

# GENERAL REQUIREMENTS FOR BOX AND PALLET LOADING

## RECORD OF CHANGES

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**Written:** Michael Bohlen**Approved:** Dan Eggert

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CORPORATE STANDARD

File No. 19-0

TABLE OF CONTENTS

Section	Page
1.0 SCOPE .....	3
2.0 REFERENCE.....	3
3.0 GENERAL.....	4

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## 1.0 SCOPE

This document describes requirements for consolidating nonbulk items into boxes and onto pallets for inbound, interplant, and outbound shipments by Snap-on and suppliers. In case of conflicting information, the drawing, contract, or any prevailing laws and regulations shall take precedence.

## 2.0 REFERENCE

Snap-on prefers three pallet sizes:

1. GMA 48 x 40 inch (1219 x 1016 mm), partial 4-way entry stringer pallet;



2. EUR-2 1200 x 1000 mm (47-1/4" x 39-3/8") block style pallets; and,






3. EUR-3 1200 x 1000 mm (39-3/8" x 47-1/4") block style pallet.



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### 3.0 GENERAL

- When selecting box sizes for consolidation and pallet loading, consider the ergonomics of handling large, awkward, and/or heavy products by following these guidelines:

Package Weight or Size	Lifting Safety Symbol	Handles/Hand Holes	Description
0 - 24 LBS (0 - 11 KG) <u>AND ALL DIMS &lt; 20"</u> (500 mm)	<b>NONE</b>	<b>NONE</b>	<b>Standard Package - 1 Person Lift</b> Package handling is not likely to cause harm during normal operations
0 - 24 LBS (0 - 11 KG) <u>AND ONE DIM &gt; 20"</u> (500 mm)	<b>NONE</b>	<b>TWO</b>	<b>Standard Package - 1 Person Lift</b> Handling can be improved and fatigue reduced with convenient locations to firmly grasp the package.
25 - 35 LBS (12 - 16 KG) <u>OR ONE DIM &gt; 30"</u> (760 mm)	 25 - 35 lbs. (12 - 16 kg)	<b>TWO</b>	<b>Heavy or Awkward Package – 1 Person Lift</b> Applied when the package is in the range of 25-35 lbs. (12-16 kg) OR one dimension is greater than 30" (760 mm). The package should have two handles or hand holes to make it easier for lifting/carrying.
26 - 70 LBS (16 - 32 KG) <u>OR TWO DIMS &gt; 30"</u> (760 mm) <u>OR ONE DIM &gt; 42"</u>	 36 - 70 lbs. (16 - 32 kg)	<b>FOUR</b>	<b>Large Heavy Package – 2 Person Lift</b> Applied when the package is in the range of 36-70 lbs. (16-32 kg) OR two dimensions are greater than 30" (760 mm) OR one dimension is greater than 42" (1060 mm). The package should have four handles or hand holes to make it easier for two persons to lift and carry.
> 70 LBS (32 KG) OR CONVEYED BY PALLET	 over 70 lbs. (32 kg)	<b>NONE</b>	<b>Very Heavy Package - Mechanical Lift Only</b> Applied whenever the package weight exceeds 70 lbs. (32 kg) or is of such size as to be conveyed on a pallet.

- To promote identification and stability, all items must be palletized and uniformly arranged.
- Floor loading (i.e., practice of not using pallets) of containers or trailers is prohibited.
- Use only solid wood pallets.
- Paperboard, corrugated, or composite wood based pallets are prohibited.
- Pallet load footprint should be approximately 45 x 37 ±2 inches (1194 x 991 ±50 mm).
- Product(s) cannot overhang the pallet edges and maximize pallet area without gaps between units.
- Pallet loads should be less than 1,000 lbs (455 kg) unless otherwise preapproved by Snap-on.
- Preferred load heights (excluding pallet): Full load height < 48" (1219 mm), Half load height < 24" (610 mm), and Quarter load height < 12" (305 mm).

