# TABLE OF CONTENTS

1.0 Introduction ................................................................................................................2  
1.1 Purpose .............................................................................................................................2  
1.2 Scope .................................................................................................................................2  
1.3 Partnership ........................................................................................................................2  
1.4 Supplier Performance Rating ..........................................................................................2  
2.0 Supporting Documentation and References ..............................................................2  
3.0 Foreign Object Debris (FOD) Free Packaging ...............................................................3  
4.0 Supplier Responsibility ....................................................................................................3  
4.1 General Statements: ..........................................................................................................3  
4.2 Laboratory Simulation Testing .........................................................................................4  
4.3 Sample Shipments ............................................................................................................4  
4.4 Hazardous Materials .......................................................................................................4  
5.0 Packaging Requirements ...............................................................................................4  
5.1 Packaging Guidelines ......................................................................................................4  
5.2 Primary Packaging ..........................................................................................................4  
5.3 Cleanroom Packaging.....................................................................................................5  
5.4 Secondary Packaging & Shipment Requirements ............................................................6  
5.5. Returnable Packaging (SpaceX Supplied Packaging) .....................................................7  
6.0 Packaging Authorization ...............................................................................................8  
7.0 Protective Packaging for Special Handling Considerations .........................................9
1.0 INTRODUCTION

1.1 Purpose
To clearly define packaging and labeling requirements to SpaceX suppliers.

1.2 Scope
This standard applies to the manufacturing, production, purchasing, and inventory of all product & material supplied or handled by vendors of SpaceX facilities.

1.3 Partnership
Packaging development requires partnership. It can only function as intended when both supplier and customer work together from proposal through implementation. It is absolutely crucial that both parties adhere to authorized packaging. The key is open, two-way communication.

1.4 Supplier Performance Rating
A supplier’s conformance to this standard and adherence to authorized packaging is factored into the Supplier’s Delivery Performance Rating. Adherence to packaging specifications listed on the Purchase Order will be checked by SpaceX’s receiving inspection with nonconformances to the standard reported to the Buyer.

2.0 SUPPORTING DOCUMENTATION AND REFERENCES

ISO 9001 / AS9100 Clause 7.5.5 Product Preservation

SPX-00008703 Supplier Returnable Packaging Standard


SPX-00000874 Quality Clauses for Purchase Orders

ASTM Standard D3951-10: Standard Practice for Commercial Packaging

ASTM Standard D4610: Hazardous Material Packaging

SPX-00002691 Supplier Request Form

3.0 FOREIGN OBJECT DEBRIS (FOD) FREE PACKAGING

3.1 All packaging, handling, storage, and preservation efforts must protect the parts from FOD and must not introduce FOD.
3.2 All components packaging should require FOD preventative packaging unless otherwise noted by SpaceX.

4.0 SUPPLIER RESPONSIBILITY

4.1 General Statements:

4.1.1 The supplier is responsible for the packaging of direct materials to assure their proper condition and quality upon delivery to SpaceX. Parts must arrive at SpaceX without damage, rust/corrosion, and/or contamination.

4.1.2 Packaging shall not be a source of contamination. Barrier materials such as plastic bags, foam or Electrostatic Discharge (ESD) compliant barriers may be required as determined by a cooperative effort between SpaceX and the vendor.

4.1.3 Packaging is part of the supplier manufacturing process and shall be included as appropriate in the supplier’s Failure Mode Effective Analysis (FMEA), Quality Plan or Source Release Plan.

4.1.4 Standard Packaging – Each supplier shall utilize a single size container, package and/or pallet containing a standard quantity for each part number supplied. Only 1 part number should be packed per primary package. This requirement shall be valid for expendable and returnable packaging. ASTM Standard D3951-10: Standard Practice for Commercial Packaging can be used as a guide for general good packaging practice.

4.1.5 Flight critical or fracture critical items as identified in design documentation, should be packaged and handled in accordance with design specifications or Engineering direction. If no requirements are specified, use ASTM Standard D3951-10 for packaging recommendations.

4.1.6 All employees and personnel are responsible for the proper handling and protection of parts and materials throughout the manufacturing and production process.

4.1.7 Upon receipt of product at SpaceX, Inventory, Receiving and Receiving Inspection personnel will verify that product supports documentation correctly.

4.2 Laboratory Simulation Testing

Lab testing may be required and should be considered by the supplier to assure that the product and packaging will withstand “real-world” load conditions, handling and any applicable transportation modes that may become necessary. If testing is required, please contact your SpaceX Quality representative using the SPX-00002691 Supplier Request Form.
4.3 Sample Shipments

Sample shipments may be required to test and prove packaging withstands delivery conditions and to allow SpaceX to review packaging.

4.4 Hazardous Materials

4.4.1 Labeling of hazardous materials shall be maintained in accordance with regulatory requirements, manufacturer suggestions or requirements, and/or purchase order requirements.

4.4.2 All Hazardous Materials should meet standard Hazardous Material Packaging requirements (Guide - ASTM: D4610 Hazardous Material Packaging) and contain the appropriate hazardous material labels as required by federal and state laws.

4.4.3 The vendor is responsible for any contamination damage/fines related to improper HazMat packaging.

5.0 PACKAGING REQUIREMENTS

Exceptions are subject to specific approval by SpaceX personnel and facilities. Unique requirements may be required for specific components as agreed upon by SpaceX and the vendor.

