

PACKAGING STANDARDS

for Furniture

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This document contains minimum requirements for cartons, packaging, pallets and loading of furniture items



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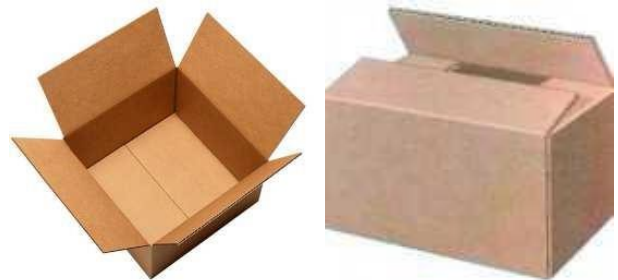
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1.0 MASTER CARTON

Ross uses the specifications for corrugated fiberboard per Rule 222 provided by the National Motor Freight Traffic Association. An outline is provided below. For more information and detailed specifications, please refer to www.nmfta.org

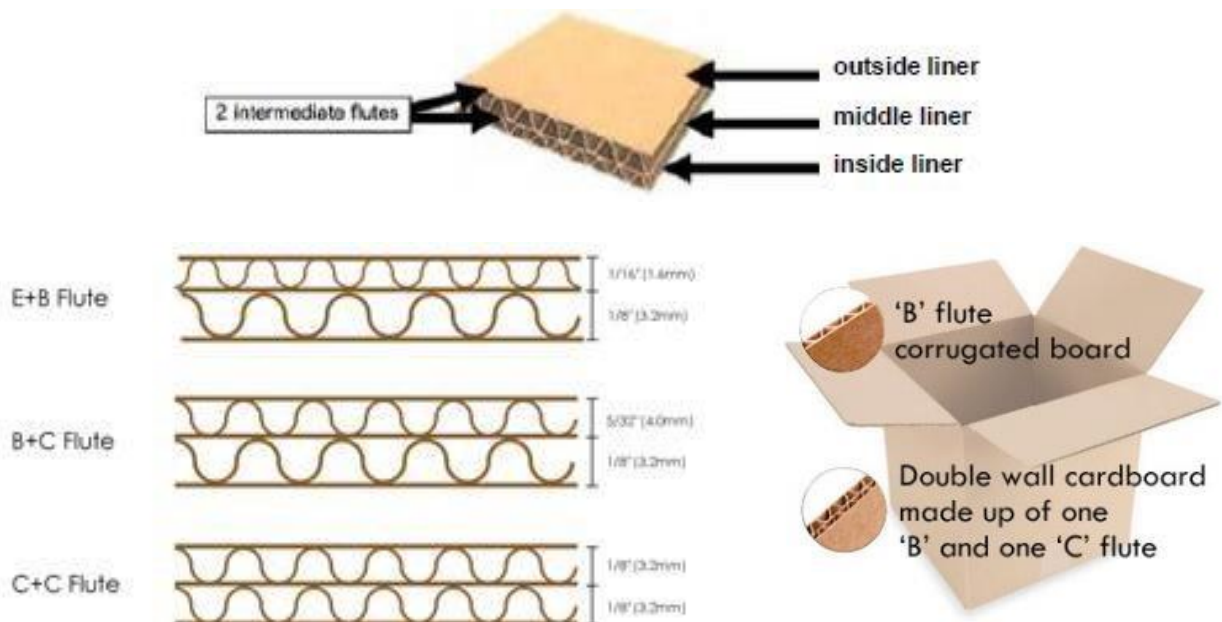
1.1 Carton Types

- All Vendors should use a regular slotted carton (RSC)
 - Flaps are the same depth, with the two major flaps being one-half of the carton's width so that they meet in the center of the box when folded
 - Do not use poly straps to seal individual carton
- Boxes must have manufacturer's joints formed by lapping the sides of the box forming the joint not less than 1 ¼ inches and fastening the joint glue or metal staples, spaced not more than 2 ½ inches apart
- Reused cartons are not acceptable
 - Cartons made from recycled cardboard that meet the standard Ross guidelines are acceptable



