



Lexmark™

# Supplier and Interplant Packaging and Handling Specification

Part 1 - Packaging and Handling  
3085125

**Approved By:**  
Lexmark Packaging Engineering

**Document Owner:**  
John Gasset  
Packaging Engineering Manager

Revision: 010

Engineering Change: 6137385

Date: 10/27/2023

**THIS DOCUMENT AND THE INFORMATION CONTAINED HEREIN IS THE PROPERTY OF LEXMARK INTERNATIONAL. ANY REPRODUCTION OR DISCLOSURE, IN WHOLE OR IN PART, OR USE THEREOF IS PROHIBITED EXCEPT AS AUTHORIZED IN WRITING BY LEXMARK INTERNATIONAL.**

See revision history at the end of this document.  
For the latest revision, refer to the above specification number in Enovia / PLM.

## Table of Contents

1.0 Preface	5
1.1 Scope	5
1.2 Communication	5
1.3 Responsibility	5
1.4 Application	5
1.5 Compliance	6
1.6 Document Maintenance and Control	6
1.7 References and Other Applicable Documents	6
2.0 Environmental Packaging Requirements	7
2.1 Restricted Substances and Materials in Packaging	7
2.1.1 Heavy Metals	7
2.1.2 Elemental Chlorine	7
2.1.3 Ozone Depleting Substances	8
<b>2.1.4 Wood Preservatives</b>	8
2.1.5 Halogenated plastics	8
2.1.6 Perfluoroalkyl Substances	8
2.1.7 Phthalates	8
2.1.8 Solvents Prohibited in Printing Inks	8
2.1.9 Polystyrene Loose Fill	8
2.1.10 Mineral Oil in Ink and Packaging	8
2.1.11 ECHA Annex XIV Authorisation List	9
<b>2.1.12 Formaldehyde in Packaging</b>	9
2.1.13 Free Rise Foam	9
2.2 Reportable Substances and Materials in Packaging	9
<b>2.3 Reusable Packaging Systems</b>	9
2.4 Recyclability of Packaging Materials	9
2.4.1 Separable by Material Type	9
2.4.2 Marking of Material Type	9
2.4.3 Minimum Total Recovered Fiber Content	10
2.4.4 Recovery of Materials and Energy	10
2.5 California Rigid Plastic Packaging Container Law	10
2.6 Plastic Markings	10
2.7 Deceptive Environmental Labeling	10
2.8 EU Classification, Labeling and Packaging of Substances and Mixtures (CLP)	11
<b>2.9 Minimum Weight and/or Volume</b>	11

3.0 Shipping Hazards	11
3.1 Shock	11
3.2 Vibration	11
3.3 Compression	11
3.4 Temperature	12
3.5 Moisture	12
3.6 Electrostatic Discharge (ESD) Packaging Requirements	12
3.6.1 Static Shielding Bags	12
3.6.2 Mailer Style Boxes	12
<b>3.6.3 Thermoformed Blister Style Packages</b>	12
3.6.4 Bulk Packaging	12
4.0 Primary Packaging	13
4.1 Ease of Unpacking	13
4.2 Polybags–Suffocation Warning	13
4.2.1 Bags Equal to or Less Than 1 Mil in Thickness	13
4.3 Corrugated Cartons and Inserts	13
4.3.1 Edge Crush Test (ECT) versus Mullen Equivalents	14
4.3.2 Minimum Corrugated Board Strength	14
4.3.3 Best Carton Closure Method	15
4.4 Requirements for Safely Lifting Heavy Packages	15
4.4.1 Handling Features	15
4.5 The Use of Desiccants	15
5.0 Pallet Design Requirements	16
5.1 Pallet Style and Size Requirements	16
5.1.1 GMA style pallets, partial four-way entry	16
5.1.2 Block style pallets, 9 blocks with four-way entry	17
5.2 Pallet Requirements	17
6.0 Palletized Shipments	18
6.1 Basic Requirements	18
6.1.2 Pallet Weight and Height Limits	18
6.2 Stacking	18
6.3 Pallet Securement	19
7.0 Unpalletized Shipments	21
7.1 Manually Handled Shipments	21
8.0 FRU and CRU Packaging Requirements	22
8.1 Modular Carton Usage	22

8.2 Marking and Labeling	22
8.3 FRU Quality Seal	22
8.4 Element Protection	22
8.4.1 FRU—Loose Dunnage Packaging Method for Packaging FRUs	24
8.4.2 FRU—Fabricated Foam Cushion Method for Packaging FRUs	25
8.5 FRU/CRU Palletization	26
9.0 Product Shipments	26
9.1 Shipping Costs	26
9.2 Air Safety Requirements	27
9.3 Hazardous Materials	27
10. Revision History	27

## 1.0 Preface

### 1.1 Scope

This specification defines the minimum general requirements for the preparation and packaging of all parts, subassemblies, products, and materials that are shipped to any Lexmark manufacturing, distribution center, or customer from suppliers or Lexmark locations. In this document, suppliers, vendors, contract manufacturers, distribution centers, and all other Lexmark locations are collectively referred to as shippers.

### 1.2 Communication

All packaging questions and communications are to be coordinated through the Supplier Relationship Manager or the Sourcing Commodity Manager. In this document, this contact person is referred to as SRM/SCM.

### 1.3 Responsibility

It is the shippers' responsibility to ensure that:

- The packaging methods and materials comply with all applicable laws and regulations, especially for materials classified as hazardous or dangerous.
- Import/export shipments are packaged to comply with all applicable laws and regulations. For labeling and marking information, see the Packaging and Handling Specification *Part 2 - Bar Codes and Labels, PN 3085126*.
- The containers and their contents arrive at their final destination free from damage. Protection from dust, dirt, or abrasion must be applied when necessary.
- When loading a container of varying part numbers (also known as a mixed container load), the shipper must ensure each column stack contains only the same part number or a unit load with the same pallet size. As load movement and unsecured cargo may contribute to damaged goods, measures must be taken to ensure a secure container. Any unstable load must be secured; stretch wrap may be used to bind pallet loads together for stability. Secure any and all empty space with dunnage, airbags, or roping to eliminate load movement.
- Shipments are packaged and palletized economically.

### 1.4 Application

Adherence to the requirements of this specification is necessary to minimize shipping damage, streamline Lexmark's receiving process, and reduce costs. Follow this specification unless unique packaging specifications are issued by Lexmark. International shipments must also conform to unique import/export requirements. See section 9.0.

## 1.5 Compliance

Compliance to the Lexmark packaging requirement, safety guidelines and legal regulations contained in this specification is enforced as a condition of purchase per Lexmark contracts.

At any time, Lexmark reserves the right to:

- Reject and return any shipments that are packaged or identified improperly.
- Charge the shipper for the cost of labor and materials for any repackaging resulting from noncompliance with this or any other specification referenced on the Lexmark Purchase Order.
- Remove from its list of approved vendor sources any supplier that, after notice, repeatedly fails to comply with its packaging requirements.

Any shipper requiring deviation from requirements contained in this specification must receive authorization from Lexmark International before shipment.

## 1.6 Document Maintenance and Control

This specification was originated and is maintained by Lexmark Packaging Engineering. For questions or concerns about this specification, address them with your SRM/SCM.

