Delphi Technologies

REQUIREMENTS MANUAL

Global Packaging and Shipping Standards for Suppliers

Revised: Jan 2018

Goals:

1. *All parts received to the point of use with superior quality*
2. *Packaging complies with Delphi Technologies Standard Container and Pallet Menu options*
3. *Parts presented with operator ergonomics and work cell efficiencies considered*
4. *Achieve 90% container density and maximize the cubic shipping footprint while minimizing costs*
5. *Provide for responsible disposal of used packaging by designing in recyclable materials and minimizing disposal impacts to the environment*

Delphi Technologies

Requirements Manual

GLOBAL PACKAGING AND SHIPPING STANDARDS FOR SUPPLIERS

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II. INTRODUCTION

This Delphi Technologies (known throughout this manual as 'Delphi') Global Packaging and Shipping Requirements Manual specifies the packaging and shipping standards for materials being shipped to Delphi. The requirements in this manual apply to all current and future parts being shipped to Delphi. Note: This revision supersedes all previously published guidelines, requirements, or standards by Delphi or its Divisions.

Delphi is concerned with safe movement of material, part quality, control of total costs, and compliance to regulations. Each Supplier (both internal and external) shall develop its production packaging to meet the basic requirements contained herein and to ensure part quality from their facility to the point of use. If Delphi requirements are not met or part quality is compromised, the Supplier will be held responsible for costs related to packaging redesign, repack, inspection, and freight.

III. RESPONSIBILITIES

A. Delphi Technologies Responsibilities

1. Define the preferred packaging system (expendable and/or returnable).
2. Assist the Supplier with its packaging plan, as required.
3. Approve the Supplier's packaging plan.
4. Determine system size, quantity, allocation, and management of returnable containers.
5. Monitor and assure compliance to Delphi requirements.

B. Supplier Responsibilities

1. Comply with the current Delphi Packaging and Shipping Requirements Manual and Customer Specific Requirements.
2. Design the pack (container design, container dunnage, closure, etc.) and packaging system (unit-load design, overpack, palletization, securement, etc.) to ensure part quality from origin to destination point of use (during transport, handling, and storage).
3. Discuss any questions with the Delphi Packaging Responsible Person (PRP) to ensure all requirements are clearly understood and met. Contact Delphi Buyer if the PRP name is not known.
4. Submit all required packaging documentation with part quote submission(s).
5. Ensure that the packaging design and materials meet governmental, industry, and transport modal requirements; provide results to Delphi upon request.
6. Ensure that the packaging design and material is validated by an accredited laboratory prior to program start-up dates; provide results to Delphi upon request.
7. Provide sample production intent packaging and back-up packaging with parts.
8. Obtain formal approval (Supplier Packaging Information Form) from the Delphi PRP for Supplier-designed packaging before shipments commence and provide with PPAP submission.
9. Ship all production intent parts in production intent packaging.
10. Ensure that sufficient materials and contingency plans exist to protect continuity of supply.
11. Annually review packaging for compliance to Delphi's current requirements and resubmit for approval when requested by Delphi, or when:
    a) There is a Quality occurrence,
    b) There is a Change; e.g., part design, packaging design, volumes, standard pack quantities, transport mode, ship-to location, regulatory requirements, etc.

NOTE: Non-compliance will result in a Problem Case and Cost Recovery (PC/CR).

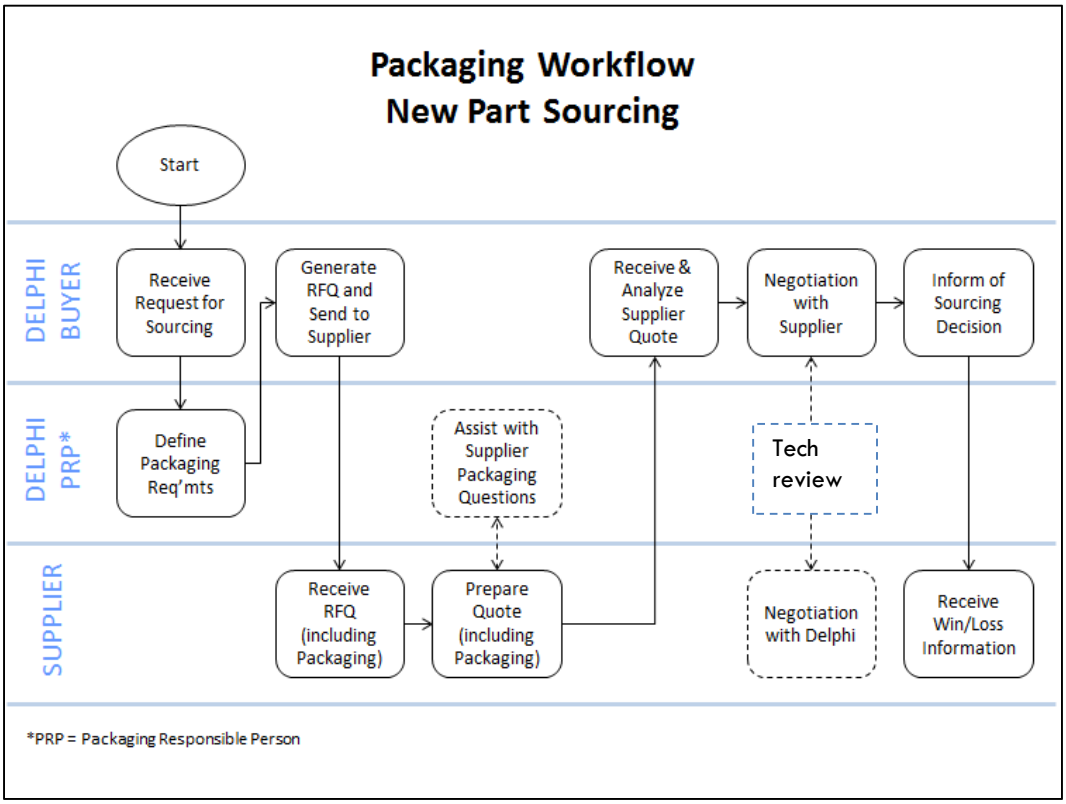
IV. QUICK-START MENU

1. Select packaging container and pallet from Delphi's Standard Container and Pallet Menu
2. Submit packaging plan to Delphi Technologies (via RFQ process or change process)
3. Obtain packaging approval from the Delphi Technologies Packaging Responsible Person (PRP)
4. Place manufactured goods for Delphi Technologies in approved container and affix container labels
5. Palletize containers (flat layers), secure the load, and attach required paperwork (packing slip, etc.)
6. Deliver goods and shipping documentation to carrier or freight forwarder for transport