1.2 Acceptable Corrugated Thickness

- Minimum Standard:
 - Double- or Triple-Walled Corrugate: Corrugating medium with 2 or 3 flutes and 3 or 4 liners
 - Flutes must be B + C grade
 - *Minimum strength as determined by size (see weight matrix next page)*



1.3 Furniture Weight Matrix

- Burst Strength and Edge Crush Test strength are to be determined by weight of contents

Maximum Weight (lbs)	Size Limit of Box (inches)	Burst Strength minimum requirement	Edge Crush Test (ECT) minimum requirement
0-49	75	175 psi	32
50	85	200 psi	42
70	100	275 psi	48
75	105	350 psi	51
140	110	400 psi	61
160	115	500 psi	71
180 +	120 +	600 psi	82

**Per the NMFTA Rule 222 and Packaging 1F guidelines for furniture*

1.4 Testing

- In addition to meeting specifications above, the carton must also pass required testing. For testing requirements, see section **3.0 Carton Performance Testing**. Note, 3rd party testing is not required. All testing can be performed at the factory.

1.5 Required Carton Markings

- Cartons must have all of the following, on at least 2 sides:
 - Universal Fragile Symbol
 - The word "FRAGILE"
 - Directional arrows



- If the carton contains mirrors or glass, the words "MIRROR" or "GLASS" must be printed on the container



- The maximum carton size that can be conveyed is 30L x 24W x 24H or 50 lbs. If your carton is larger than this guideline, the words "DO NOT CONVEY" must be printed on the carton.
- Furniture containing Glass or Mirrors must always say "DO NOT CONVEY"
- Carton marking guidelines apply to both master and inner cartons

2.0 PACKAGING REQUIREMENTS

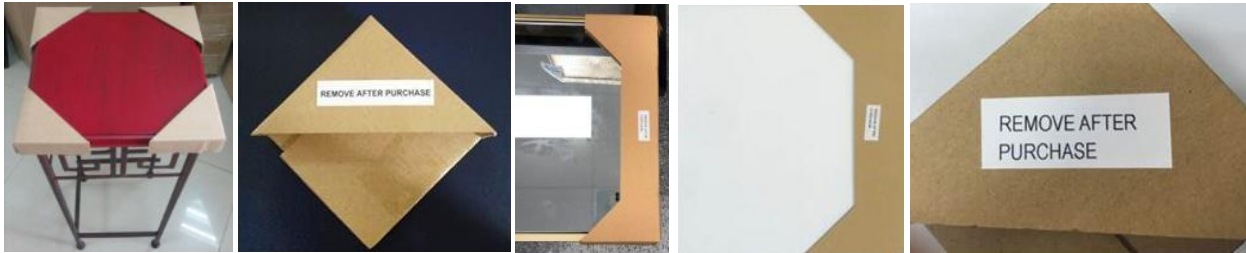
2.1 General Requirements

- Merchandise must fit firmly inside the carton, with no gaps between merchandise and protective packaging or carton wall
- Protective packaging must maintain a minimum of ¼-inch clearance between merchandise and carton wall
 - Corrugate or foam corner posts or foam edge protectors must be used when needed
 - **Round items** should be buffered on the corners with foam or rolled cardboard protectors to avoid direct contact with carton wall
 - Protective packaging must not come loose in transit and must not damage the merchandise when removed



2.2 Top Corner Protection

- **Item with sharp corners:** Add cardboard corner protectors with “Remove After Purchase” label



- **Packaging corners:** The corners and side edges must be completely protected by foam



2.3 Top Layer Protection

- A top layer of foam or corrugate must be between the carton seam and the furniture, to prevent cutting/scratching



2.4 Leg Protection

- Legs must be fully protected with corrugate, foam and/or MDF board



2.5 Metal Embellishments

- All metal or abrasive attachments, such as knobs, handles and decorative embellishments, must be covered to prevent surface abrasions while in transit

Examples of metal embellishments:



- Appropriate coverings include foam sheets and bubble wrap



2.6 Nesting Multiple Items

- If multiple units are in a carton, they must not be touching
- Provide a barrier of foam, bubble wrap or double walled corrugate between units