## 1.7 References and Other Applicable Documents

- Lexmark Part Number 3085126 - Supplier and Interplant Packaging and Handling Guide - Part 2
- Lexmark Part Number 7377700 - Packaging - Regulatory Mark
- Lexmark Part Number 3089570 - Supplier Certification Form for Packaging
- Lexmark Part Number 3075000 - Package Verification Test Specification
- Lexmark Part Number 7374868 - Artwork for HDPE SPI Code for Bags
- Lexmark Part Number 7374869 - Artwork for LDPE SPI Code for Bags
- Lexmark Part Number 3057910 - Lexmark Pallet Construction and Quality Specification
- Lexmark Part Number 1040000 - Product Environmental Specification
- Lexmark Part Number 3093950 - Stretch Film Application and Testing Specification
- Lexmark Part Number - 7374239 - Modular Carton List
- Lexmark Part Number - 7344648 - FRU Q-tape
- European Committee for Standards - CEN Standard EN 13429:2004
- European Union Packaging Directive 94/62/EC
- California Rigid Plastic Packaging Container Law (RPPC)
- Society of the Plastics Industry (SPI)
- US Federal Trade Commission (FTC) - Guides for the Use of Environmental Marketing Claims
- National Motor Freight Item 222
- International Standards For Phytosanitary Measures (ISPM) 15
- ISO 7000 No. 2403
- ANSI/ESD S8.1 - 2012

- International Air Transport Association (IATA)
- International Maritime Organization (IMO)
- US Code of Federal Regulations (CFR) Title 49, Transportation

## **2.0 Environmental Packaging Requirements**

Packaging resource conservation, pollution prevention, and the effect packaging waste has on the environment is important to Lexmark. When choosing materials to be purchased by Lexmark, shippers must consider reducing the impact on the environment of discarded packing materials by using recycled and recyclable materials. Suppliers are encouraged to use the highest recycled material content possible, while maintaining the functionality of the package and without compromising the integrity of the product. Suppliers are required to document the amount of recycled content of the packaging materials they supply.

It is the suppliers' responsibility to keep abreast of and conform to the dynamic worldwide legislation concerning packaging materials, designs, and markings. Parts supplied to Lexmark must comply with the latest revision of the [Lexmark Product Environmental Specification \(LPES\)](#), PN 1040000, available at <https://www.lexmark.com/env-spec> and the Packaging Regulatory Marks specification, PN 7377700. Suppliers must acknowledge and sign the "[Supplier Certification Form for Packaging](#)," PN 3089570, available at <https://www.lexmark.com/pdoc>. Copies of documents are available from the SRM/SCM team.

### **2.1 Restricted Substances and Materials in Packaging**

Lexmark prohibits the use of some materials in its packaging. Chemicals and substances listed below and in Tables 3 and 6 in the Lexmark Product Environmental Specification must not be present in packaging above the provided threshold limits.

#### ***2.1.1 Heavy Metals***

Cadmium, hexavalent chromium, lead and mercury and their compounds shall not be intentionally added to any package or packaging component. The sum of the concentration of incidentally present cadmium, hexavalent chromium, lead and mercury shall not be greater than 0.01% (100 ppm) by weight. The procedure is explained in CR 13695-1 and CR 13695-2. Supplier provides packaging in compliance with the heavy metals standards consistent with 94/62/EC and as required for packaging in IEEE 1680.21 (Section 4.8.1.1).

#### ***2.1.2 Elemental Chlorine***

Elemental chlorine shall not be used as a bleaching agent to bleach virgin or recovered content fibers used in paper-based product packaging.

### **2.1.3 Ozone Depleting Substances**

Chlorofluorocarbons (CFCs) and Hydrochlorofluorocarbons (HCFCs) (see Table A3 and A4 in the Lexmark Product Environmental Specification [www.lexmark.com/env-spec](http://www.lexmark.com/env-spec)) shall not be used in the product packaging or in the manufacturing process.

### **2.1.4 Wood Preservatives**

Arsenic, creosote, and compounds of chromium shall not be used in wood packaging including pallets. For diboron trioxide, report the concentration above 0.1% weight by weight (w/w).

### **2.1.5 Halogenated plastics**

Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers/oxides (PBDEs), including deca-BDE (see [LPES](#) Table A6) and polyvinyl chloride (PVC) shall not be intentionally added to packaging or packaging components. Clear PET and HDPE are acceptable alternatives to PVC.

### **2.1.6 Perfluoroalkyl Substances**

Per- and Polyfluoroalkyl substances (PFAS) shall not be intentionally added to packaging or packaging components. For the EPA's full list of PFAS visit <https://comptox.epa.gov/dashboard/chemical-lists/PFASSTRUCT>

### **2.1.7 Phthalates**

All ortho-Phthalates (1,2-Benzenedicarboxylic acid esters) shall not be intentionally added to any packaging or packaging component. The sum of the combined concentrations of phthalates shall not exceed 0.01% (100 ppm) by weight (w/w). These prohibited phthalates include but are not limited to Benzyl butyl phthalate (BBP), Bis (2-ethylhexyl) phthalate (DEHP), Dibutyl phthalate (DBP), Diisononyl phthalate (DIBP), and Diisononyl phthalate (DINP). For the full list visit the Biomonitoring California Designated Chemicals at <https://biomonitoring.ca.gov/chemicals/phthalates>

### **2.1.8 Solvents Prohibited in Printing Inks**

Solvents listed in Table 7 of the [LPES](#) shall not be added to printing inks on products or packaging at levels above the limit requirements referenced in Chinese Standards GB 33372-2020, GB 38507-2020, and GB 38508-2020.

### **2.1.9 Polystyrene Loose Fill**

Expanded polystyrene (EPS) loose fill packing material shall not be used in Lexmark packaging.

### **2.1.10 Mineral Oil in Ink and Packaging**

Mineral oil with mineral oil aromatic hydrocarbons (MOAH) consisting of 1 to 7 aromatic rings greater than 1.0% (10,000 ppm) is prohibited from use in packaging and inks effective January 1, 2023. Mineral oil with MOAH consisting of 1 to 7 aromatic rings greater than 0.1% (1000 ppm) is prohibited January 1, 2025. Mineral oil with MOAH consisting of 3 to 7 rings greater than 1 ppm is prohibited effective January 1, 2025. Mineral oil with mineral oil saturated hydrocarbons (MOSH) consisting of 16 to 35 carbon atoms greater than 0.1% (1000 ppm) is prohibited effective January 1, 2025. Preferred ink formulations are water-based or inks that are FDA/USDA approved.



### **2.1.11 ECHA Annex XIV Authorisation List**

Lexmark prohibits the use of substances listed in the European Chemicals Agency (ECHA) Annex XIV of REACH (Authorization List) available at <https://echa.europa.eu/authorisation-list>.

### **2.1.12 Formaldehyde in Packaging**

Formaldehyde, CAS # 50-00-0, released from an article has a threshold limit of 0.062 mg/m<sup>3</sup> for furniture and wood-based articles  
0.080 mg/m<sup>3</sup> for all other articles based on test methods listed in [Appendix 14 of Commission Regulation \(EU\) 2023/1464 of 14 July 2023](#)

### **2.1.13 Free Rise Foam**

Free rise foam shall not be used in product packaging.

