MOTUS INTEGRATED TECHNOLOGIES

SUPPLIER PACKAGING STANDARDS MANUAL

TABLE OF CONTENTS

OBJECTIVE

The purpose of this manual is to provide Leon Motus suppliers packaging standards to ensure that the most effective packaging is used. To achieve this, suppliers must adhere to the guidelines stated in this manual and work with Motus packaging when necessary. Successful packaging will:

- Deliver product free of damage
- Be as ergonomic as possible
- Be cost effective
- Be logistically efficient

RESPONSIBILITY OF THE SUPPLIER

Leon Motus Suppliers are responsible for:

- Designing and obtaining product packaging
- Providing a completed Motus Packaging Data Sheet (PDS) to the Motus purchasing department (See page 4 for example)
- Making sure that all packaging used has been approved through Motus PDS submission and approval by Motus packaging engineer(s)
- Communicating packaging related concerns with Motus packaging engineer(s)
- Having Motus packaging approval for any deviations from standards listed in this manual
- Submitting new PDS's for any change implemented to the packaging
- Storing containers inside
- Cleaning and repairing returnable containers when necessary
- Making sure that the proper fleet size for returnable containers is obtained and maintained
- Have the ability to ship parts in pre-production packaging for trials
- Maintain sufficient supply of packaging at all times and have backup expendable packaging for returnable packs
- Providing packaging that protects the product for a minimum of 30 days for North American shipments and 90 days for offshore shipments (note: air shipments may require specifying heavier duty packaging materials)

***Note: All packaging should be designed to efficiently cube out a pallet load with a standard automotive footprint of 48"x45" or 32"x30" whenever possible. If deviations to these footprints must be made it needs to be approved by the Motus Packaging Engineer(s).

- ***Note: Motus approval of product packaging doesn't eliminate supplier responsibility for packaging issues

MOTUS PACKAGING DATA SHEET (PDS)

MOTUS PACKAGING DATA SHEET (PDS)				Date	Rev. Level:

Section 1: Supplier Information

Program	Annual Volume	Supplier Name	Supplier Contact	Fax
Model Year	**Motus Plant Location**	**Supplier Plant Location**	**Cell Phone**	**Email**

Section 2: Part Information

Motus Part Number	Part Material	Part Dimensions (inches)		
		Length	Width	Height
Supplier Part Name	Part Weight (lbs)			

Section 3: Container Information

Primary Container

Expendable or Returnable	Container Type	Container Dimensions (inches)		
		Length	Width	Height
		(Outside Length)	(Outside Width)	(Outside Height)
Parts/Container	Container Weight (lbs, with parts)			
		(Inside Length)	(Inside Width)	(Inside Height)

Dunnage

Dunnage Description	Expendable or Returnable	Quantity/Container
Dunnage Description	Expendable or Returnable	Quantity/Container
Dunnage Description	Expendable or Returnable	Quantity/Container

Section 4: Pallet Load Information

Expendable or Returnable Pallet	Layers/Pallet	Unit Load Dimensions (inches)		
		length	width	height
Containers/Layer	Containers/Pallet			
	-			
Pallet Type/Description	Lid Type/Description	Stretch Wrap or Banding		

Section 5: Images

Part	Part in Pack	Unit Load

Section 6: Motus Approval Signatures

Supplier Packaging Engineer	Manucturing	Ergonomics	Purchasing
Motus Packaging Engineer	Quality	Materials	Other

EXPENDABLE PACKAGING GUIDELINES

HANDHELD EXPENDABLE CONTAINER REQUIREMENTS

- Handheld containers should be HSC style boxes (Figure 1) unless the box height is under 7”
- Boxes under 7” tall may have a flanged top and dust cover (Figure 3) or individual lid assembly (Figure 2). Individual lids may not interfere with visibility to box labels. RSC containers (Figure 4) must have prior approval from Motus packaging engineer before use
- Flanged tops and dust covers must only be secured using non- reinforced tape
- When applicable, parts should be packed in a handheld container not exceeding a weight (with packaging included) of 35lbs
- Parts unable to be packed into handheld containers should be packed in bulk sized containers with footprints of 48”x45” or 32”x30” whenever possible
- Container bottom and top closures should be assembled with tape whenever possible
- Containers should be stackable
- The minimum board rating for a handheld expendable container is 32 ECT /200# C-flute corrugated board. Heavier parts may require a higher rated board
- Hand holes should be cut into containers when practical (Figure 8)
- At least two labels are required per handheld container, one on a length face and one on a width face.
- Board flutes should run in the vertical orientation of the box (Figure 7)
- Any container that requires a special tool to open requires Motus packaging engineer(s) approval