V. QUOTING / PRICING

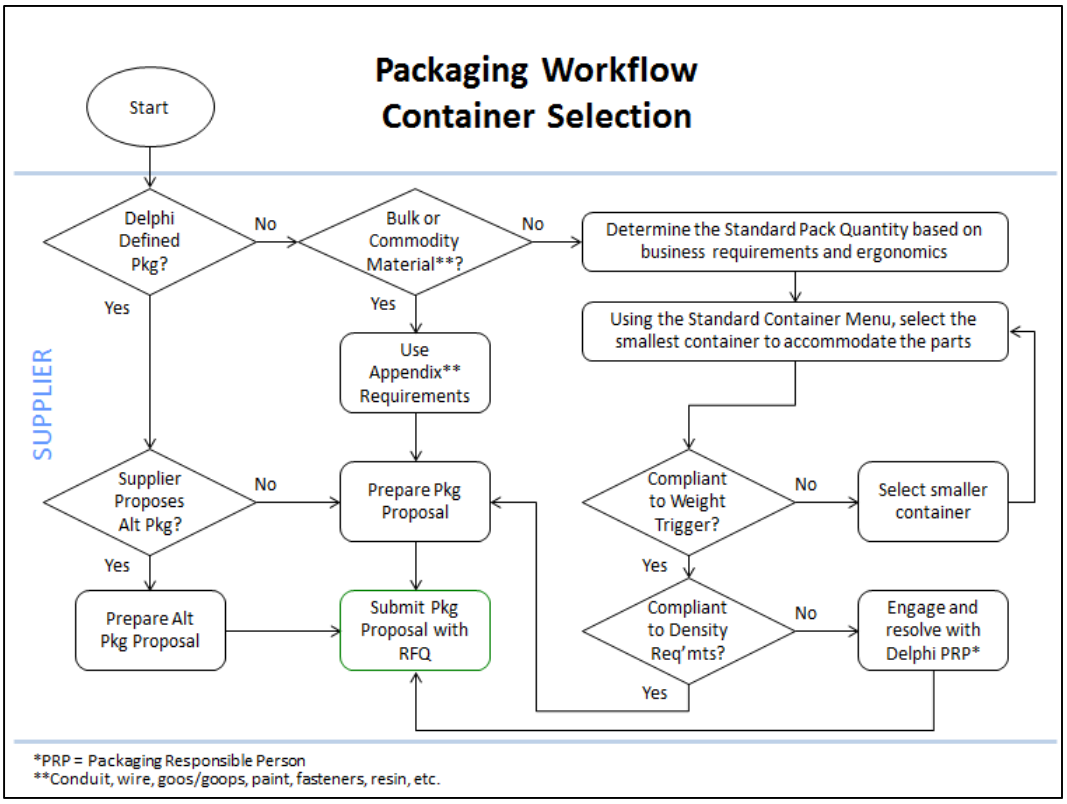
Packaging costs shall be included with all part quote submissions and clearly itemized in the piece price. When responding to a Delphi Technologies Request for Quotation (RFQ), Supplier shall quote all packaging as expendable. All packaging pricing is negotiated with Delphi Supply Chain Management Commercial (Purchasing Buyer). No price increases will be granted to correct defective and/or non-conforming packaging.

If an opportunity to utilize returnable packaging exists, the Supplier and/or the Delphi PRP shall investigate the feasibility of this option and present the returnable proposal. Delphi will not pay for additional packaging to support Supplier's buffers. Handling, storage, cleaning, and return of returnable packaging terms shall be approved by the Delphi Buyer and Delphi PRP.



If a specific container requirement has not been included in Delphi's RFQ, use the Packaging Workflow for Container Selection (below) to select a right-sized container from Delphi's Standard Container and Pallet Menu. All containers shipped to Delphi facilities shall be chosen from the Delphi Standard Container and Pallet Menu unless product dimensions necessitate a non-standard container and formal approval has been obtained in writing from the Delphi PRP.

NOTE: Packaging changes resulting from part design, packaging materials, and/or standard pack quantities during the quote stage require resubmittal to Delphi. Changes after business award shall follow Change Management (see Section X).



VI. PACKAGING SYSTEMS REQUIREMENTS

Packaging design shall be aligned with standard dimensions as specified within this manual. The Supplier is responsible to work with its packaging vendor(s) to ensure that the defined packaging is compliant to Delphi's requirements and ergonomic standards.

The package design and Standard Pack Quantity (SPQ) for the same part number shall not vary unless otherwise approved in writing by the Delphi PRP.

Only one (1) component part number is allowed per individual container unless otherwise approved in writing by the Delphi PRP (special circumstance examples: complimentary 'mating' part numbers, kitting, etc.).

The 'Packaging System' is the cooperative grouping of the individual container design (either returnable container with back-up expendable or expendable container), dunnage, palletization, and securement materials. The unit-load design shall consider both standard and expedited modes of transport. Under no circumstances shall dirty or damaged packaging materials be used for shipments to Delphi facilities.

A. Container Design

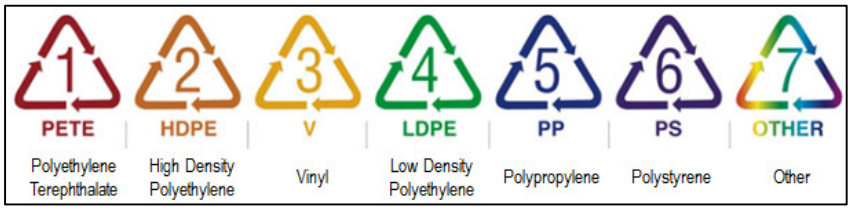
All container designs shall be stackable and rigid with no excessive flexing, bowing, buckling or distortion. Sharp or protruding edges/ridges are prohibited.

If handholds are required, select the appropriate type of handhold for the container; e.g., hinged access holes for expendable containers, D-shaped or molded handles for returnable containers, accommodate gloved hands, and position handholds above the center of gravity.

B. Returnable Container / Packaging Materials

A returnable container system is designed for multiple years of functional use. The design and selection of the returnable container shall meet all Delphi requirements. Expendable back-up packaging for the returnable production container shall be equivalent in size to match the footprint, part quantity, part density, and part presentation. The Delphi PRP shall provide approval for the returnable system proposal, including back-up packaging, dunnage, and system size (loop size).

- All returnable containers shall include a card holder and/or label placard.
- Containers shall include 'Made in (Country)' markings and a unique identifier; e.g., the container part number.
- The tare weight shall be stamped into the individual components of the returnable container system.
- Resin Identification Code(s) for all vacuum-formed and injection-molded plastic packaging materials shall be stamped into the individual components of the returnable container system.



Returnable containers may be owned by Delphi or the Supplier; ownership shall be determined during sourcing. Returnable container rental and collapsible returnable containers may also be pursued as options.

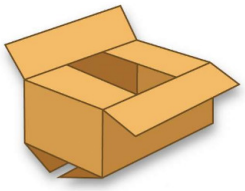
Delphi-owned returnable containers are to be used only for finished goods shipments of Delphi products. Containers and returnable dunnage are to be maintained in good order.