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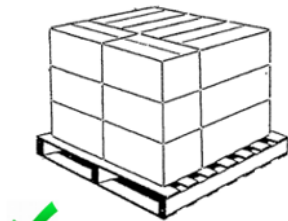
10. Pallet loads must be configured for safe stacking of additional pallets.
  - Ensure that the top surface of the loading pallet is level for stacking purposes. Otherwise, place products inside a closed-top bulk container of sufficient strength.
11. Visually inspect pallets before use for excessive wear and tear. Avoid pallets where top deck board spacing exceeds 4 inches (100 mm).
  - Multiple-layered pallet loads should have a sheet of paper or fiberboard placed between every other layer to increase load stability and maintain package integrity.
  - For lightweight brown/nonretail cartons use 50-pound basis weight kraft paper or similar.
  - For heavier brown/nonretail boxes use solid or corrugated fiberboard between layers.
  - For printed retail cartons, use nonabrasive layer sheets of paper or poly foam between layers to minimize abrasion.
  - Products that are individually shrink-wrapped, in glossy packaging, or otherwise have slippery surfaces will require nonslip layer sheets.
12. Pallet loads must have a stacking strength equivalent to:
  - 2-high whenever the load on the bottom-most box exceeds 750 lbs.
  - 3-high whenever the load on the bottom-most box is less than 750 lbs.
  - The stacking strength must accommodate a safety factor of 3 for corrugated containers or 2 for rigid containers (wood, steel, plastic, etc.).

*Example: A pallet load has 32 corrugated boxes (4 layers with 8 boxes per lay) and a total weight of 992 lbs. The load on the bottom-most box is 11 (number of loads stacked on top) x 31.3 lbs (992÷32) = 344 lbs. Therefore, the stacking strength of the carton must be capable of 344 x 3(safety factor) = 1,032 lbs. Suitable corner supports and top stacking frames may be necessary to meet this requirement.*
13. Top and bottom trays are recommended to distribute weight and stabilize loads.
  - Horizontal edge protectors are not required when using top or bottom trays.
14. Edge protectors at each vertical corner and each horizontal edge are required.
  - Use 2" x 2" (50 x 50 mm) x .160 inch (4 mm) thickness or larger solid fiberboard edge protection.
  - Vertical edge protectors must extend the entire load height.
15. Pyramid stacking is prohibited.
16. Use column stacking patterns to maximize corner-to-corner stacking strength of corrugated boxes.
  - Caution: If using interlock patterns, increase box compression strength by 40%-50%.

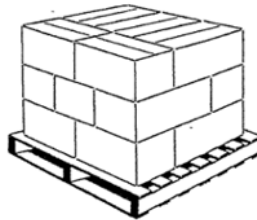
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Revision B: 2020JAN17

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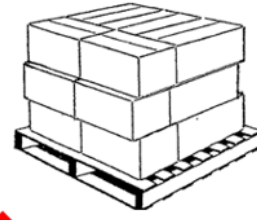
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✓ Column stacking



! Interlock (brick) stacking



✗ Misaligned stacking

17. Whenever possible, orient packages with label side outward and/or use additional labels on outward facing surfaces.
18. Avoid long-term storage (> 6 mos.) under load (50% less strength).
19. Avoid prolonged periods of high humidity, 80%-90%, storage (52% less strength).
20. Use of “DO NOT STACK” labels, symbols, or marking is prohibited without prior approval.
21. Heavier items should be floor loaded first with lighter items on top.
22. Containers shall be securely closed to prevent spillage during transit. For corrugated & fiberboard boxes, refer to ASTM D1974 for guidance. However, stapled closures are prohibited.
23. When the size of the individual shipping container does not fit any of the load patterns of Appendix A, the proposed load pattern or request to use a different size pallet shall be submitted to Snap-on for approval.

