUB 505, Packaging and Materials Handling - Preparation of Hazardous Materials for Military Air Shipment

NAVSUP Pub 4107, Master Repairable Item List (MRIL)

NAVSUP Pub 4400, Vols. 1 and 2, Afloat Shopping Guide

NAVSUP Instruction 4030.34A, Foam-In-Place Packaging, Afloat and Ashore

NAVSUP Instruction 4030.41, Vacuum Foaming Skin Packaging, Afloat and Ashore

NAVSUP Instruction 4030.47, Reduction of Combustible Packaging Materials Aboard Navy Ships

NAVSUP Instruction 4030.54, Reduction of Plastic Packaging Materials Aboard Navy Ships

NAVSUP 4440.179, ROD Manual

SF 364, Report of Discrepancy (ROD) S/N 7540-00-159-4442

SPCC Instruction 4030.4, Packaging of FBM Weapons System Repairable Items

SPCC Instruction 4030.10, Packaging, Packing and Marking of SUBSAFE/Level 1 Items

SPCC Instruction 4030.14, Packaging, Packing and Marking of TRIDENT Repairable and TRIPER Items

SSPO Instruction 4423.39, Fleet Ballistic Missile (FBM) Weapons System Repairable Program, Requirements and Procedures

12. ACRONYMS

AEL	- Allowance Equipage List
ASO	- Aviation Supply Office
BA	- Bale
CE	- Cone
D	- Domestic
DOP	- Designated Overhaul Point
ESD	- Electrostatic Discharge
ESDS	- Electrostatic Discharge Sensitive
FBM	- Fleet Ballistic Missile
FIP	- Foam-In-Place
FRAA	- Fleet Repairable Assistance Agent
F/R	- Fire Retardant
HMAP	- Hazardous Material Afloat Program
HMC&M	- Hazardous Material Control & Management
IRAM	- Improved Repairables Asset Management
MOM	- Military Official Mail
MPD	- Movement Priority Designator
MRIL	- Master Repairable Item List
MTR	- Mandatory Turn-In Repairable
NICN	- Navy Item Control Number
NIIN	- National Identification Item Number
NRFI	- Not Ready for Issue
NSN	- National Stock Number
OF	- Optional Form
POD/APOD	- Port of Debarkation/Aerial
POE/APOD	- Port of Embarkation/Aerial
POP	- Performance Oriented Packaging
PRIME	- Plastics Removal in Marine Environment
ROD	- Report of Discrepancy
RDD	- Required Delivery Date
RFI	- Ready for Issue
SF	- Standard Form
SPCC	- Ships Parts Control Center
SSPO	- Strategic Systems Project Office
U/I	- Unit of Issue
W/R	- Weather Resistant