Returnable Container Management:		
Party	**#**	**Responsibility**
Delphi	1.	Maintain, repair, supplement, and dispose of Delphi-owned systems
	2.	Assure empty containers are free of debris and expendable packaging materials prior to shipment of empty containers to Supplier
	3.	Coordinate any economic feasibility study for acceptable return on investment
Supplier	1.	Maintain, repair, supplement, and dispose of Supplier-owned systems
	2.	Regularly inspect and clean containers to ensure part quality and cleanliness (regardless of ownership); remove all one-time shipment labels and expendable dunnage
	3.	Load production parts into clean undamaged containers and load container systems into transport equipment in a manner that maintains part quality
	4.	Assure accurate container identification and quantities (including pallets, returnable dunnage and containers) are included in the Advance Shipping Notice (ASN)
	5.	Maintain receiving and shipping records of all Delphi-owned returnable packaging (including outbound shipments by container and location, Supplier in-house reserve, and balance not returned from each Delphi location)
	6.	Alert/contact the Delphi receiving plant's Production Control Department when/if shortages begin to occur

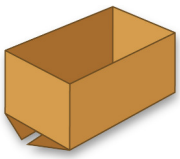
C. Expendable Container / Packaging Materials

Regular Slotted Containers (RSC) and Half Slotted Containers (HSC) may be used as defined in the Standard Container and Pallet Menu. When HSCs are used, individual lids or full-layer covers are acceptable (confirm with PRP for preference); uncovered (uncapped) HSCs are not permitted.

RSC



HSC



Drop Side Bulk

Corrugated materials shall have sufficient strength (minimum 44 ECT) to maintain part quality during transport and in storage. All containers shall have a Box Manufacturer's Certificate (BMC) stamp visible on the assembled container displaying the edge crush (ECT) or burst(ing) strength, construction type (single, double, or triple wall), and maximum allowable weight. Flute direction shall be vertical to optimize the compression strength of the container. All containers shall be constructed with an outside tab-style manufacturer's joint. A stitched manufacturer's joint may be required if a glued or other type joint proves inadequate.

The use of scored drop sides on palletized/bulk containers may be required. The location and size of the drop side is determined by part orientation and operator ergonomics. Consult the Delphi PRP for further clarification.

Expendable packaging shall be adequately sealed to ensure failure does not occur during shipping, handling, or distribution. The required closures for corrugated boxes are glue and/or packing tape; staples and asphalt sealing tapes are forbidden.

D. Dunnage and Additional Considerations

Dunnage is considered to be any packaging component that requires a container or a pallet to be shippable; e.g., vacuum formed trays, corrugated partitions, layer pads, etc. Dunnage shall be used to prevent damage in container loading/unloading, shipping, handling, or for special case situations; e.g., part cleanliness, moisture protection, corrosion protection, Electrostatic Discharge (ESD) protection, surface finish, part movement restrictions, etc.

Suppliers are responsible for the design, performance, and procurement of all dunnage. Container loading, unloading, recycling, and disposal shall be considered during the design phase. The use of non-recyclable materials is prohibited unless approved by the Delphi PRP.

Parts plus dunnage shall fill the container to prevent compression failures due to void space. Part orientation within the container shall match the part orientation used by the operator, allow space to accommodate fingers/hands, and minimize forces required for part placement/removal. Pallet-sized 'corrugated sheets' (a.k.a. pads) are permitted for use on the bottom layer and between layers.

E. Ergonomics and Performance (Height and Weight)

The maximum acceptable weight of a container depends upon container specifics, weight of goods being packaged, and human factors. At a minimum, Supplier shall use the National Institute for Occupational

Safety and Health (NIOSH) Lifting Equation as the basis for its weight limit analysis. If the selected container exceeds its weight limit, Delphi may require the Supplier to modify the design and/or perform additional ergonomic analysis prior to issuing approval.

Pallet loads shall be designed for safe stacking during transport and in storage. The unit-load construction requirements are listed in the table below and align with transport routing requirements. Supplier shall respect all regulations for the value stream (countries of origin, transit, and destination).

#	Required Design Elements	Metric System	Imperial System
1.	**Height** of an individual unit-load shall not exceed:		
	Standard ocean container	1168 mm (1.168 m)	46 inches (3'10")
	Standard truck or high-cube ocean container	1320 mm (1.320 m)	52 inches (4'4")
	Mega truck *For 3 unit-loads:* *For 2 unit-loads:*	965 mm (0.965 m) 1450 mm (1.450 m)	38 inches (3'2") 57 inches (4'9")
2.	**Dynamic Stack Height** (during Transport) shall not exceed:		
	Standard ocean container	2336 mm (2.236 m)	92 inches (7'8")
	Standard truck or high-cube ocean container	2640 mm (2.64 m)	104 inches (8'8")
	Mega truck *(typically 3 unit-loads)*	2900 mm (2.9 m)	114 inches (9'6")
3.	**Static Stack Height** (during Storage) shall not exceed three (3) unit-loads or:	3200 mm (3.2 m)	126 inches (10'6")
4.	Maximum gross **Weight** of a manually-handled container:	15 kg	33 lbs.
5.	Maximum gross **Weight** of a unit-load:	908 kg	2000 lbs.

A Delphi Technologies plant and/or Delphi's logistics providers may require special labels on goods that exceed 500 kilograms (1102 pounds) to alert material handlers to weight risks or on items requiring handling caution; examples below.

'Do Not Stack' labels and 'No Stack' pyramids are strictly prohibited. The use of a 'Do Not Stack' label or pyramid will not exempt the Supplier from over, short, or damaged product claims and will result in a PC/CR.

ALLOWED:

PROHIBITED:

F. Factors

Container density percentage for parts packaged in trays/dividers is analyzed by Delphi based on the cubic dimensions of the container and standard pack. Delphi measures bulk pack density percentage according to the formula below; target is 90%.

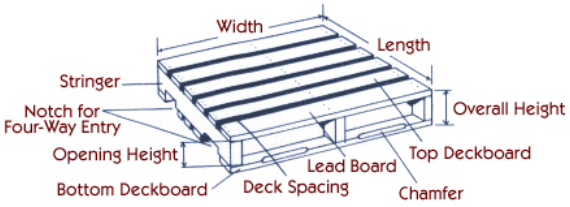
$$\% \text{ Density (Bulk Pack)} = \frac{\text{Height of goods in container}}{\text{Height of container}}$$

G. Pallet Design and Construction

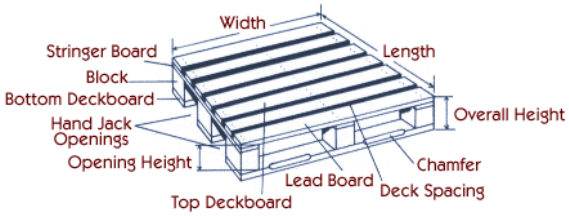
The pallet shall have the minimum strength to withstand static and dynamic forces in the distribution environment. Pallet design criteria shall be sufficient to prevent pallet deformations, damages, and structural failures that may detrimentally affect the functionality of the unit-load. All unit-load shipments shall be prepared on a wooden or plastic pallet. Acceptable pallet dimensions are listed in the Delphi Standard Container and Pallet Menu; non-standard pallets require written approval by the Delphi PRP.