## **2.2 Reportable Substances and Materials in Packaging**

Packaging articles containing substances in the [EU REACH SVHC Candidate List](#) above the threshold limit, or reportable substances in the [Lexmark Product Environmental Specification](#) shall be disclosed in the Supplier Certification Form for Packaging in Table 1.

## **2.3 Reusable Packaging Systems**

Lexmark favors reusable package designs over expendable designs when applicable. The design of a reusable packaging system may be a joint effort between Lexmark and its supplier while respecting the criteria for claiming reusability provided in the most recent revision of the CEN standard EN 13429 mandated by EU Packaging Directive 94/62/EC as amended by 2004/12/EC. The involvement of each is necessary to understand fully the logistics affecting operations at either location.

## **2.4 Recyclability of Packaging Materials**

Designs that are recyclable and promote easy recyclability are very important to Lexmark. Suppliers are encouraged to choose high recycled content fiber-based packaging alternatives to plastic. Corrugated fiberboard should not be coated or impregnated with resins or chemicals. To ensure recyclability of packaging, suppliers are required to meet the following component requirements:

### **2.4.1 Separable by Material Type**

All packaging components greater than 25 grams shall be separable by material type without the use of tools. Avoid bonding two or more dissimilar materials together (for example, polyethylene glued to corrugated fiber board). Exclusions: plastic parts smaller than 50 cm<sup>2</sup> labels affixed to plastic bags or wraps, tape, glue, staples, nails in pallets, and co-laminated materials for purpose of moisture or electrostatic discharge barrier protection.

### **2.4.2 Marking of Material Type**

All plastic components greater than 25 grams shall be clearly marked with material type in accordance with at least one marking type such as ISO 11469/1043, ASTM D7611/D7611M50, DIN612051, or equivalent relevant to the geographic location in which the product is being

sold. Exclusions: plastic protective films, stretch wraps, strapping, tape, label, surface area less than 50 cm<sup>2</sup>, plastic pieces when due to shape marking is not possible and expanded polyurethane foam.

### ***2.4.3 Minimum Total Recovered Fiber Content***

Packaging materials - paperboard, corrugated fiberboard, solid fiberboard, and spiral wound tubes - shall meet or exceed the minimum total recovered fiber content specified in the table shown below:

<b>Recover Content in Fiber-based packaging materials</b>		
<b>CATEGORY</b>	<b>EXAMPLES</b>	<b>TOTAL RECOVERED FIBER CONTENT<sup>2</sup></b>
Paperboard	Boxboard, Chipboard, Barrier board, Carton board	80%
Corrugated Fiberboard <sup>1</sup>	Container board, Linerboard, Corrugated medium	35%
Solid fiberboard	---	40%
Spiral Wound Tubes	Comprised of paper only	90%

<sup>1</sup> Required content based on weighted average (by weight) of all components in packaging part (e.g., liners and mediums in corrugated).

<sup>2</sup> Calculated as percent of total packaging per weight over the course of a year using a weighted average.

### ***2.4.4 Recovery of Materials and Energy***

Packaging is compliant with the standards for one or more of the following required recovery routes: material recovery by recycling (EN13430), energy recovery (EN 13431), and/or organic recovery by composting (EN 13432).

## **2.5 California Rigid Plastic Packaging Container Law**

All suppliers must comply with the rules and regulations stated in the California Rigid Plastic Packaging Container (RPPC) Law. The Lexmark SRM/SCM must be notified of any RPPC that does not meet this requirement.

## **2.6 Plastic Markings**

All Lexmark packaging parts must be marked in accordance with Lexmark specification 7377700.

## **2.7 Deceptive Environmental Labeling**

The U.S. Federal Trade Commission (FTC) guidelines regarding environmental labeling are the most comprehensive and are comparable to those of other countries; claims compliant with FTC guidelines generally satisfy other guidelines. All shippers must comply with the FTC guidelines regarding deceptive environmental labeling.

## 2.8 EU Classification, Labeling and Packaging of Substances and Mixtures (CLP)

Supplier has identified any substance identified as dangerous (as classified in CLP17 (Classification, Labeling and Packaging of substances and mixtures) EC-No: 1272/200817), present in any of its packaging components and, if present, has minimized its use. All packaging and packaging components supplied to Lexmark comply, in all respects, to the requirements for dangerous substances as stated in Annex II, paragraph 1 of the European Union's Directive 94/62/EC4 on packaging and packaging waste as amended by 2004/12/EC5 (procedures found in CEN/TR 13695-2:200416)

## 2.9 Minimum Weight and/or Volume

Supplier demonstrates compliance with the source reduction standards consistent with EU Directive 94/62/EC and the latest revision of EN 13428.

# 3.0 Shipping Hazards

All packaging must provide enough protection to ensure that its contents arrive damage free. Finished goods, components, and field replaceable units (FRUs) must comply with the test procedures called out in the "Lexmark Package Verification Test Specification," PN 3075000. For a copy of this specification, contact your SRM/SCM. Consideration must be given to all hazards encountered in the distribution environment. The following terms represent hazards that are found typically in the shipping environment.

## 3.1 Shock

Shock forces are intermittent forces caused by dropping the package to the floor, stack tipping over, bump in the road, or any number of other causes. Express carrier or small package delivery systems represent the most severe environment for shock hazards.

## 3.2 Vibration

Vibration forces are continuous forces applied to the package whenever it is physically transported. Airplanes, trucks, and conveyors will impart some level of vibration to the package.

## 3.3 Compression

During shipping, handling, and storage, packages are subjected to dynamic and static compression due to stacking. Compression strength diminishes considerably in humid/moist environments and when the stacks are not aligned or overhang the shipping pallet.

Packages or containers must withstand dynamic stack height of at least 2.5 M (8 feet), the height that they are stacked in trucks and other vehicles. Furthermore, packages or containers stored in a warehouse must be able to withstand static stack heights of 5.0 M (16 feet), measured from floor to top of stack, for a period of 30 days without visible degradation to any package, container or its contents. Shippers must incorporate a 5-1 safety factor into their package design to allow for warehouse stacking up to 5.0 M (16 feet).

### **3.4 Temperature**

Products may encounter temperature extremes ranging from -40°C (-40°F) to +60°C (+140°F) in the distribution environment. Packaging materials and methods must be effective at these extremes as well.

### **3.5 Moisture**

Moisture-sensitive items may need to be packaged with moisture-sensitive packaging materials. For questions regarding your product, contact your SRM/SCM.

### **3.6 Electrostatic Discharge (ESD) Packaging Requirements**

All electronic parts are treated as ESD sensitive regardless of the actual level of ESD sensitivity of a part. This treatment eliminates confusion regarding when to apply proper protective techniques.

#### ***3.6.1 Static Shielding Bags***

Static shielding bags are multilayer bags that have a static dissipative material next to the ESD-sensitive item along with a thin outer metallic layer. Static shielding bags are required for ESD-sensitive products.

#### ***3.6.2 Mailer Style Boxes***

An ordinary kraft corrugated container with foam insert may be used to contain the ESD-sensitive item provided that the part is placed first in a static shielding bag. If a static shielding bag is not used, then the outer box must be manufactured from an approved conductive corrugated board and have static dissipative cushioning.