BULK EXPENDABLE CONTAINER REQUIREMENTS

- Bulk containers should be used when product is dimensionally too large or heavy to be shipped in handheld sized containers
- Bulk containers should not exceed 46” in height with lid assembly unless approved by Motus packaging engineer
- Bulk containers should be designed to efficiently fit pallet footprints of 48”x45” or 32”x30”. Exceptions need to be approved by Motus packaging engineer
- Material used for bulk sized containers should be rated at a minimum of 275# BC 48 ECT Flute corrugated board
- Containers should either be a large HSC style box (Figure 1) or a Tube and Tray assembly (Figure 6). RSC style boxes may be used only with Motus approval
- Motus recommends flanged top HSC containers (Figure 3) with a separate lid to provide easy opening of containers, but prevent sidewall deflection
- Two labels are required, on Hilo loading sides of the container (normally ends up being the 48” dimension)
- Any container that requires a special tool to open requires Motus packaging engineer(s) approval

INTERIOR DUNNAGE REQUIREMENTS

- Interior dunnage can be made from C, B, or E flute corrugated board. Chipboard may also be used. Specialty coatings on interior dunnage may be used only with the approval of Motus packaging engineer(s). Material should be chosen based on product need and cost
- Polybags are recommended and preferred over the use of specialty coatings whenever possible. Polybags typically offer an abrasion barrier, protect the product from dirt and contaminants, scuffing, etc.
- No staples should be used to secure interior dunnage to container unless authorized by Motus packaging engineer(s)
- Interior dunnage should be ergonomic and not cumbersome to work with. When used, layer pads should be easily removable

EXPENDABLE PALLET LOAD REQUIREMENTS

- Pallet loads should be standard automotive footprints of 48”x45” or 32”x30”
- Pallet loads should be designed to height targets of 25”, 34”, or 51” with pallet and lid included when feasible. These heights are stackable 4 high, 3 high, and 2 high in a standard 53’ trailer. Anything over 51” is prohibited without Motus authorization
- Pallet loads are required to have a lid over the top of each layer. HSC boxes with individual lids or RSC boxes when approved by Motus packaging engineer(s) do not need to follow this rule
- Top lids should be made from 200# C-Flute or 32 ECT corrugated board
- Boxes cannot overhang the edges of the pallet (Figure 9)
- Under hang should be avoided whenever possible on pallets. Under hang should never exceed 2”
- Stretch wrapping is recommended for securing pallet loads. 3 layers are recommended. When banding is used, Motus requires the use of edge protectors unless otherwise approved by Motus packaging engineer(s)
- Stretch wrap must be clear enough to permit scanning of labels
- Pallet load labels must be clearly visible
- Stretch wrap must encompass the entire pallet load including the pallet and lid (Figure 10)
- Flush pallets are required. Wing style pallets are not allowed (Figure 5)
- Pallets must allow 4-way entry
- Any wood material or pallets that are being shipped internationally require heat treatment following ISPM 15 standards
- Pallets should be stringer style pallets unless Motus approves otherwise (Figure 5)
- Pallets should not exceed a height of 5”
- Expendable pallets must be made from wood material. Corrugated pallets or pallet blocks may only be used with Motus packaging approval
- Primary entry side on a 48”45” pallet should be in the 48” dimension to maximize truck efficiency
- Packaging PDS is required to be submitted with packaging cost. Packaging cost should be provided along with completed PDS
- Mixed loads are only allowed with the approval of the Motus packaging engineer(s). If a mixed load is shipped, it must be clearly labeled as a mixed load
- Top layer must be an even layer when possible
- Maximum weight of a pallet load must not exceed 2000lbs
- All pallet loads must be stackable

RETURNABLE PACKAGING GUIDELINES

*Note-Suppliers are responsible for carrying 3 days’ worth of expendable backup packaging that mimics the returnable in parts per box and as closely as possible in size

- Returnable fleet size is determined between Motus and the supplier
- Motus returnable packaging is ONLY to be used for Motus shipments
- Motus containers are not to be used for WIP storage. WIP containers are the sole responsibility of the supplier

HANDHELD RETURNABLE CONTAINER REQUIREMENTS

- Handheld totes are preferred over bulk bins whenever possible
- Handheld containers should be chosen in standard sizes that will fit a standard 48”x45” or 32”x30” pallet footprint
- Weight of handheld containers should not exceed 35lbs loaded (including packaging weight).
- Totes that collapse or break down are permitted, but must still be able to be palletized for return shipments

- Totes must be stackable

BULK RETURNABLE CONTAINER REQUIREMENTS

- Bulk containers should be used whenever the part is too large or heavy to fit in a handheld container
- Bulk containers should follow standard 48”x45” or 32”x30” pallet footprints whenever possible
- Bulk containers should not exceed 51” in height with top lid and pallet base installed
- Bulk containers should be stackable
- Bulk containers should collapse down whenever possible.
- Two labels are required, one on each normal Hilo access side of the container (normally the 48” dimension)
- Bulk containers with pallet bases built in should allow 4 way Hilo entry
- Bulk containers that break down are preferred in applications where it is feasible to collapse the container for return shipments