At a minimum, Supplier shall use the current ASTM D1185 *Standard Test Methods for Pallets and Related Structures Employed in Materials Handling and Shipping* when designing its packaging system. This standard is used by Delphi as the guideline for testing details and pallet acceptance criteria.

Stringer Design

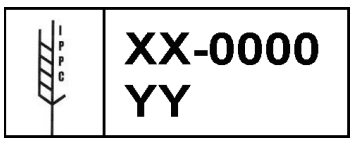


Block Design



#	Required Design Elements	Metric System	Imperial System
1.	Non-reversible four-way entry stringer or block construction		
2.	Minimum load-bearing capacity shall meet unit-load and stacking requirements		
3.	Minimum primary opening height:	88 mm	3.5 inches (3½")
4.	Minimum secondary entry (4-way entry notch) height:	50 mm	2.0 inches (2")
5.	Nailed construction using four-flute helical hardened nails with a minimum length of:	57 mm	2.25 inches (2¼")
6.	Nail heads and points are to be flush, but may not exceed:	3 mm	0.125 inches (⅛")
7.	No missing boards or tapered breaks longer than:	254 mm	10 inches
8.	No exposed splinters greater than:	76 mm	3 inches
9.	No double stringers, patched boards, metal plates, winged pallets, or deck nails with shanks exposed.		
10.	No corrugated pallets, pressed wood pallets, chipboard pallets, or 'slip sheets'		
11.	Pallets shall be clean and odor free; aging discoloration is acceptable.		

All solid wood packaging materials shall be fully compliant to ISPM 15 (International Standards for Phytosanitary Measures #15) and contain the required stamp. Non-ISPM15 solid wood materials are prohibited and may not be used for materials delivered to Delphi.



XX – *Indicates the two-letter ISO country code*
0000 – *Is the unique mark of the wood treatment agent or packaging manufacturer*
YY – *Indicates the type of treatment: Heat Treat (HT) or Methyl Bromide (MB)*

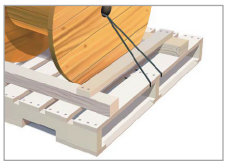
H. Special Packaging Systems

Special packaging systems may be utilized for different types of materials and industry packaging standards (not limited by the examples list below). Review by the Delphi Technologies PRP is necessary prior to shipment to Delphi.

At times, Delphi may choose to assume responsibility for the Packaging System when there are specialized design requirements; e.g., a tray that is used by the Supplier for coating parts and then the same tray is used by a robot at Delphi's facility.

1. **Wire Spools and Wire Fiber Drums (Barrels):** Wire spools shall support the full weight of the material during transport and handling. Spools and Drums (Barrels) may not overlap or overhang in any dimension. Spools and Drums (Barrels) shall be secured to pallet with strapping (for vertical orientation, use a 4-way pattern; for horizontal orientation, the strapping shall pass through the core (arbor hole) of the spool).

Vertical orientation: 

Horizontal orientation: 

2. **Convoluted Tubing:** Bulk convoluted tubing may be packed in octabins; container(s) shall be secured to pallet with two (2) lengthwise straps plus two (2) widthwise straps.

3. **Terminal Reel Containers:** Containers may not overhang the pallet in any dimension. Pallet dimensions shall be optimized and assure stackability. A single terminal reel shipment without a reel container is prohibited.

4. **Surface Mount Component Packaging**: Component Engineering maintains detailed specifications ('C-Specs') defining additional requirements for device identification, labeling, marking, and packaging.

I. Testing and Validation

The objective of packaging testing and validation is to ensure product protection. The Supplier shall ensure part integrity and performance of the pack from origin to destination point of use (during transport, handling, and storage). Approval by Delphi Technologies of the packaging system does not relieve the Supplier of its responsibility for part integrity.

The Supplier is required to test the pack design under simulated and/or real conditions in a certified packaging test laboratory. Packaging shall pass the current ASTM D4169 *Standard Practice for Performance Testing of Shipping Containers and Systems* at the appropriate test level based on logistics; testing elements include conditioning, vibration, and handling (drop and impact). Supplier's validation results and testing documentation are to be provided to Delphi in accordance with APQP (Advanced Product Quality Planning). Delphi reserves the right to require additional testing and corrective action(s) at the Supplier's expense if part integrity is compromised and/or non-conforming packaging is discovered.

#	Required Design Elements	Metric System	Imperial System
1.	Low Temperature*:	-29 ± 2°C	-20 ± 4 °F
2.	High Temperature*:	60 ± 2 °C	140 ± 4 °F
3.	Vibration, Drop, and Impact Tests based on routed freight mode		
4.	Compression Test considering the Static and Dynamic Stack heights (see Section VI. E.)		
5.	Additional tests as required by Delphi's Product Engineer or Packaging Responsible Person		
* *May vary based on Origin and Destination*			

NOTE: Delphi has a certified Packaging Test Lab in its Mexico Technical Center (Juarez, Mexico). It contains specialized equipment to test material and packaging in various transportation and handling conditions (vibration, compression, drop, impact, and environmental).

VII. DANGEROUS GOODS / HAZARDOUS MATERIALS

A Supplier offering Dangerous Goods (DG) / Hazardous Materials (HazMat) for transport is responsible to properly classify, package, mark, label, placard, document, and ship the material. Supplier shall be in compliance with all DG/HazMat regulations and requirements (international, federal, state, provincial, and local) governing the countries of origin, transit, and destination.

The packaging design and testing for DG/HazMat shall be aligned with the specific transport mode and expedited mode(s) that will be utilized in production. DG/HazMat packaging shall comply with the United Nations (UN) packaging symbol requirements and have a valid test report and certification date. If a packaging variation has been granted by a competent authority, copies of all exemption and exception documentation shall be supplied to the Delphi PRP and Buyer.

Supplier is required to provide a current Safety Data Sheet (SDS) to Delphi Technologies Environmental Engineering (and/or the destination's Hazardous Material Committee) for all materials. The transporter/carrier for all DG/HazMat shall be provided a copy of the SDS and/or an emergency response guide.

VIII. SHIPPING STANDARDS

The Packaging System is subject to humidity, pressure, and temperature extremes during transport. Adequately designed packaging will consider the standard mode(s) and expedited mode(s) of transport. Goods shipped via air freight, parcel, less-than-truckload (LTL), or expedited modes require reinforced packaging due to additional handling and rough treatment; e.g., higher carton ECT, dunnage, stronger/additional tape, etc.

Supplier shipment preparation shall ensure that the load is durable, stackable, secure, and compliant to regulations (governmental, international, federal, country, state, provincial, and local). Supplier shall include proper labeling and documentation with all products shipped.