**Mixed Loads:** Individual products, that otherwise would ship in less than full pallet load quantities, may be consolidated onto the same pallet with other products using the following guidelines:

1. Must have prior approval of the Snap-on receiving facility.
2. Must have a mixed load label.
3. Packing slip must identify entire contents of load.
4. No mixing multiple destinations on the same load.
5. All labels must be facing outwards.
6. The weight must be distributed evenly.
7. Heaviest parts must be placed on bottom layer.
8. Each layer must be level. Use empty containers as filler when needed.

**Partial Layers:**

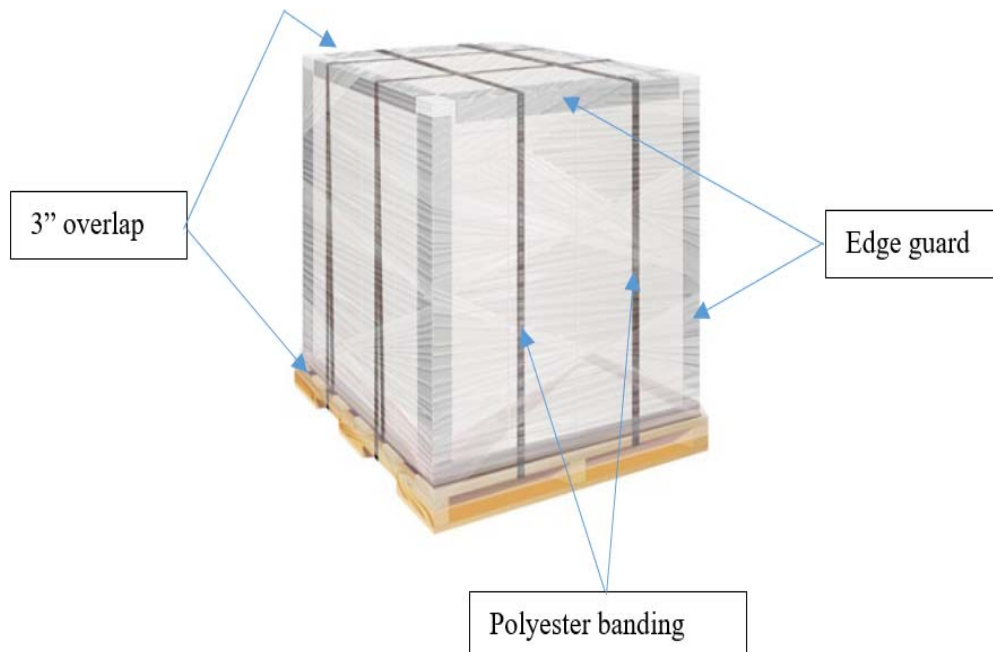
1. If the top layer is > 2/3 filled, complete layer by using filler boxes marked “EMPTY.” Apply a mixed load label.
2. If the top layer is < 2/3 filled, move the entire layer onto a separate pallet.
3. Partial loads should be shipped, centered on a pallet with no voids.

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Revision B: 2020JAN17

**CORPORATE STANDARD****File No. 19-0****Securing Loads to Pallets:**

1. Both banding and stretch wrapping is required unless approved otherwise by Snap-on.
2. Single bulk containers or Gaylords may be attached to the pallet by banding or stretch wrap. Do not staple the container to the pallet.
3. Banding - Use at least 2 bands in each direction (4 bands total) to secure the load to the pallet.
  - Banding to conform to ASTM D3950, Type IV, polyester, with a minimum breaking strength exceeding 2,250 lbf (10,000 N).
4. Tighten banding sufficiently to retain products without crushing the packaging.
5. Banding to be welded or mechanically clinched.
6. Steel banding is prohibited.
7. Stretch wrapping - Wrap freight tightly to prevent load shifting.
  - Use at least 70-gauge LLDPE stretch wrap of sufficient clarity to allow scanning of bar codes.
  - To manually apply stretch wrap, tuck the lead wrap between the pallet and the bottom box. Spiral around the boxes in an upward direction, overlapping the film by 50 percent. When you reach the top, stretch the film diagonally over the top corners with a 3" overlap to anchor the stack vertically before spiraling back to the bottom to finish the load with a 3" overlap of the pallet.
8. Horizontal banding of corrugated boxes is prohibited.