2.7 Mirror and Glass Items

• Requirements

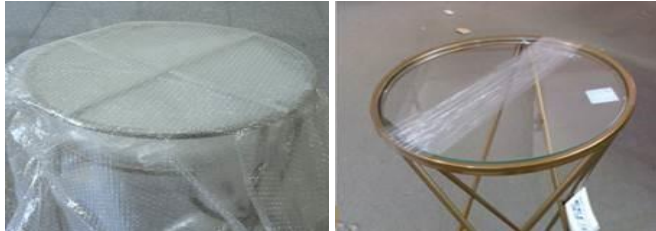
- Carton must be made of corrugated cardboard with at least 200 psi burst strength
- Protective packaging must maintain a minimum of 1½-inch clearance between merchandise and carton wall
- Face of the mirror/glass must be completely covered with foam sheets or bubble wrap



• 1-Tier or Multi-Tier with Mirror/Glass Top

○ Mirror/Glass Securement

- **1-Tier:** Loose glass must be wrapped with plastic wrap to the frame to keep glass in place



- **Multi-Tier:** Styrofoam must be used to cover the full surface of middle and bottom tiers and kept in place with zip tie



○ Protective Packaging

- A. Molded Styrofoam on the top and bottom, fit tightly around the item
- B. Bubble wrap around the entire item
- C. Styrofoam around all 4 sides of the item



3.0 CARTON PERFORMANCE TESTING

3.1 General Information

- Vendors must perform the Drop Test.
- Proof of carton testing must be provided to Ross upon Merchant request.

3.2 Conditioning

- The packaged products must be stored for 24 hours in the testing environment before testing. The tests should be conducted as soon as possible after the 24 hour conditioning period has been met.

3.3 Drop Test

- Perform 10 variations of drop tests at the height indicated in Table 1 below, based on carton weight.

Table 1

<i>Shipping Weight, lbs (kg)</i>	<i>Drop Height, inches (cm)</i>
0 - 61 (0 - 28)	18 (45.7)
61 - 100 (28 - 45)	12 (30.5)
100 - 150 (45 - 68)	8 (20)

1. Hold carton level to the ground, over a flat surface, oriented upright (arrows pointing up)
2. Drop carton in free-fall dead drop from the height specified in Table 1
3. Repeat free fall drops in Drop Sequence in Table 2, continuing with Sequence 2

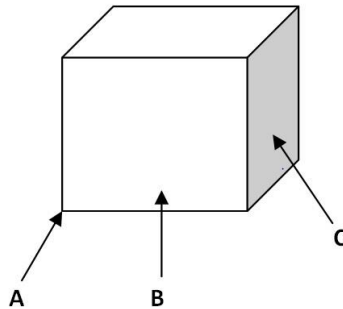


Table 2

<i>Sequence</i>	<i>Orientation</i>	<i>Specific face or edge</i>
1	Base	Bottom Face
2	Corner	Corner A
3	Edge	Shortest edge radiating from Corner A
4	Edge	Next shortest edge radiating from Corner A
5	Edge	Longest edge radiating from Corner A
6	Edge	Remaining bottom edge
7	Face	Face B
8	Face	Opposite side to Face B
9	Face	Face C
10	Face	Opposite side to Face C

3.4 Documentation

- Testing documentation must be presented to Ross merchants upon request

Date:	
Vendor:	
Styles:	

PACKAGE INFORMATION:

1. Container Dimensions:
2. Gross weight of packaged product:
3. Corrugated strength (i.e., 250 psi; 51 ECT):
4. Provide description of all packaging including Styrofoam, bubble wrap, etc.:

TESTING PERFORMED:

1. Was the test carton conditioned for 24 hours YES NO
2. Drop Test
 - a. Procedure A B
 - b. Free-Fall drop height:
 - c. # of Sequences:
3. Describe results of test below:

Provide photos of the test carton before and after testing.