A. Container Labeling

Goods delivered to Delphi are to be correctly labeled according to Delphi's Global Container Label Requirements Standard found on www.delphi.com in the Delphi Supplier Standards documents section. All packaging shall be identified with required Delphi compliant container label formats containing accurate alphanumeric characters, legible print, and electronically scannable barcodes. If placards are available on returnable containers, utilize this area to apply shipping labels.

Labeling deviations may only be approved by using the PC&L Supply Chain Requirements Deviation Form (HOGW_4-2_SC-DIR_37-01_EN); signatures of the Buyer, Global Category Team Manager, and Divisional Production Control Director are required.

B. Transport / Paperwork

When Delphi is responsible for transport costs, Supplier shall deliver the goods to Delphi's specified carrier or freight forwarder (based on contracted Incoterms). Suppliers shall make dock door available for scheduled/established carrier window times and allow Driver dock access to verify/supervise loading of material. Supplier shall accommodate Driver directions; e.g., loading and stacking material in the trailer, unloading/reloading another Supplier's empty containers, rearranging pallets to maximize trailer utilization, etc.

Supplier shall follow additional requirements as issued by Delphi's Logistics Department.

It is the Supplier's responsibility to ensure that required paperwork (labels, packing slip, bill of lading, dangerous goods paperwork, etc.) accompanies the goods at time of shipment.

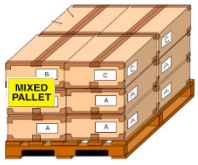
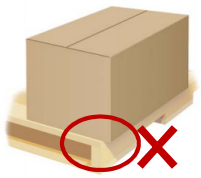
When a Supplier ships direct to Delphi's Customer; e.g., contracted arrangement, drop-ship, direct-ship, expedite, diversion, etc., it shall comply with the requirements of Delphi and its Customer (including transport mode, labeling, paperwork, and PPAP at a minimum).

C. Palletization / Unitization

To ensure optimization during transport and storage, the Supplier's palletizing pattern shall comply to the following items: edge-to-edge container alignment (vertical surfaces) with a complete flat top-layer (horizontal surface).

When ordered quantities are less than a unit-load pallet, Delphi will accept partial-load and mixed-load pallets (where more than one part number is shipped on the same pallet to the same destination plant) under these conditions: (1) partial layers are completed with empty boxes of the same footprint; (2) empty boxes are identified as such; (3) mixed-load labels are applied; and (4) the packing slip and/or mixed-load manifest details the number of empty boxes and number of containers for each part number. Use of an over-pack (pallet-sized carton) to consolidate individual boxes to the same destination plant is acceptable.

The mixing of containers with different Delphi plants or delivery dock destinations on the same pallet is prohibited. Mixing bulk and manually handled containers on the same pallet is prohibited. Brick stacking, pyramid stacking, and containers overhanging the pallet are prohibited.

Full Pallet Acceptable	Mixed Pallet Acceptable	Brick Stacking Prohibited	Pyramid Stacking Prohibited	Overhang Prohibited
				

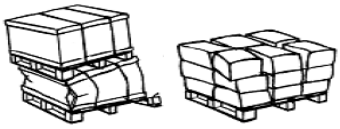
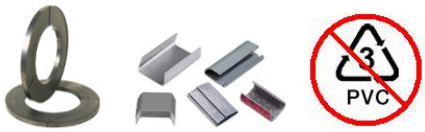
D. Securement Materials

Polyester strapping is required. At a minimum, containers shall be secured to pallet with two (2) lengthwise straps plus two (2) widthwise straps. Any deviations to securement materials shall be approved in writing by the Delphi PRP.

Stretch film shall be used on the unit-load to protect corrugated packaging from the environment. Stretch film shall be linear low-density polyethylene (LLDPE) and clear in color to enable the barcode scanning of labels. A minimum of four (4) turns/layers of stretch film, or the equivalent in performance, are required around and encompassing each individual pallet/unit-load.

External pallet load bracing, when used with strapping and stretch wrap, provides additional stability. Corner boards or edge protectors (minimum thickness of 5mm) are required when the unit load is shipped internationally or does not meet the dynamic and static stacking requirements as defined in Section VI. E. The four (4) horizontal corners shall be placed over the four (4) vertical corners. Adequate clearance between the containers and the pallet edge is necessary to guarantee support for vertical corner-boards.

Metal (nails, screws, strapping, buckles, clips, etc.), glue, and unitizing adhesives to secure loads to pallets are prohibited. Polyvinyl chloride (PVC) stretch film is prohibited due to environmental reasons. Wire-bound wood pallet boxes or wood crates are prohibited.

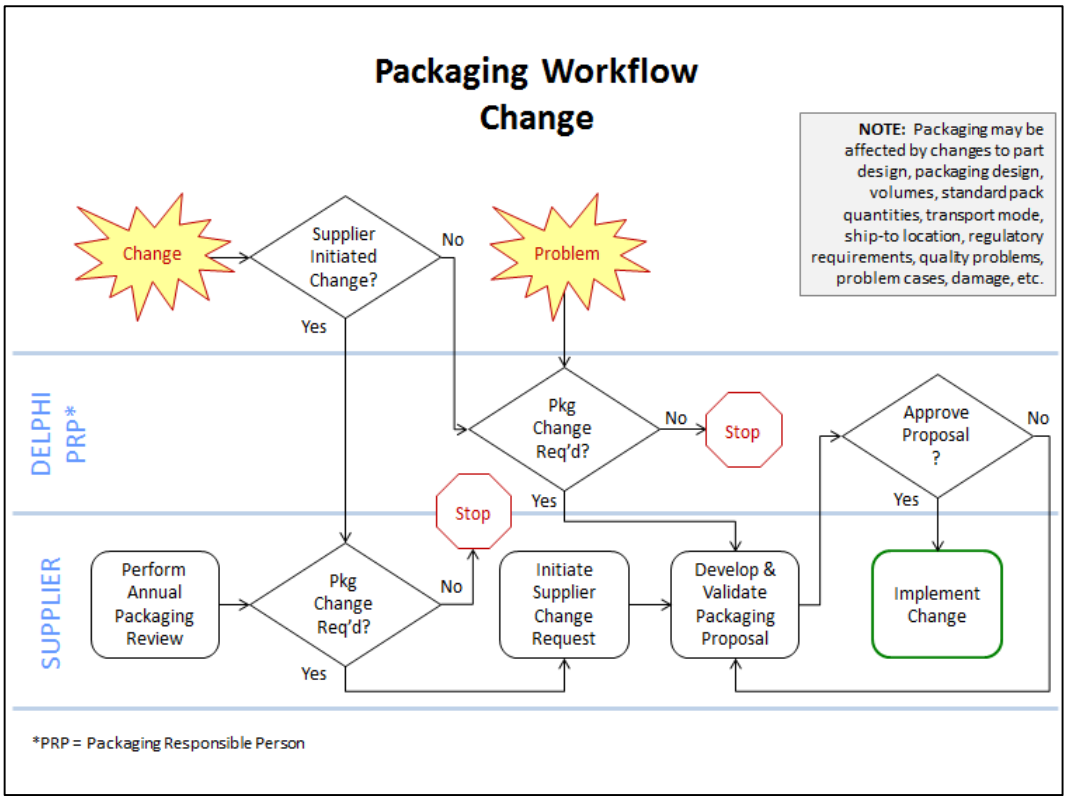
Acceptable	Unacceptable	Prohibited
		

IX. SUPPLIER PORTAL

Supplier is responsible to connect, monitor, and respond to information on Delphi's Supplier Portal and Delphi Problem Solver. All Supplier manufacturing locations are required to register to Delphi Problem Solver as a requirement for conducting business with Delphi. Problem Cases are used to communicate issues, initiate corrective action, and facilitate problem resolution. Supplier suggestions may be submitted by using the Supplier Change Request process.