**General Box Packing Requirements:**

1. Filled boxes should not exceed 35 lbs (16 kg) whenever possible.

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Revision B: 2020JAN17

**CORPORATE STANDARD****File No. 19-0**

2. Filled boxes should not exceed 30” in any direction whenever possible.
3. Pack boxes with items relating to only one purchase order (PO).
4. If boxes must contain items from different POs, then apply the “Mixed” label and limit box contents to five or less POs.
5. Boxes and packing materials must sufficiently protect items in transit.
6. Use large-sized dunnage, such as air pillows, full sheets of paper, sheet foam or bubble wrap. Do not use loose fill of any kind, such as Styrofoam peanuts or shredded paper.
7. Choose boxes of sufficient strength for weight and size of item. Whenever possible use standard box sizes to maximize pallet efficiency.
8. Plastic bags used to package parts inside totes, boxes, and/or bulk containers shall be marked with the part number, quantity, and lot number (if applicable) in plain text and bar code otherwise specified.
9. Prevent part-to-part contact.

**Standard Boxes:** Unless otherwise specified, “nonmerchandised” products and material are to be shipped in corrugated containers listed in Appendix A. The standard container sizes are intended to ship in full layer increments for effective utilization of standard pallets.

1. For HSC style boxes – use one common top cover for entire layer rather than individual top covers whenever possible.
2. Parts plus dunnage should fill the entire box to prevent collapsing using corrugated inserts, folded shapes, and air-filled pillow pads. Styrofoam and other poly foam products are discouraged. Loose fill dunnage is prohibited.
3. All boxes must display the box maker’s certificate in a conspicuous location on the bottom major flap and be visible on the assembled container.

**Unit Containers** – The first enclosure for a standard unit issue or SKU. Sometimes the unit container is sturdy enough to be used as the shipping container. Other times it may require additional outer packaging.

1. Minimize empty space within the unit container with dunnage or inserts to secure the item in place. Do not use loose fill dunnage.

**Intermediate Containers** – Whenever possible use standard size containers to bundle multiple quantities of the same SKU for ease of handling. Do not mix SKUs within the same intermediate container unless the SKUs are a defined kit or bundled promotion.

1. Can be used as the shipper container whenever the quantity shipped to a single destination fills two or more intermediate containers.

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Revision B: 2020JAN17

**CORPORATE STANDARD****File No. 19-0**

2. Use whenever the unit pack is a bag or wrap.
3. Use whenever the unit pack is smaller than 64 cu. in. (e.g., 4" x 4" x 4")
4. Maximum of 100 unit containers or 40 lbs total allowed per intermediate container.

**Bulk Containers:** All nonstandard expendable containers (such as Gaylords or bulk containers) shipped on pallets must be adequately secured to the pallets. Nails, screws, metal staples, metal strapping, metal clips or banding buckles, glue or PVC film to secure loads to pallets are prohibited.

1. Container loads shall not overhang the pallet and have a maximum footprint of 39.25" x 47.25".
2. The overall height when palletized should not exceed 50".
3. Container loads must provide for dynamic (in transit) loading of 3X the static (in storage) load and must have sufficient strength to stack to a height of 100 in.
4. Suitable corner supports and top stacking frames may be necessary to meet this requirement.