#### ***3.6.3 Thermoformed Blister Style Packages***

This style of packaging is acceptable for interplant shipments if the material that contacts the part is manufactured from an approved static dissipative material. This style of packaging should not be used for finished goods.

#### ***3.6.4 Bulk Packaging***

Reusable tote boxes manufactured from conductive corrugated or plastic materials may be used for interplant, supplier, or interplant shipments to manufacturing areas. Tote-style boxes must not be used for parts bound for retail or field service distribution locations.

## 4.0 Primary Packaging

The following section provides general packaging guidelines for primary packaging. For FRU/CRU packaging requirements, see section 8.0.

### 4.1 Ease of Unpacking

Where possible, all efforts must be made to ensure that the products are easy to unpackage. The following guidelines must be followed:

- Tape used on any printer, option, or supplies is recommended to be colored so that it is easily visible.
- The cushion material must be cleared away from any product handhold so that a person can reach down and remove the product from the carton easily.
- If an unbox artwork is not provided by Lexmark for complex package designs, it is recommended that the vendor include one. The wordless graphical illustration should be simple and easy to follow, it can be printed on the box top flaps and should detail how to open and remove the product from the shipping carton.
- For those products with more complex internal packaging, a separate sheet illustrating how to remove this packaging may need to be included.

### 4.2 Polybags—Suffocation Warning

#### *4.2.1 Bags Equal to or Less Than 1 Mil in Thickness*

- The appropriate suffocation warning labels must be printed on any bag 1 mil (1/1000th of an Inch) in thickness or less, which also has an opening greater than 304.8 mm (12 inches). An illustrated warning is required. For a sample of the suffocation label graphics, obtain a copy of Lexmark part numbers 7374868 and 7374869.
- For bags less than 1 mil (1/1000th of an Inch) in thickness and that have an opening greater than 127 mm (5 inches), the following statement must be printed in addition to the appropriate symbols (7374868 for HDPE and 7374869 for LDPE):

"Warning: Keep this bag away from babies and children. Do not use in cribs, beds, carriages, or playpens. The thin film may cling to nose and mouth and prevent breathing."

### 4.3 Corrugated Cartons and Inserts

Use the following design methods to assure the greatest performance from corrugated cartons and inserts while holding cost to a minimum.

- The flute direction of the outer carton must always run vertically in the stacking direction of the carton.

- Double-wall materials with lower board strength usually provide more compression strength than single-wall materials with higher ECT values. Double-wall also offers the best overall value relative to its enhanced performance.
- Glue or staples are acceptable methods for securing carton manufacturing joints.
- When the carton is closed the top flaps must meet in the middle with no more than 3mm of space between them. Additionally, the flaps must not overlap.

#### 4.3.1 Edge Crush Test (ECT) versus Mullen Equivalentents

Either method of specifying corrugate can be used for packages of equal size and gross weight according to their respective rules. However, they may not perform exactly the same in practice because the materials are made differently. See the following table for equivalency values.

ECT vs. Mullen Equivalency Chart			
The following defines rule equivalentents, not necessarily performance equivalentents.			
Single-Wall Corrugated		Double-Wall Corrugated	
ECT (lb/in.)	Mullen (lb/in. <sup>2</sup> )	ECT (lb/in.)	Mullen (lb/in. <sup>2</sup> )
32	200	48	275
40	250	51	350
44	275	61	400
55	350	71	500
		82	600

#### 4.3.2 Minimum Corrugated Board Strength

Corrugated cartons that do not have a specified compression strength must have a minimum board strength of 275 psi Mullen Test (44 ECT) or comply with the National Motor Freight Item 222, whichever is greater. Cartons less than 44 ECT must be approved by Packaging Engineering. If specific compression strength is provided, then it takes precedent and must be met.

### 4.3.3 Best Carton Closure Method

The following are acceptable carton taping methods. Use this for guidance if no Lexmark bill of material (BOM) is provided. Also, if a carton has an access door that has been used, it must be sealed with tape.



## 4.4 Requirements for Safely Lifting Heavy Packages

- The target weight limit for inbound shipments for manufacturing is 16 kg (35 lb), but not all countries will accept this maximum weight. For example, 10 kg (22 lb) is the maximum weight for packages inbound to Mexico per safety considerations and controls. To determine the maximum package weight limit for a specific country, contact your local Lexmark plant representative or your SRM/SCM for more detail.

### 4.4.1 Handling Features

Heavy packages must include handles, handgrips, or hand holes to facilitate manual handling and improve safety. Hand holes or integral handles are required for packages in the 12 kg-68 kg (26 lb-150 lb) weight range and others deemed to be bulky.

- Hand holes must be die cut with a scored top line so that the material remains in the hole. This minimizes contamination and improves gripping comfort.
- Reinforcement of the hole may be necessary to prevent the carton hand hole from ripping out when lifted.
- Interior packaging must align with and be designed to provide clearance for the hand holes.
- Plastic or fabric handles may be used but must be recessed if possible when not in use to prevent snagging on conveyors.
- Two hand holes in each end must be provided in packages weighing more than of 32 kg (70 lb).

## 4.5 The Use of Desiccants

The use of desiccants in Lexmark customer shippable packaging must be approved in advance by Lexmark Packaging Engineering.

## 5.0 Pallet Design Requirements

Pallets must comply with ISPM 15, titled "Regulation of wood packaging material in international trade." ISPM can be found at [www.ippc.int](http://www.ippc.int). Also, all pallets must conform to Lexmark Pallet Quality and Construction Specification, part number 3057910.

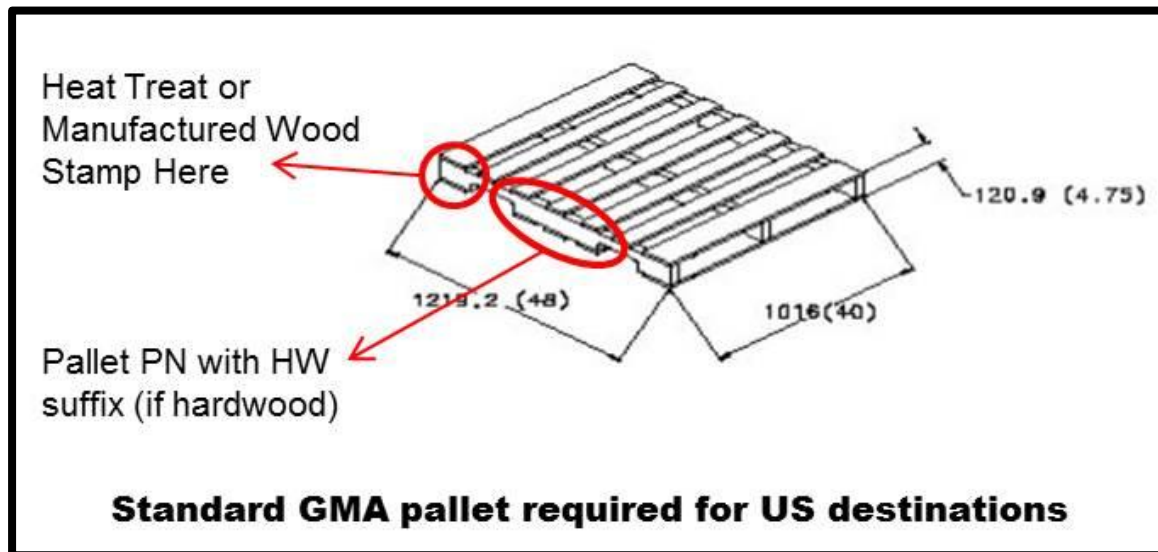
### 5.1 Pallet Style and Size Requirements

If the Lexmark bill of materials (BOM) does not include a specified pallet, shippers are to select from one of the following standard pallet designs. For authorization to deviate from the standards, contact Lexmark Packaging Engineering.