X. CHANGE MANAGEMENT

Changes to the part design during the development process may trigger packaging-related changes. Any modifications related to the pack structure, quantity, or system need to be communicated to the Delphi PRP and costs discussed with the Buyer. Delphi encourages the Supplier to send photographs to assist in clarifying specific questions/suggestions/proposals/concerns. All proactive and reactive changes shall be tracked using the Change Request process.



XI. CHECK YOURSELF

These questionnaires were developed to aid the Supplier in self-assessing its compliance to the Delphi Technologies Global Packaging and Shipping Requirements Manual during Design/Approval and in Production.

If your answers are not 'YES', immediately correct the issue and/or contact your Delphi Packaging Responsible Person (PRP) if assistance is required.

STAGE: Design and Approval (for Quotes and Changes)				
#	**Packaging Self-Assessment Questionnaire**	**Section Reference**	**True**	**False**
1.	Contact with the Delphi PRP has been established and Supplier understands Delphi Packaging and Shipping Requirements.	III.		
2.	An approved standard container and pallet have been selected from the Delphi Standard Container and Pallet Menu or an alternate has been authorized for quote/design by the Delphi PRP.	V.		
3.	Supplier's pack and system design meets Delphi's design criteria and value stream requirements.	VI.		
4.	Supplier's packaging system design was submitted to Delphi's Buyer with the Request for Quote or Change Request.	V.		
5.	Formal approval for Supplier's packaging system design was granted by the Delphi PRP and/or Delphi Buyer; the Supplier Packaging Information Form utilized.	III.		

STAGE: Production Packaging and Shipping Compliance				
#	**Packaging Self-Assessment Questionnaire**	**Section Reference**	**True**	**False**
1.	Unit-load meets required stack height and weight limitations.	VI. E.		
2.	Achieve 90% container density.	VI. F.		
3.	Pallet meets required construction elements and ISPM15 requirements.	VI. G.		
4.	Dangerous Goods are properly classified, packaged, marked, labeled, placarded, documented, and shipped.	VII.		
5.	Container/pallet labels are applied per labeling requirements.	VIII. A.		
6.	Proper shipping paperwork is provided.	VIII. B.		
7.	Unit-load is properly palletized (containers aligned edge-to-edge and have complete flat-top layer).	VIII. C.		
8.	Mixed loads contain material for only one destination plant.	VIII. C.		
9.	Unit-load is properly secured with polyester strapping, stretch film (for corrugated), and corner boards (if international or when necessary).	VIII. D.		
10.	Prohibited items are avoided; e.g., metal, 'Do Not Stack' label, etc.	VI. &VIII.		

XII. STANDARD CONTAINER AND PALLET MENU

A. Delphi Technologies plants in the Europe, Middle East, and Africa (EMEA) region align with VDA and Galia container and pallet dimensions (* *preferred inbound*)

EMEA Pallets	External Dimensions Metric System (mm)			External Dimensions Imperial System (inches)			Important Notes
Common Name / Type	Length	Width	Note	Length	Width	Note	
European Pallet (EUR)*	1200	800		47.24	31.50		For Returnable and Expendable Containers
Industrial Pallet (IND)*	1200	1000		47.24	39.37		
Alternate Pallet: Prior approval required	1000	600		39.37	23.62		Expendable Containers only
	1140	980	IMCK160	45.00	38.50		
	800	600		31.50	23.62		
Reel Pallet	1200	600		47.24	23.62		Reels only

EMEA Returnable Containers		External Dimensions Metric System (mm)			External Dimensions Imperial System (inches)			Containers/Layer by Pallet Type	
Standard	Code	Length	Width	Height	Length	Width	Height	EUR	IND
VDA	KLT 3214	300	200	148	11.81	7.87	5.83	16	20
VDA	KLT 4314	400	300	148	15.75	11.81	5.83	8	10
VDA	KLT 4328	400	300	280	15.75	11.81	11.02	8	10
VDA	KLT 6428	600	400	280	23.62	15.75	11.02	4	5
Odette	Galia 3212	300	200	114	11.81	7.87	4.49	16	20
Odette	Galia 4312	400	300	114	15.75	11.81	4.49	8	10
Odette	Galia 4322	400	300	214	15.75	11.81	8.43	8	10
Odette	Galia 6422	600	400	214	23.62	15.75	8.43	4	5
Odette	Galia 6423	600	400	214	23.62	15.75	8.43	4	5
Odette	Galia 6432	600	400	314	23.62	15.75	12.36	4	5
Odette	Galia 6433	600	400	314	23.62	15.75	12.36	4	5

EMEA Expendable Containers		External Dimensions Metric System (mm)			External Dimensions Imperial System (inches)			Containers/Layer by Pallet Type	
Standard	Code	Length	Width	Height	Length	Width	Height	EUR	IND
Odette	Galia A16	300	200	125	11.81	7.87	4.92	16	20
Odette	Galia A15	300	200	200	11.81	7.87	7.85	16	20
Odette	Galia A14	400	300	150	15.75	11.81	5.90	8	10
Odette	Galia A13	400	300	200	15.75	11.81	7.87	8	10
Odette	Galia A12	400	300	300	15.75	11.81	11.81	8	10
Odette	Galia A11	600	400	200	23.62	15.75	7.87	4	5
Odette	Galia A10	600	400	250	23.62	15.75	9.84	4	5
Odette	Galia A9	600	400	300	23.62	15.75	11.81	4	5
IMC100	DPN 28139123	560	480	240	22.05	18.90	9.45		

EMEA Special Container Types	External Dimensions Metric System (mm)			External Dimensions Imperial System (inches)			Containers/Layer by Pallet Type	
	Length	Width	Height	Length	Width	Height	EUR	IND
Bulk Container	800	600	465	31.50	23.62	18.31	2	
Bulk Container	1200	1000	860	47.24	39.37	33.86		1
Bulk Container	1200	1000	975	47.24	39.37	38.39		1
Reel Container (only with acceptable Reel Pallet above)	600	600	varies	23.62	23.62	varies	2	