Examples:



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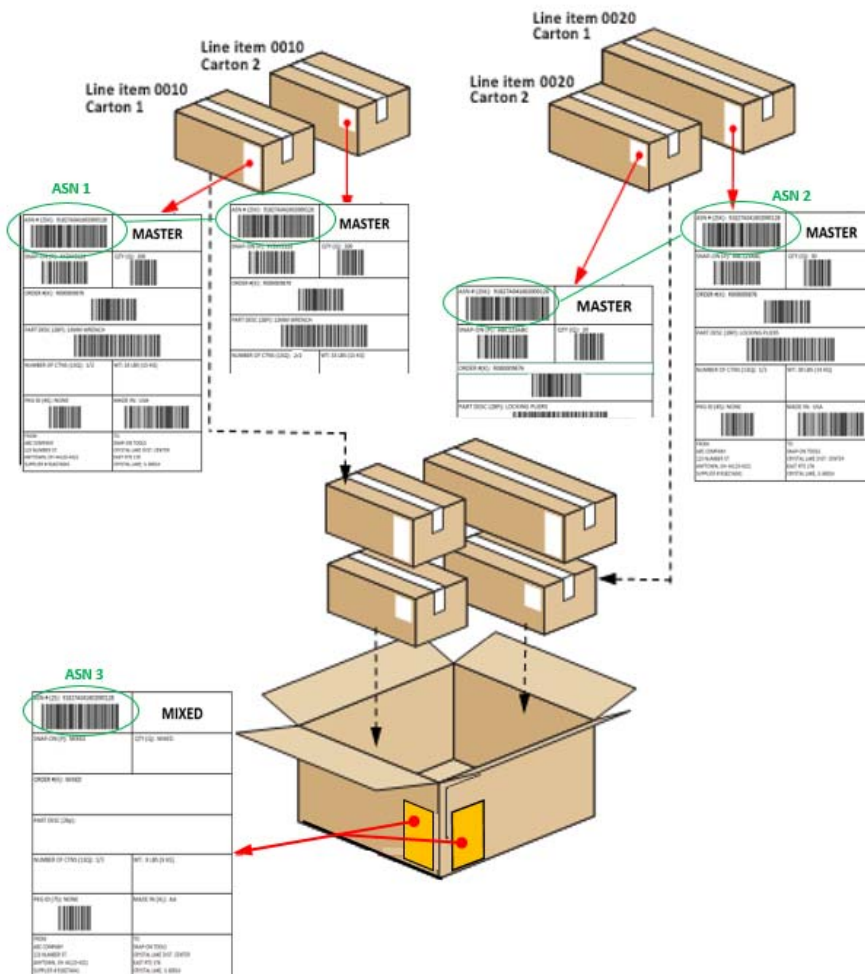
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**File No. 19-0**

**Box Consolidation:**

1. Each PO line item may be packed in multiple boxes containing one or several identical parts.
2. The quantity per box must be consistent and the box properly labeled.
3. Unit packs for each PO line item can be further consolidated into intermediate containers:
  - Do not mix POs within the same intermediate containers,
  - Do not mix line items within the same intermediate containers,
  - The intermediate container must be properly labeled,
  - Do not mix SKUs inside the intermediate container.
4. A mix of intermediate containers can be consolidated into shipping boxes as long as all items are part of the same PO and being shipped to the same location.
5. The shipping box must be properly labeled and identified as “MIXED” any time multiple SKUs or line items are inside.

Example:



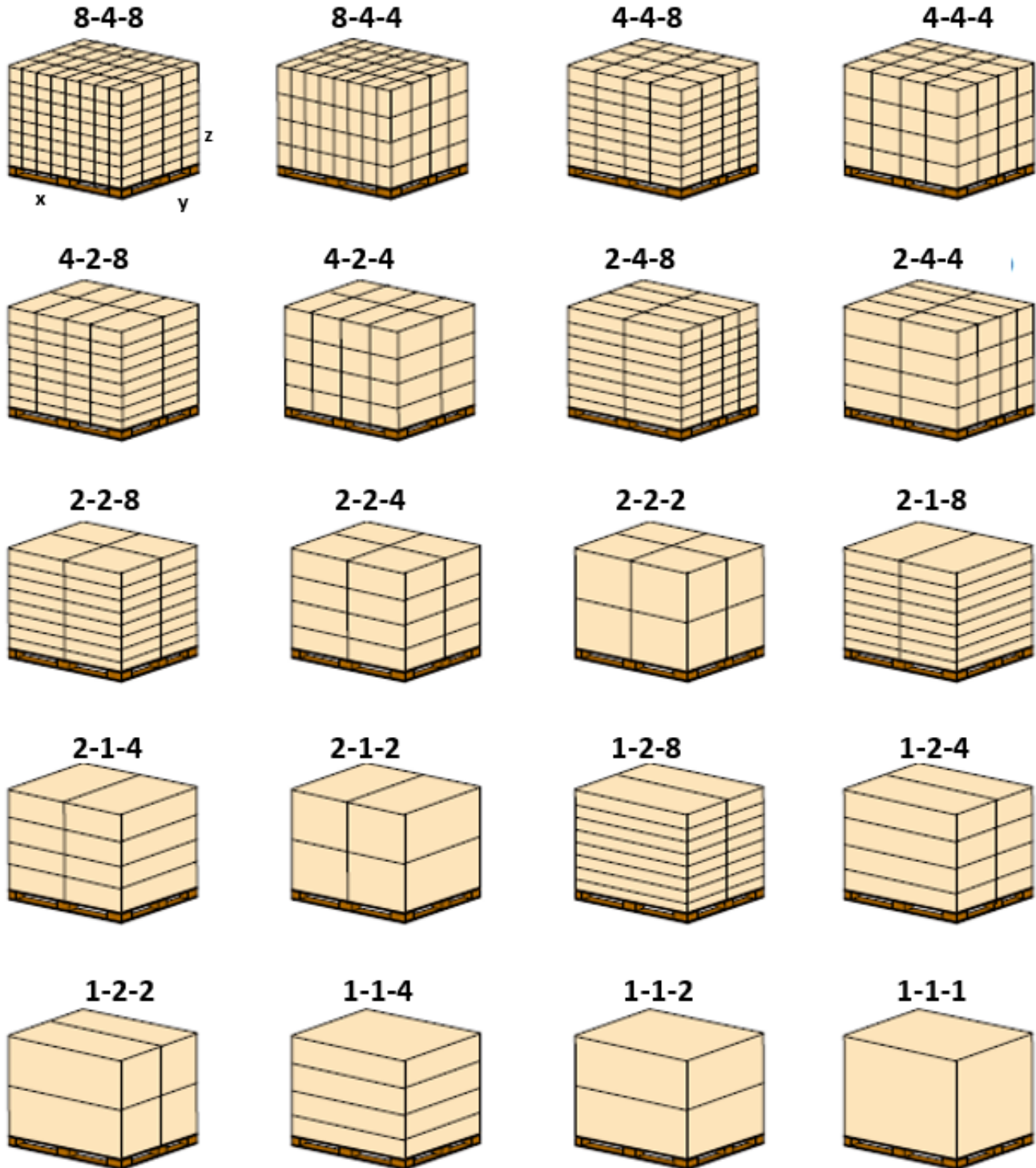
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Revision B: 2020JAN17

### CORPORATE STANDARD

File No. 19-0

#### Appendix A – Standard Pallet Patterns:



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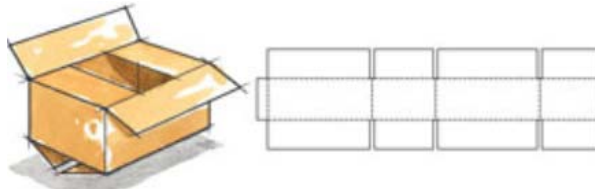
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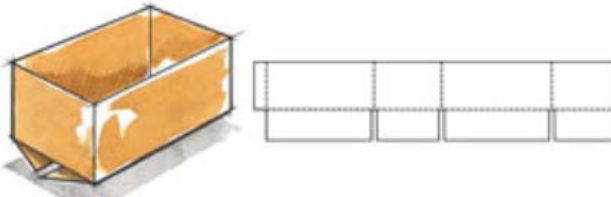
Appendix A – Standard Corrugated Boxes:

box #	pallet pattern			box size - inside dims			box classification				box size - outside dims		
	rows	columns	layers	l (id)	w (id)	h (id)	Style	Variety	Grade	Caliper	L (od)	W (od)	H (od)
8-4-8	8	4	8	9 5/16	5 9/16	5 1/4	RSC	SW	275	0.175	9 7/8	5 15/16	6
8-4-4	8	4	4	9 5/16	5 9/16	11 1/4	RSC	SW	275	0.175	9 7/8	5 15/16	12
4-4-8	4	4	8	11 5/16	9 1/2	5 1/4	RSC	SW	275	0.175	11 13/16	9 7/8	6
4-4-4	4	4	4	11 5/16	9 1/2	11 1/4	RSC	SW	275	0.175	11 13/16	9 7/8	12
4-2-8	4	2	8	18 3/4	11 1/4	4 3/4	RSC	DW	350	0.282	19 11/16	11 13/16	6
4-2-4	4	2	4	18 3/4	11 1/4	10 3/4	RSC	DW	350	0.282	19 11/16	11 13/16	12
2-4-8	2	4	8	22 3/4	9 1/2	4 3/4	RSC	DW	350	0.282	23 5/8	9 7/8	6
2-4-4	2	4	4	22 3/4	9 1/2	10 3/4	RSC	DW	350	0.282	23 5/8	9 7/8	12
2-2-8	2	2	8	22 3/4	19 1/8	4 3/4	RSC	DW	600	0.307	23 5/8	19 11/16	6 5/8
2-2-4	2	2	4	22 3/4	19 1/8	10 3/4	RSC	DW	600	0.307	23 5/8	19 11/16	12
2-2-2	2	2	2	22 3/4	19 1/8	22 3/4	RSC	DW	350	0.282	23 5/8	19 11/16	24
2-1-8	2	1	8	38 1/2	23	4 3/4	RSC	DW	600	0.307	39 3/8	23 5/8	6 5/8
2-1-4	2	1	4	38 1/2	23	10 3/4	RSC	DW	600	0.307	39 3/8	23 5/8	12
2-1-2	2	1	2	38 1/2	23	22 3/4	RSC	DW	350	0.282	39 3/8	23 5/8	24
1-2-8	1	2	8	46 3/8	19 1/8	4 3/4	RSC	DW	600	0.307	47 1/4	19 11/16	6 5/8
1-2-4	1	2	4	46 3/8	19 1/8	10 3/4	RSC	DW	600	0.307	47 1/4	19 11/16	12
1-2-2	1	2	2	46 3/8	19 1/8	22 3/4	RSC	DW	350	0.282	47 1/4	19 11/16	24
1-1-4	1	1	4	45 3/4	38 3/8	10	RSC	TW	900	0.506	47 1/4	39 3/8	11 1/4
1-1-2	1	1	2	45 3/4	38 3/8	22	RSC	TW	900	0.506	47 1/4	39 3/8	23 1/4
1-1-1	1	1	1	45 3/4	38 3/8	46	RSC	TW	900	0.506	47 1/4	39 3/8	47 1/4

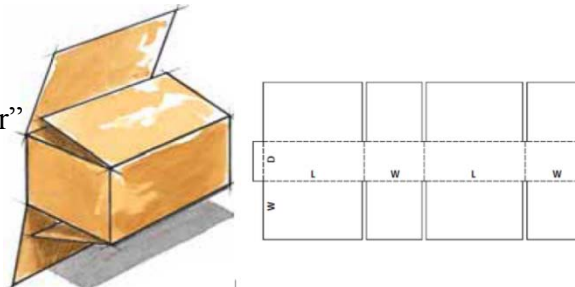
RSC “Regular Slotted Container”



HSC “Half Slotted Container”



FOL “Full Overlap Slotted Container”



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