#### 5.1.1 GMA style pallets, partial four-way entry

These pallets are required for orders shipped to the United States or Canada:

- Full—1219 mm (48 in. stringer) x 1016 mm (40 in. deck boards)
- Half—1016 mm (40 in. stringer) x 610 mm (24 in. deck board)
  - All deck boards (top and bottom) must be 13 mm (0.50 in.) thick minimum.
  - Top and bottom deck boards on ends (4 each) must be 139.7 mm-152 mm (5.5 in.-6 in.) wide and top and bottom center deck boards (8 each) must be 88.9 mm-101.6 mm (3.5 in.-4.0 in.) in width.

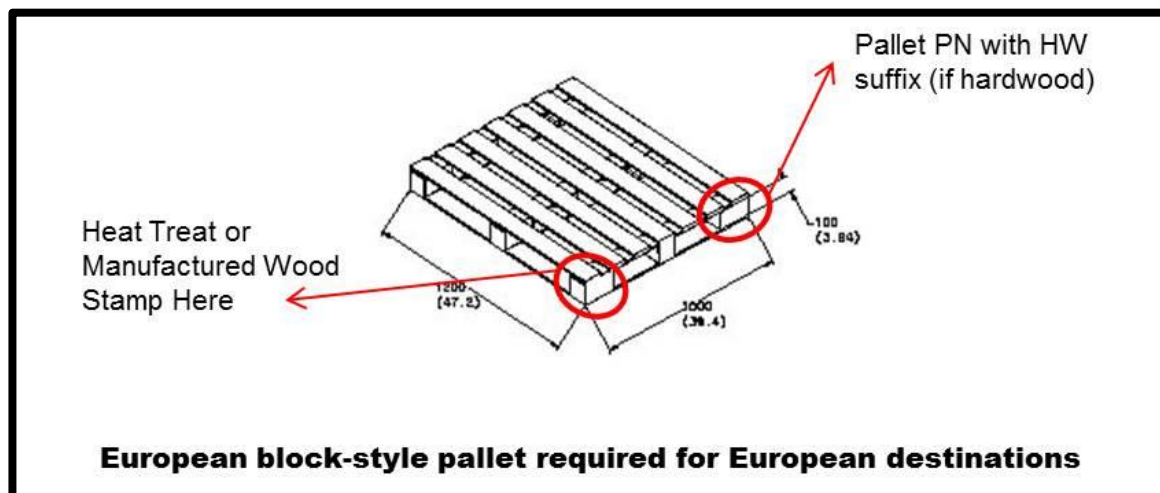




### 5.1.2 Block style pallets, 9 blocks with four-way entry

These pallets are required for orders shipped to Europe as well as all FRU/CRU parts worldwide:

- Full—1200 mm x 1000 mm
- Europallet—1200 mm x 1000 mm
  - Bottom deck boards around the full perimeter of the base are required for added strength.
  - Bottom deck boards must be beveled to allow easy use of pallet jacks.
  - All deck boards must be 100 mm (4 in.) wide and 13 mm (0.5 in.) thick minimum.
  - Pressed wood blocks are not allowed for any shipments.



## 5.2 Pallet Requirements

- All pallets used for shipment of Lexmark finished goods must be approved by Lexmark Packaging Engineering. Also, pallets manufactured from material other than wood products such as plastic, corrugated, metal, and so on are not allowed unless approved by Lexmark Packaging Engineering.
- When using pallets constructed of wood, the moisture content of the pallet must be less than 20 percent.
- It is recommended to store pallets indoors.
- All pallets must be treated for insect infestations in accordance with the ISPM 15 regulations; The only approved method for treating Lexmark pallets for insect infestation is by heat treatment. Fumigation with Methyl Bromide is not allowed. Lexmark requires all natural wood pallets to undergo heat treatment.

## 6.0 Palletized Shipments

### 6.1 Basic Requirements

- Cartons in excess of 40.9 kg (90 lb) must be palletized individually.
- Unit loads must be configured to fit a standard pallet size as defined in section 5.1.
- Packaging must be designed to withstand stacking and the top and bottom surfaces of a palletized load must be flat to permit stacking.
- Use top caps sized for the load when palletizing cartons.
- Select the best pallet size to optimize cube and lower freight costs. Load configuration must achieve a minimum of 80 percent utilization of the pallet surface.
- Loads must not lean, shift, bulge, or overhang the pallet.
- Center the unit load on the pallet.
- Heavier unit loads must be loaded on the floor of the container.
- Production and nonproduction materials must not be placed onto the same pallet.

#### *6.1.2 Pallet Weight and Height Limits*


- A full-size pallet load must not exceed 910 kg (2000 lb).
- A half-size pallet load must not exceed 455 kg (1000 lb).
- Pallet height must not exceed 1270 mm (50 inches), for container shipments.
- Pallet height must not exceed 1524 mm (60 inches) for air shipments.

### 6.2 Stacking

All packaging must be strong enough to withstand in-transit and warehouse stacking. Usually, a "DO NOT STACK" label is not followed and does not absolve the shipper of its responsibility for proper packaging.

- All palletized loads must have a cubic shape to permit stacking. If necessary, use empty boxes marked "Empty" to complete the top layer. Place the empty cartons in the center of the top layer. All empty cartons must be made of the same material and design as the product that is being shipped.
- Palletized loads must have sufficient stacking strength to withstand stacking heights of four unit loads of the same product. Column pallet stacking configurations are preferred to ensure load strength.
- Use corner supports (angle boards) on all four vertical corners to prevent carton damage from compressive forces due to stack misalignment, shifting, and the tension of the stretch film. The length of the corner support must be about 50 mm (2 inches) shorter than the height of the cartons stacked.
- Use a cap or top sheet to help prevent compression failures and pallet abrasion by distributing the weight more evenly over the load and preventing abrasion and scuffing from the pallet when top loaded.

- Pallet overhang can significantly reduce stacking strength and is not permitted.
- The use of unit load shippers is strongly recommended especially when multiple-size packages are consolidated on one pallet and for air shipments and other shipments when multiple handlings occur. These containers provide the necessary stacking strength and discourage theft and split shipments.
  - The contents must not protrude above the top of the unit load tube.
  - All unit load shippers and over-packs are to be sized to minimize void space and dunnage.
  - Unit load shippers are to be cut down so that the headspace within the unit is no more than 25 mm (1 inch).
  - Use empty boxes marked "EMPTY" to fill any void pockets in unit load shippers.
- Lexmark uses the ISO standard stack icon on packaging to identify how many cartons may be stacked on the bottom package. See below for details.