4.0 MOLD PREVENTION (ALL FURNITURE)

4.1 General Guidelines

- Keep merchandise and cartons away from windows

Example of appropriate distance between window and merchandise:



- Maintain appropriate humidity levels in the facility that stores your corrugated cardboard
 - Ross recommends the use of a hygrometer to test moisture levels



4.2 Trailer Inspections

- Trailers must be inspected for holes or leaks before loading
 - Check for any damage to the wall or roof, and gaps or holes in the floor
 - Doors should close tightly and rubber seal must be in good condition
 - Containers must be clean and dry before loading
- Seal the air vents
- Do not load trailers in the rain unless your facility has a protective overhang



- After loading, make sure trailers are sealed tightly

4.3 Desiccant Bags

How much desiccant is needed to do the job?

Below is a simple REQUIREMENT CHART to assess how much Silica is needed to do the job inside each carton based on size of the box

Chart 1.1 - Reference dosage (silica):

<i>Carton Volume (m3)</i>	<i>Weight of desiccant bag (G)</i>
<0.001	1-3G
0.01-0.05	3-15G
0.05-0.1	15-30G
0.1-0.3	30-100G
0.3-0.5	100-150G
0.5-1	150-300G

RECOMMENDATION

Based on desiccant manufacturer feedback, the product must include the appropriate amount of silica (Chart 1.1) accompanied by the appropriate amount of calcium chloride desiccant hung in the container (Chart 2.1).

Vendors must protect goods from the elements during storage, transfer and loading.

Bamboo and wood products are recommended to use anti-stain treatment which provides a microscopic barrier against molds that last from 3-6 months, as well as heat treatment to prevent mold and insects.

The following outlines the recommended process at the vendor's factory.

PRODUCT PREPARATION

1. Product Protection:

- a. Seal goods with an appropriately volume of silica desiccant (see chart 1.1)



CONTAINER PREPARATION

2. Container Inspection:
 - a. Check for any damage on the containers such as holes in the walls or in the roof, gaps or holes in the floor
 - b. Doors should close tightly, and rubber seal must be in good conditions
 - c. Containers should be clean and dry before loading
3. Check the moisture content of container floors
 - a. If possible, do not use containers with over 20% moisture content
 - b. If this is not possible, adjust the number of desiccant bags used in the container, add 1kg desiccant for each 1.5% moisture content
 - c. Do not use container with floors with moisture contents in excess of 25%
4. Seal air vents
5. Remove container desiccant from plastic bag
6. Hang the units in even spacing from securing points on side walls just under roof throughout the container*



Chart 2.1 - Reference dosage (Calcium Chloride):

Container Size	20'	40'	40HC	45'
Kg of Desiccant	8-10	15-20	19-24	22-27

**If there is a very tight fit in container, the desiccants units may be laid flat on top of cartons. However hanging should be appropriate for the vast majority of containers. Desiccants absorb water and moisture. Therefore the sacs/bags will increase volume and need space. There should be no pressure on the desiccants.*

7. Close/Seal the container doors.

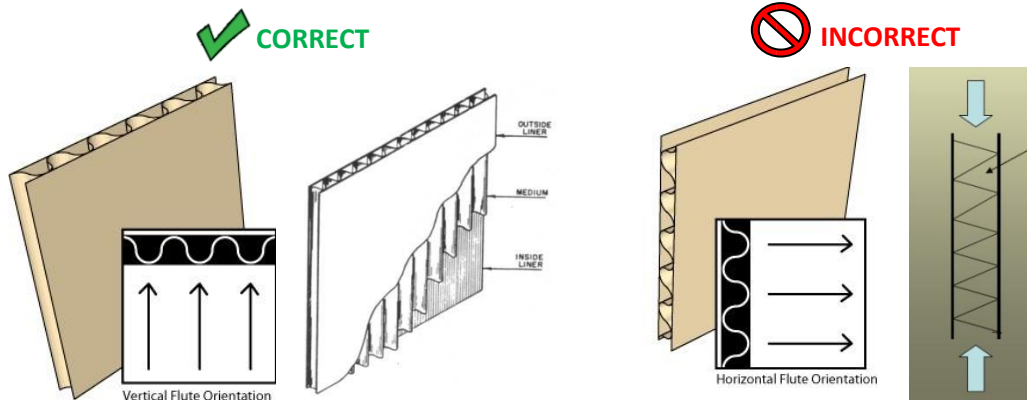
PROPER DESICCANT SPECS/STORAGE

Each desiccant pack should come from supplier in individual, sealed bags only to be opened at time of placement in the container. Ideally, multiple packs would be aggregated in a larger bag placed inside a carton to protect the integrity of the individual packs. All desiccant materials should be stored in an environment safe from weather and secure from accidental damage. Any packs showing leakage (punctures or tears) are not to be used and should be discarded.