B. Delphi Technologies plants in the North America (NA) region align with AIAG and ISO container and pallet dimensions *(* preferred inbound)*

NA Pallets	External Dimensions Metric System (mm)			External Dimensions Imperial System (inches)			Important Notes
Common Name / Type	Length	Width	Note	Length	Width	Note	
Automotive Pallet (AUTO)*	1219	1143		48	45		For Returnable and Expendable Containers
Industry Standard (ISO)	1219	1016		48	40		
Alternate Pallet: Prior approval required	1170	610		46	24		
	1140	980		45	38 ½		
	915	810		36	32		
Fastener Industry Pallet	810	760		32	30		Fasteners only

NA Returnable Containers	External Dimensions Metric System (mm)			External Dimensions Imperial System (inches)			Containers/Layer by Pallet Type
Standard	Length	Width	Height	Length	Width	Height	AUTO
Manually Handled	305	191	102	12	7 ½	4	24
Manually Handled	305	381	102	12	15	4	12
Manually Handled	305	381	191	12	15	7 ½	12
Manually Handled	610	381	102	24	15	4	6
Manually Handled	610	381	191	24	15	7 ½	6
Manually Handled	610	381	280	24	15	11	6
Manually Handled	610	381	369	24	15	14 ½	6
Manually Handled	610	572	191	22	22 ½	7 ½	4
Manually Handled	610	572	280	24	22 ½	11	4
Manually Handled	610	572	369	24	22 ½	14 ½	4

NA Expendable Containers		External Dimensions Metric System (mm)			External Dimensions Imperial System (inches)			Containers/Layer by Pallet Type
Standard	Delphi Reference #	Length	Width	Height	Length	Width	Height	AUTO
RSC	Fastener	229	229	102	9	9	4	25
RSC	Fastener	229	229	153	9	9	6	25
RSC	22224727	305	191	102	12	7 ½	3 ¾	24
RSC	22224728	305	381	102	12	15	3 ¾	12
RSC	22224729	305	381	191	12	15	7 ½	12
RSC	22224730	610	381	102	24	15	3 ¾	6
RSC	22224731	610	381	191	24	15	7 ½	6
RSC	22224732	610	381	280	24	15	11 ¼	6
RSC	22224733	610	381	369	24	15	14 ½	6
RSC	22224734	610	572	191	24	22 ½	7 ½	4
RSC	22224735	610	572	280	24	22 ½	11 ¼	4
RSC	22224736	610	572	369	24	22 ½	14 ½	4
HSC	22224737	281	189	93.7	11 11/16	7 7/16	3 11/16	24
HSC	22224738	281	200	93.7	11 11/16	14 7/8	3 11/16	12
HSC	22224739	281	200	187.3	11 11/16	14 7/8	7 3/8	12
HSC	22224740	595.3	200	93.7	23 7/16	14 7/8	3 11/16	6
HSC	22224741	595.3	200	187.3	23 7/16	14 7/8	7 3/8	6
HSC	22224742	595.3	200	281	23 7/16	14 7/8	11 1/16	6
HSC	22224743	595.3	200	374.7	23 7/16	14 7/8	14 ¾	4
HSC	22224744	595.3	566.7	187.3	23 7/16	22 5/16	7 3/8	4
HSC	22224745	595.3	566.7	281	23 7/16	22 5/16	11 1/16	4
HSC	22224746	595.3	566.7	374.7	23 7/16	22 5/16	14 ¾	4
HSC Cover	22224747	325.4	198.4	50.8	12 13/16	7 13/16	2	
HSC Cover	22224748	406.4	306.4	50.8	16	12 1/16	2	
HSC Cover	22224749	623.9	387.4	50.8	24 9/16	15 ¼	2	
HSC Cover	22224750	623.9	576.3	50.8	24 9/16	22 11/16	2	
HSC Cover	22224751	1219.2	1143	76.2	48	45	3	

NA Special Container Types	External Dimensions Metric System (mm)			External Dimensions Imperial System (inches)		
	Length	Width	Height	Length	Width	Height
Bulk Container	813	762	635	32	30	25
Bulk Container	813	765	864	32	30	34
Bulk Container	1219	1143	635	48	45	25
Bulk Container	1219	1143	864	48	45	34

C. Delphi Technologies Plants in the Asia Pacific and South America regions may align with either the EMEA or NA standard menus, please contact the PRP for requirements.

XIII. GLOSSARY

Adhesives	Materials capable of attaching one surface to another. Used in conjunction with fibre boxes; a material to glue plies of solid fibreboard, to glue facings to corrugating medium in combined corrugated board, to glue the overlapping sides of a box forming the manufactures joint, or to glue the flaps in closing a slotted box.
Box	See CONTAINER.
Box Maker	A corrugated or solid fibre box manufacturing establishment which has equipment to score, slot, print, and join corrugated or solid fibre sheets into boxes; equipment is regularly utilized to produce commercial quantities of fibre boxes.
Brick Stacking	The act of alternating the stacking of containers on pallets; length by width and width by length. NOTE: Prohibited.
Burst(ing) Strength	The resistance of a material to bursting expressed in pounds per square inch. Burst strength depends on the tensile strength and extensibility of the material. It is typically determined using the Mullen burst test.
Carton	See CONTAINER.
Box Manufacturer's Certificate (BMC)	A statement printed on a corrugated Box Maker's fibreboard box guaranteeing that all construction requirements have been observed and providing specific information about the container. The information allows the user to identify and locate the box maker.
Closure	The method used to seal a container once the parts have been packaged within it.
Container	A rigid object having closed faces and completely enclosing its contents. It may be constructed of expendable or returnable materials. Also known as a box or carton.
Cross Stack	A feature molded into the bottom of returnable manually handled containers that allow a larger container to stack on top of smaller containers.
Deck	The horizontal load-carrying or load-bearing surface of a pallet.
Deck Opening	Any void in the deck caused by the spacing of surface elements or a cut-out in a solid deck pallet.
Deckboard	The surface element used in the construction of a pallet deck.
Density	Quantity of mass per unit volume.
Depth	See WIDTH.
DSPA	Direct Sourcing Process Application; the system Delphi uses for sourcing.
Distribution Environment	The entire material flow process from the start of the supply chain (supplier) until the material is used (destination point-of-use).
DUNS Number	A code assigned to manufacturers by Dun & Bradstreet; typically nine (9) digits in length.
Dunnage	Devices or materials used to hold, secure, or protect goods during shipment.
Expendable	A pack that makes only one trip; typically made of corrugated material.
Edge Crush Test (ECT)	A corrugated board test to determine the force that will crush a standard size of board standing on an edge. ECT indicates the probably compression strength of the container made from the board.
Footprint	The outermost dimensions (length and width) of a pallet, container, or container system.
Four-Way Pallet	A pallet constructed to allow insertion and withdrawal of handling equipment from all four sides of the pallet.
Gaylord	A bulk corrugated packaging solution for the transport and storage of bulk cargo such as granular, powder, and other loose-fill products.
Goods	Parts, Pieces, Materials, or Items being purchased from the Supplier by Delphi.
Gross Weight	The total weight (mass) of the goods plus the packaging; [Net Weight + Tare Weight = Gross Weight].
Height	The vertical distance of a three-dimensional shape (y-axis) measured perpendicular to its length and width.
Half-Slotted Container (HSC)	A corrugated container with four sides and no flaps; it requires a separate lid.
ISPM 15	International Standard for Phytosanitary Measures, publication #15 – Regulation of Wood Packaging Material (WPM) in International Trade. ISPM 15 requires treatment of all wooden packaging and the application of a special mark for the type of treatment utilized.
Joint	The part of the container where the ends of the scored and slotted blank are joined together by taping, stitching, or gluing. May be accomplished in the box manufacturer's plant (manufacturer's joint) or at the time the box flaps are sealed in a box user's plant (user's joint).