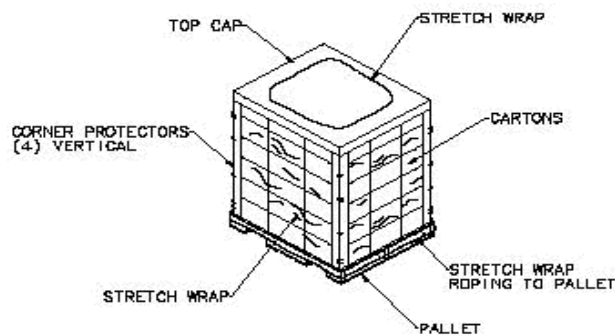
Symbol number and title	No. 16 STACKING LIMIT BY NUMBER
<p style="text-align: center;"><i>Graphical symbol:</i></p> 	<p><i>Reference:</i> ISO 7000, No.2403</p> <p><i>Meaning:</i> Maximum number of identical transport packages/items which may be stacked on the bottom package, where "n" is the limiting number.</p> <p><i>Requirements:</i></p> <ul style="list-style-type: none"> <li>— Maximum number of packages permitted to be stacked on the bottom package shall be indicated to ensure safe stacking and also to improve loading and storage efficiency.</li> <li>— In order to ensure quality of shipping and storing of distribution packages, it is recommendable that the number indicating the maximum number of packages permitted to be stacked on the bottom package be corrected by hand on site if deterioration of the packages is detected.</li> <li>— The number "n" may be corrected by hand.</li> <li>— The prohibition symbol may be hand written.</li> <li>— This symbol shall be used in the orientation shown.</li> </ul> <p><b>NOTE</b> The number "n" does not include the bottom package.</p>

### 6.3 Pallet Securement

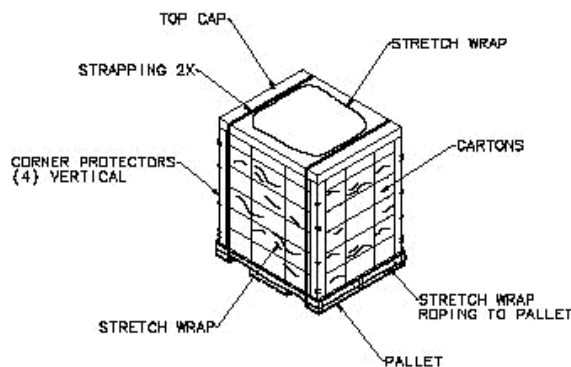
The following are the minimum required methods for all shipments (ocean container or domestic shipments) and must comply with the Stretch Film Application and Testing Specification 3093950:

- When shipping palletized cartons, use a top cap and vertical edge protectors on all four corners beneath the stretch wrap.

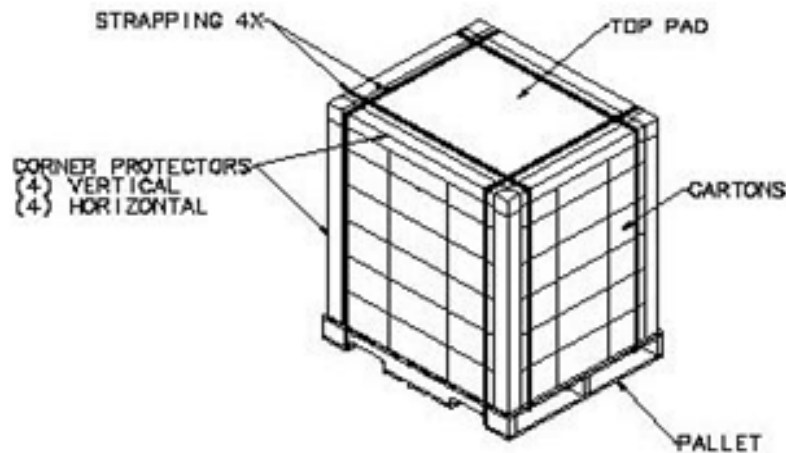
- In addition to stretch wrap for loads weighing less than 68.2 kgs (150 lbs), apply two polyester (PET) bands on one side spaced equally from each side. For loads weighing more than 68.2 kgs (150 lbs), apply four polyester (PET) bands, two on each side.
- Do not use polypropylene or nylon banding.
- Angle boards or edge protectors are required under the bands of the unit load to protect containers and contents from damage. The angle board lengths must be sufficient to secure all cartons.
- When banding to stringer-style pallets, proper use of the banding notches in the pallet is required.
- The ends of the bands must be fused or crimped; buckles are not allowed. Do not attach banding to the pallet with staples or nails.



**Palletized unit load using stretch wrap**



**Palletized unit load using stretch wrap and 2-way plastic banding**



**Palletized unit load showing four-way banding, corner edge protectors, and a top corrugated**

## 7.0 Unpalletized Shipments

In some situations (for example, direct full ocean container shipments), the use of slip sheets or horizontal squeeze clamps may be permitted to load and unload containers in order to optimize cube and lower Lexmark freight expenses. A financial justification must be provided and approved by the appropriate Lexmark SRM/SCM. Also, a test shipment must be conducted and approved before final approval and full-scale implementation.

- Unit loads must be configured to fit a standard pallet size as defined in section 5.1.
- Unit loads must be held together or to the slip sheet using stretch film with a minimum of four complete wraps around the top and bottom for light loads weighing 350 kg (800 lb) or less and a minimum of 150 mm (6 inches) overlap. For heavier loads, five complete wraps around the top and bottom should be used and a minimum of 250 mm (10 inches) overlap.

### **7.1 Manually Handled Shipments**

- The packaging must be designed to withstand the extra forces due to manual handling throughout the distribution process.
- Double-wall cartons with a minimum ECT value of 48 lb/in. and Mullen test value of 1896 kPa (275 lb per square inch) are preferred.
- All cartons must be securely taped on all flap edges in addition to the center.
- Cartons must be 190 mm (7.5 inches) x 160 mm (6 inches) x 25 mm (1 inch) or larger.

## 8.0 FRU and CRU Packaging Requirements

This section provides general packaging guidelines for field replaceable unit (FRU) and customer replaceable unit (CRU) packaging. The minimum requirements in this section have been established for the purpose of achieving damage-free delivery. Extra measures may be necessary if a higher assurance level of protection is needed.

### 8.1 Modular Carton Usage

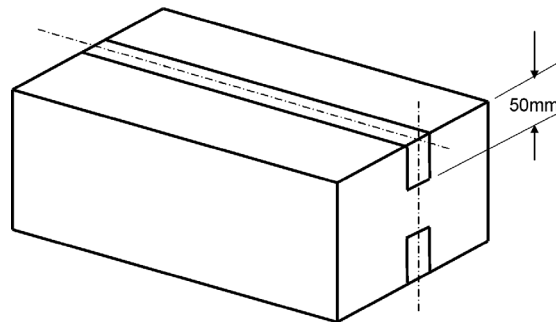
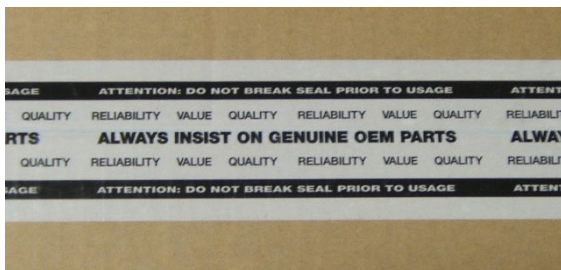
All FRUs and CRUs are to be packaged in cartons selected from the Modular Carton List, Lexmark PN 7374239. These carton sizes have been chosen to maximize the fit into a standard unit load shipper. Note that all cartons are subject to the standard Lexmark Package Verification Test. Also note that the minimum board strength for most FRU cartons is 275 psi Mullen Test (44 ECT). Deviations from the standard size or material must be approved by Packaging Engineering.