5.0 LOAD REQUIREMENTS

5.1 Container / Trailer Loading

- Cartons must be loaded according to the directional arrows
 - Directional arrows must correspond to the direction of the flutes
 - Flutes must be vertical to be effective (*The inherent structural strength of any corrugated board is created by the fluting*)



- Horizontal flutes are not as effective (or as “strong”) as vertical flutes, and more like to give under pressure



- Do not stack rows higher than carton strength can withstand based on weight of merchandise and carton burst strength/ECT
- The top 1 or 2 rows do not need to follow the orientation in order to maximize the cube of the container. We have found crushed cartons when orientation is not followed. Examples below:



- Cartons must not be able to tilt or shift in transit. Fill any open space with corrugate of empty unmarked cardboard boxes in order to minimize shift in the container.
- Make sure Mold Prevention best practices are followed (see section 4.0 Mold Prevention)

5.2 Pallet Shipping (for domestic POs)

- Choose a pallet size that best fits the product. Half-pallets, quarter-pallets, and custom pallets are acceptable for use, with the stipulation that the pallet can be handled using a standard pallet jack and fork lift.
- Secure merchandise firmly to the pallet
- Make sure pallets are labeled correctly, fragile markings are clearly visible and directional arrows are followed

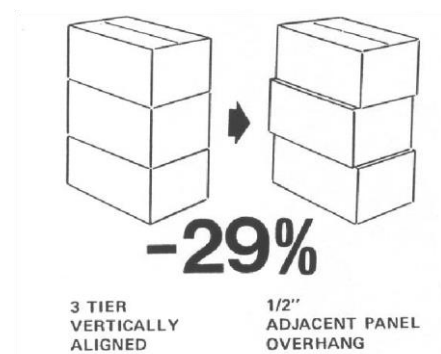


- Use V-boards along the corners of palletized merchandise to secure cartons firmly and increase weight tolerance. (Please see the “correct” photo above as an example of v-boards in use)
- Assorted merchandise will ship intact to the stores



5.3 Floor Loading (for import POs)

- All cartons must be stacked neatly and secured within the container
- Cartons must be aligned appropriately. Cartons stacked one on top of the other will have a higher compression strength than cartons that are misaligned.



- Cartons must not be able to tilt or shift in transit



GLOSSARY OF TERMS

- ***Burst Strength***
The force required to rupture corrugated combined board with a rubber diaphragm; relates indirectly to a box's ability to withstand external or internal forces (according to industry standards)
- ***Corrugated Board***
One or more sheets of fluted corrugating medium to two flat facings of linerboard
- ***Corrugating Medium***
The paper inside the corrugated board (wavy), between the flat liners
- ***Double Wall Corrugated Board***
Three flat liners alternating with two corrugating mediums
- ***ECT (Edge Crush Test)***
The amount of force needed to cause compressive failure of an on-edge specimen of corrugated board; a primary factor in predicting the compression strength of a completed box (according to industry standards)
- ***Flaps***
Extension of the panels that form the four side walls of a box. When folded, flaps must be sealed securely with tape, adhesive, or wire stitches
- ***Flutes***
The ridges in the corrugated medium. The Ross standard required flute size is B/C.
- ***RSC (Regular Slotted Containers)***
A box style manufactured from a single sheet of corrugated board. Flaps extending from the side and end panels form the top and bottom of the box. The two outer flaps are on-half of the container's width so that they meet at the center of the box when the user folds them. Flute direction is normally vertical.
- ***Top-opening Regular Slotted Container***
An RSC designed to be filled from the top and remain upright. The flute direction is normally vertical, providing maximum stacking strength.