Length	The longest horizontal dimension of a three-dimensional shape (x-axis).
Mixed Load	When more than one part number is shipped on the same pallet.
Net Weight	The weight (mass) of the goods without packaging.
Octabin	A bulk corrugated packaging solution for the transport and storage of bulk cargo such as granular, powder, and other loose-fill products.
Overhang	The portion of the unit-load that exceeds either the length or width dimension of a pallet. NOTE: Prohibited.
Pack Unit Quantity	See STANDARD PACK QUANTITY.
Pack Validation	The process used to verify/test the basic functions of containment and protection of a unit-load or container.
Pad	A corrugated or solid fibreboard sheet (or other authorized material) used for extra protection, separating tiers, or separating layers of items when packed for shipment.
Pallet	A horizontal platform used as a base for assembling, storing, handling, and transporting materials and products in a unit-load.
PC/CR	Problem Case / Cost Recovery.
Placard	An easy-release label or card-holder area affixed to a container for the placing a label or Kanban card. In Dangerous Goods/Hazardous Materials, a placard is a diamond-shaped sign that identifies the class of the goods on large containers; e.g., vehicle, rail car, cargo tank or bulk container.
PPAP	Production Part Approval Process.
Primary Container	The smallest shippable container closest to the parts (same as the STANDARD PACK).
Returnable	A pack that makes multiple trips; typically made of molded plastic material.
Rightsizing	When the container design considers the entire material flow from the start of the supply chain (supplier) until the material is used (destination point-of-use) and optimizes space requirements.
Regular Slotted Container (RSC)	A corrugated container where all flaps have the same length and the two outer flaps (typically the lengthwise flaps) are one-half the container's width, so that they meet in the center of the box when folded).
Score	An impression or crease in corrugated or solid fibreboard to locate and facilitate folding.
Seam	The junction created by any free edge of a container flap or wall where it abuts or rests on another portion of the container where it may be fastened by tape, stitching, or adhesives in the process of closing the container.
Secondary Container	The larger container on which multiple primary containers are shipped; typically it is the pallet.
Specialized Packaging	Packaging designed for a particular purpose or type of item.
Standard Pack	The smallest shippable container closest to the parts (same as the PRIMARY CONTAINER).
Standard Pack Quantity (SPQ)	The number of pieces in a primary container.
Stitching	Machine formed fastening to form the joint or close a box; typically of wire or thread from a spool.
Stapling	Application of metal fasteners to form the joint or close a box. NOTE: Prohibited.
Stretch Film / Stretch Wrap	Stretch film or stretch wrap is a highly stretchable plastic film that is wrapped around containers and pallets to protect containers from the environment.
Stringer	A continuous longitudinal board member of a pallet that supports the horizontal load-carrying or load-bearing surface.
Tape	A strip of cloth, plastic, or paper coated on one side with an adhesive. It is used to form the joint, close, or reinforce a fibreboard box.
Tare Weight	The weight (mass) of the packaging without the goods.
Top Deck	The top surface of a pallet deck, oriented perpendicular to the stringer.
Unit-Load	The total/overall height of the stacked primary containers plus the pallet (secondary container); measured from the bottom of the secondary container to the top of the highest primary container. For bulk containers, it is the height of the secondary container.
Weight Limit (Weight Trigger)	The weight under which the loaded container poses a low risk of injury to an employee. If the container exceeds its weight limit, further analysis is required.
Width	The shorter horizontal dimension of a three-dimensional shape (z-axis); may also be known as depth.

XIV. REVISION HISTORY

Release Date	Revision Comments
Jan 2018	Revisions throughout the manual to reflect new company name, Delphi Technologies (formerly Delphi). Contact your Delphi Technologies buyer with any questions.
June 2017	Complete revision to entire manual: update formatting, streamline text, incorporate lessons learned, and remove redundancies; reduced length. Added Packaging workflow charts to depict New Part Sourcing, Container Selection, and Change. Added 'Quick Start Menu', 'Check Yourself' assessment, requirement for polyester strapping, and visual aids to define acceptable, unacceptable, and prohibited examples. Incorporated EMEA special packaging system specifications, heavy pallet-load label example, container utilization %, and KLT + Galia container information, thus obsoleting the Packard 'Golden Rules' Packaging Guideline. Modified Supplier Portal section, moved Revision History to end. Removed: Forward, Section 11 (Packaging Examples), and superfluous sections of Section 12 (Recycling Information).
January / May 2015	Added: RFQ Packaging Requirements Revised: Introduction, Packaging Development and Approval, General Requirements, Expendable Packaging Systems, Export/Import Requirements, Returnable Packaging Systems, Internal Dunnage, Shipping Labels, Mixed Labels, Shipping Partial Layers, Recycling Information, Packaging Container Menus, Glossary of Terms, and Forms and Supplement Requirements. Removed: Cube Utilization Calculation and Attachment, Supplier Packaging Checklist, Supplier Shipping Compliance Checklist, Packaging Receiving Checklist, DSPA Example, and Delphi Regional Office Information.
February 2014	Remove SPI and added DSPA. Additional miscellaneous revisions.
November 2011	Revised International Container listing.
May 2007	Both Regular Slotted Cartons (RSC) and Half Slotted Cartons (HSC) are allowed. Revised ergonomics section – minimum container weights determined by weight triggers. Standards cover all Delphi operations, globally. Hand-holds for manually handled expendable cartons are now optional unless specified by receiving division/location. Partial layer guidelines provide for suppliers when ship quantity is not in level layers. Standard pack menu for expendable cartons revised to better cube the pallet. Increased maximum load height from 50" to 52". Prohibit 'Do Not Stack' labels and signs; loads shall be stackable. Shipping standards included for Lean Logistics Network. Deviation to manual requires approval from Delphi Divisional Inbound Packaging Leader. Added: Standard Pallet Menu, Audit Checklists.