### 8.2 Marking and Labeling

See the product bill of materials (BOM).

### 8.3 FRU Quality Seal

All shippers of individually packaged FRUs are required to seal all cartons with the quality seal tape (Q tape). The specification for the Q tape can be found under Lexmark PN 7344648. In addition to security, this tape is meant to imply, "I guarantee the quality of this part as I make it, pack it, and seal it."



### 8.4 Element Protection

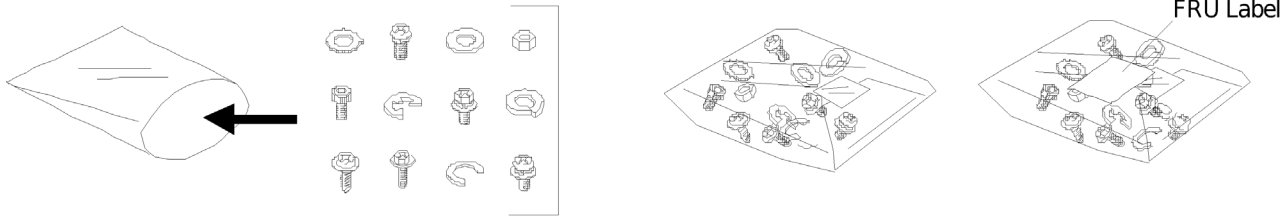
The minimum requirements for protection (shock, vibration, and compression) are specified in the "Lexmark Package Verification Test Specification." Upon passing the required performance tests, all finished goods packages and packages for fragile FRUs and CRUs are reviewed and approved by Lexmark Packaging Engineering.

Suppliers must use the packaging materials and methods specified by Lexmark in the bill of materials for each part. If the packaging materials and methods have not been specified by

Lexmark, then the suppliers must use the guidelines in this specification to assure damage-free delivery. The following illustrations are approved methods for packaging FRU parts.

**FRU–Bag-Only Packaging Method for Items Such as Screws, Bolts and Cables**

1. Put parts in poly bag.
2. Seal bag closed with tape, and then attach a FRU label.

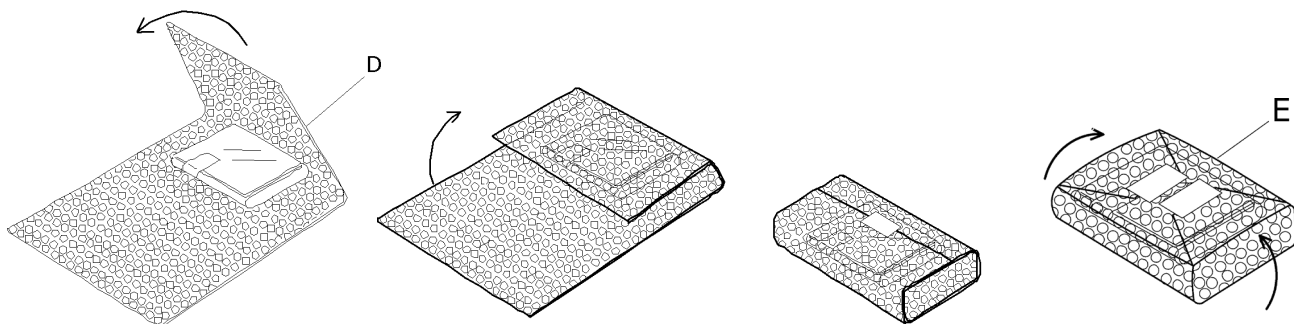


**FRU–Packaging of Printed Circuit Boards and Other Static-Sensitive Parts**

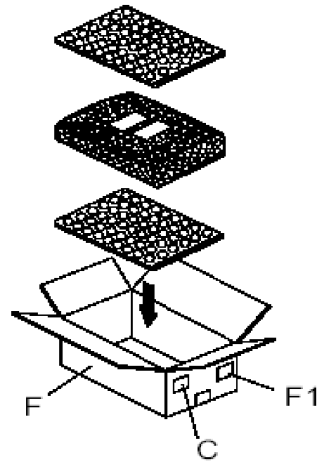


Printed boards (A) are to be placed in static shielding bags (B). Seal the bag with an ESD label (C) (Label Reference - ANSI/ESD S8.1-2012).

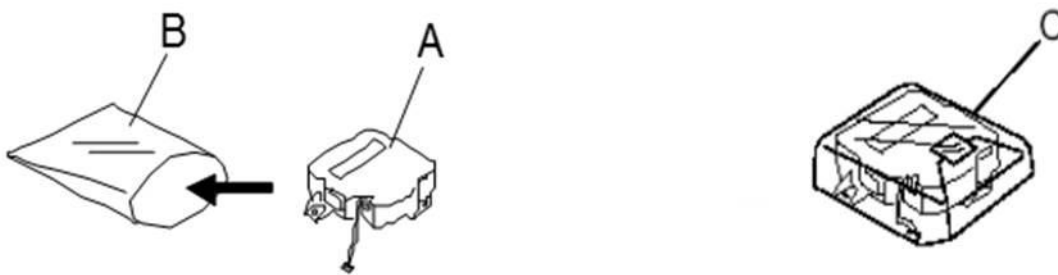
Wrap the part in protective material (D). If bubble wrap is used, then the bubble must be placed on the outside of the part, and the bubble itself must be a high-performance wrap with a minimum of 0.5 inch thickness. Fold the ends and tape it.



Place the wrapped product in a carton (F). Seal the carton with Q tape. Attach the FRU label (F1) and ESD label (C) on the outside of the carton (F).



#### 8.4.1 FRU—Loose Dunnage Packaging Method for Packaging FRUs

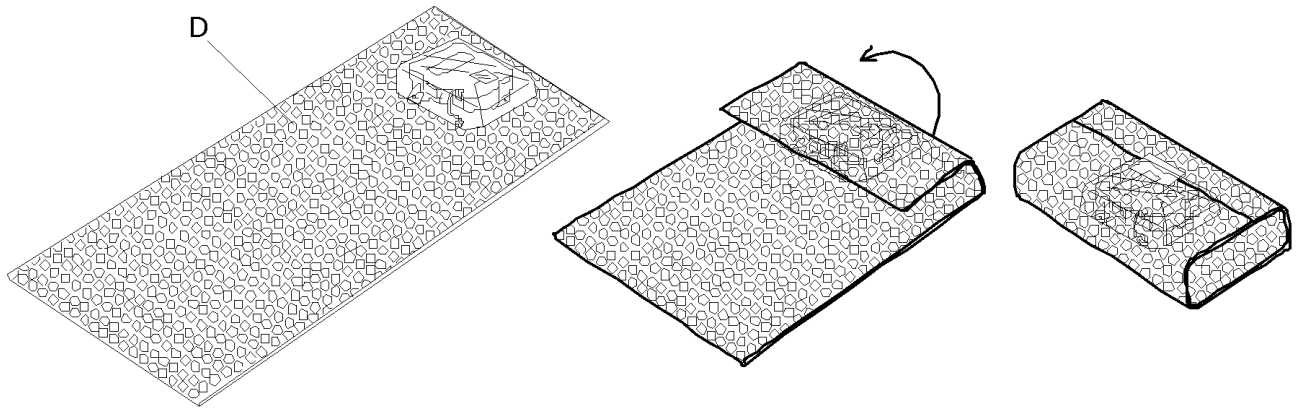


1. Put the part (A) in a poly bag (B).

2. Seal the poly bag with Q tape (C).

3. Wrap the part in protective material (D). If bubble wrap is used, then the bubble must be placed on the outside of the part, and the bubble itself must be a high-performance wrap with a minimum of 0.5 inch thickness. Do not use foam peanuts and printed newsprint dunnage.