RETURNABLE INTERIOR DUNNAGE REQUIREMENTS

- Interior dunnage should be ergonomic and not cumbersome to work with. When used, layer pads should be easily removable
- Interior dunnage should be attached to the container when possible to avoid separation/loss
- If dunnage is not permanently fixed to the container, a label stating “Property of ------“ as well as what program the packaging belongs to is required on the dunnage
- Expendable polybags or foam pads may be used with returnable containers in place of specialty coatings

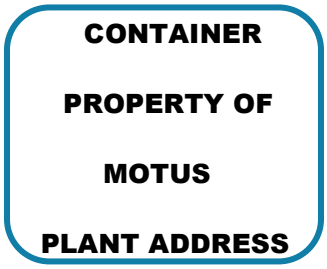
RETURNABLE PALLET LOAD REQUIREMENTS

- Pallet loads should fit standard automotive footprints of 48”x45” or 32”x30”
- Pallet loads must be designed to a height of 25”, 34”, or 51” with pallet and lid included
- Returnable pallet loads should have a top lid over the top layer to secure the load for transportation
- Stretch wrap is preferred but seatbelts can also be used. 3 layers of stretch wrap recommended
- Stretch wrap must be clear enough to permit scanning of labels
- Pallet load labels must be clearly visible
- Stretch wrap must encompass the entire pallet load including the pallet and lid (Figure 10)
- Pallets and top caps must be returnable when packing returnable containers. Exceptions must be approved by Motus packaging engineer
- Pallets must allow 4 way Hilo entry
- Mixed loads are only allowed with the approval of the Motus. If a mixed load is shipped, it must be clearly labeled as a mixed load
- The top layer of a pallet load must be a full load. Uneven top layers are not allowed
- Maximum weight of a pallet load must not exceed 2000lbs
- All pallet loads must be stackable

CONTAINER LABELING REQUIREMENTS

- Motus requires that all incoming material follow the AIAG labeling guidelines listed in Section 5 of the Motus Global Supplier Standards Manual
- The Motus Global Supplier Standards Manual can be found by visiting www.motusintegrated.com
    - Next click the heading “Partner With Us”
    - Under the Supplier Standards and Forms heading, find “MOTUS SUPPLIER QUALITY MANUAL – SUPPLY CHAIN”
    - Reference section 5.0 for labeling requirements

Returnable Container Labeling Requirements



- Motus requires that all returnable packaging containers and components be labeled following the above labeling convention
- Font color should be chosen in a contrasting color of the container
- Note that this label is to be used in addition to AIAG labels
- All returnable containers must include 2 adjacent card holders or label placards

SPECIAL CIRCUMSTANCE PACKAGING REQUIREMENTS

- Motus understands that special circumstances may arise where packaging may be required to deviate from the requirements listed in this manual. If a special circumstance arises and requires a packaging deviation, contact a Motus packaging engineer for approval

MOTUS PACAKGING CONTACTS

- To reach out to Motus packaging, please email packagingna@motusintegrated.com

IMAGES

FIGURE 1: HSC BOX

- This is a standard Half Slotted Container (HSC). Note that it does not contain any primary or secondary flaps on the top and is completely open at the top

FIGURE 2: HSC BOX WITH INDIVIDUAL LID

- This is an HSC with an individual lid. Note that the tray assembly is just large enough to fit over on individual HSC box

FIGURE 3: HSC WITH FLANGED TOP AND DUSTCOVER

- This is a flanged HSC with a dustcover. Note the sheet of corrugated underneath the flanges on the HSC acts as the dustcover, and the flanges hold the cover in place

FIGURE 4: RSC BOX

- Here is an example of a bulk sized Regular Slotted Container (RSC) box. Note the primary and secondary flaps that make up the top. The two primary flaps fold together to cover the top of the container

FIGURE 5: STRINGER STYLE PALLET

- This is an example of a stringer pallet. Note that there are three boards that run the full length of the pallet. Also note that entry is possible on all sides of the pallet

FIGURE 6: TUBE AND TRAY ASSEMBLY

- This is an example of a tube and tray box assembly. Note that the bottom is made up of a separate tray, the sidewalls of the box are a “tube”- a single sheet of corrugated that folds and joins on itself at each end to create the 4 sides of the box. A second tray is used to create the lid for the pack

FIGURE 7: EXAMPLE OF PROPER FLUTE ORIENTATION

- In this image proper flute orientation is shown. Note that the flute runs in the vertical direction of the box for maximum stacking strength

FIGURE 8: HAND HOLES

- This is a typical example of a hand hole cutout in the sidewall of box to aid in manual handling of handheld containers

FIGURE 9: PALLET OVERHANG

- This is an example of a box overhanging the edge of a pallet and is not acceptable. Doing so greatly reduces the bottom layer's stacking strength

FIGURE 10: EXAMPLE OF A PROPERLY STRETCH WRAPPED PALLET LOAD

- Note how the stretch wrap around this pallet load not only secures the totes on the pallet, but also extends around the top cap and pallet