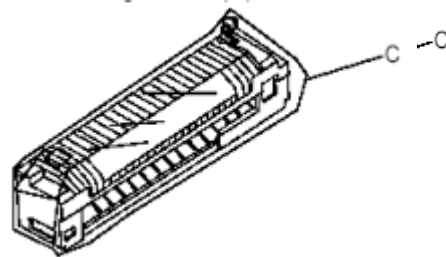
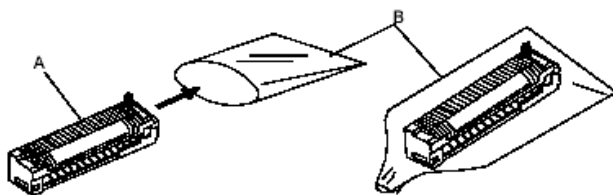
4. Fold the ends and tape it (E). Put the part in a FRU carton, seal the carton with Q tape, and attach the FRU label on the outside of the carton. Make sure to use enough packing material to fill up the FRU carton. The part must not be able to move freely in the carton.



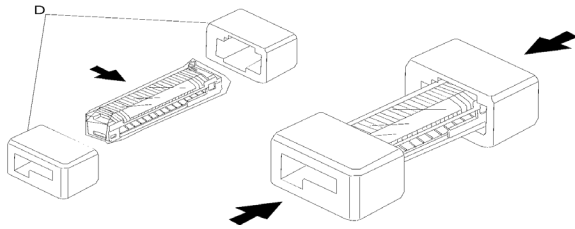
#### 8.4.2 FRU—Fabricated Foam Cushion Method for Packaging FRUs

1. Put the part (A) in a poly bag (B).

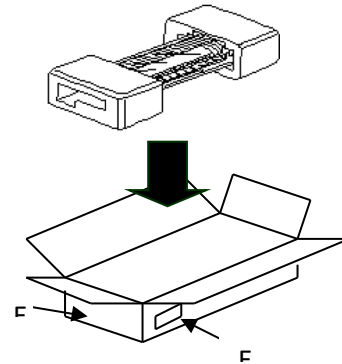
2. Seal the poly bag with Q tape (C).



3. Install foam cushions (D).



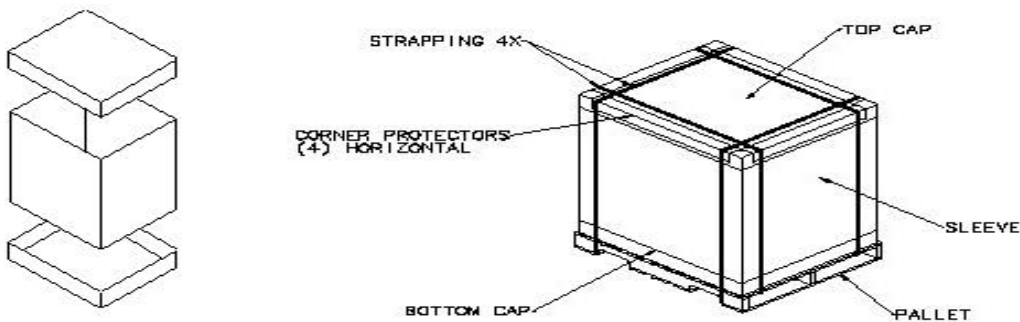
4. Put the part in a FRU carton (E), seal the carton with Q tape, and attach the FRU label on the outside



## 8.5 FRU/CRU Palletization

All palletized loads must comply with this specification. Do not use pressed wood pallets for FRU parts. All FRU/CRU parts are to be shipped on block style pallets in accordance with section 5.1.2.

Also, shipping in modular cartons (see section 8.1) and unit load shippers is required. After choosing a carton from the modular carton list and the appropriate unit load shipper, palletize as illustrated in the following image.



## 9.0 Product Shipments

### 9.1 Shipping Costs

When shipping, freight charges are calculated based on either weight or volume. Volume is calculated as the product of overall length, width, and height, including the pallet footprint. When the density is less than 6000 cubic cm per kg (166 cubic inches per lb.), a dimensional weight factor is used to determine shipping costs. To minimize shipping costs, follow these guidelines:

- Minimize voids and excessive dunnage whenever possible.
- Maximize pallet surface utilization (80 percent minimum).
- Cut down unit load shippers (over pack tubes) to match the actual height of the load.
- Loads must be cubic (flattop) in shape.
- Avoid one extra box on the top of an otherwise cubic load. Rather, ship the odd box separately.

## 9.2 Air Safety Requirements

4-way banding is required for all palletized air shipments.

## 9.3 Hazardous Materials

Package and ship hazardous materials (poisons, corrosives, flammables, batteries, magnets, and so on) in accordance with the established local and international legal requirements for safe transport and with United Nations Performance-Oriented Packaging recommendations as required by the governing regulatory agency.

- For air shipments, see the International Air Transport Association (IATA) Dangerous Goods Regulations and the Technical Instruction for the Safe Transport of Dangerous Goods by Air published by the International Civil Aviation Organization (ICAO).
- For ocean shipments, see the International Maritime Organization (IMO) volumes 1, 2, and 3.
- For truck shipments, see the U.S. Code of Federal Regulations (CFR), Title 49, Transportation, Parts 100-199.

## 10. Revision History

Revision Level	Date	Author	Description
001			Initial Release and any description
002			Major changes to Document
003	23MAR2017	ARUTLEDGE	Edit and new QE format document
004	24MAY2017	ARUTLEDGE	Edit section 1.3 bullet #3
005	18SEP2017	ARUTLEDGE	Added Reference List, Section 1.7
006	29AUG2018	ARUTLEDGE	Updated shippers' responsibility in section 1.3
007	29AUG2019	JFAIR	Updated sections 1.7, 2.0, 4.5, 5.1.2, 5.2, 6.3 and 8.5
008	06JAN2021	ARUTLEDGE	Updated section 4.4 and changed document owner
009	31OCT2022	ARUTLEDGE	Updated sections 2.1, 2.2, 2.4, 2.6, 2.8, 2.9, 4.2, 4.3, 6.1.2, 6.3, 9.2
010	27OCT2023	JFAIR	Updated 2.1.4, 2.1.12, 2.3, 2.9, 3.6.3