5.1 Packaging Guidelines

Vendors should follow general packaging guidelines that best protect the parts for shipment and storage at SpaceX.

5.2 Primary Packaging

Primary Packaging is defined as the first level product packaging that contains the item being sent. Primary packaging should protect the part for its intended use and meet engineering specifications laid out by SpaceX engineers as agreed upon by SpaceX and the vendor.

5.2.1 All shipments should follow ASTM Standard D3951-10: Standard Practice for Commercial Packaging as a standard guide for proper packaging unless special packaging instructions have been created for that component/raw material.

5.2.2 All parts or materials that have been upgraded should be noted and recorded in the paperwork sent with the packaging.

5.2.3 Packaging requirements should be appropriate to a product’s mass, cost, and environmental considerations.
5.2.4 Packaging requirements should be given consideration during design and initial manufacturing or production.

5.2.5 Completed parts and assemblies shall be packaged in accordance with design or specification requirements or accepted industry standards as applicable to assure adequate protection of quality of all items packaged for shipment.

5.2.6 Specialty packaging designated by SpaceX shall be called out on the PO or drawing for that specific part.

5.2.7 Avionics/Electronic parts should be packed with ESD sensitive packaging materials (ESD safe foam, wrap, covers, etc.)

5.2.8 Small parcel shipments should meet minimum packaging requirements as designated by the carrier (UPS, Fed Ex, etc.).


   - http://www.ups.com/packaging/

5.3 Cleanroom Packaging

SpaceX utilizes several cleanrooms to assemble components for our launch vehicles. It is absolutely critical these cleanrooms stay 100% FOD (Foreign Object Debris) Free and this starts with our packaging.

5.3.1 Cleanroom components will be noted on the PO’s and WO’s so suppliers are aware of which components need cleanroom safe packaging.

5.3.2 All cleanroom components must use the following as a guideline for cleanroom safe packaging: KSC-C-123J: John F. Kennedy Space Center, NASA Surface Cleanliness of Ground Support Equipment Specification.

5.4 Secondary Packaging & Shipment Requirements

Exceptions are subject to specific approval by individual SpaceX facilities. Unique requirements may exist and may be required by individual plants.

5.4.1 Pallet-Load Dimensions

   - Standard US sized (48 x 40”) pallets should be used in most cases.

   - Pallets need to be in good shape, no broken/missing boards, or chipped edges.

   - Shipments should be shipped without over-hang (if there is over-hang on a standard size US pallet, a large pallet is allowed for use).
• European-sized pallets require special SpaceX approval.

• Pallets should be 4-way entry unless otherwise specified.

• All wood pallets shall conform to the National Wood Pallet Container Association Voluntary Standard (NWPCA) and should be free of bark and pests according to US regulations. See site below for the most current regulations: http://www.aphis.usda.gov/ppq/swp/.

5.4.2 Strapping Options

• Stretch or shrink wrap should encompass the entire load with 3 full wraps (top and bottom). The wrap should grasp the bottom of the pallet to secure the load to the pallet. The wrap should be tight enough to keep the load stabilized during shipment.

• Strapping – non-metallic straps only, secured with a friction weld or metallic strip. Straps should not damage primary (corrugate, cases, etc.) packaging when being secured. Polyester strapping preferred.

5.4.3 Corner Boards

• Corner Boards may be used as required to protect the part. Fiberboard is preferred.

5.4.4 Corrugated

• Corrugated packaging material must have sufficient strength to adequately withstand transportation and handling rigors from the supplier’s shipping dock to SpaceX receiving dock. Corrugated packaging shall be adequate strength to support multiple stacking of unit pallet loads. Corrugated material must have sufficient Edge Crush Test and/or Burst Strength to protect the part and handle pallet load without crushing, folding or bending.

• Corrugated packaging shall be taped closed. No use of metal staples is allowed.

• If stacking exceptions are required, label accordingly: “DO NOT STACK”, “STACK ONLY 2 HIGH”, etc.

5.4.5 Weight Limits

• Max shipping pack = 2000 lbs unless otherwise specified.

• Max sub pack < 30 lbs. – If the primary pack is >30 lbs, it must be noted on the package.
5.4.6 Raw Materials

- Raw materials should be packed to avoid scratching, denting or chipping during shipment.

5.4.7 Labeling

- Label requirements require the following key elements when shipping packages from the supplier to SpaceX:
  - Supplier’s Name and Address
  - SpaceX Name, Receiver’s Name, Receiver’s Department, and Receiver’s Address
  - Purchase Order Number and Barcode
  - Description of package’s content
  - SpaceX’s Part Number and Barcode
  - Quantity of Parts in the Package
  - Number of cartons and which carton number the package is

5.5. Returnable Packaging (SpaceX Supplied Packaging)

5.5.1 All SpaceX provided packaging should be returned with the part and in the same condition as provided as per SPX-00008703 Supplier Returnable Packaging Standard.
6.0 PACKAGING AUTHORIZATION

6.1 All packaging changes for FRACTURE CRITICAL COMPONENTS should first be approved by your SpaceX Supplier Quality representative (contact through SPX-00002691 Supplier Request Form) using the following process:
7.0 PROTECTIVE PACKAGING FOR SPECIAL HANDLING CONSIDERATIONS

7.1 Some parts may require special packaging due to requirements for special handling, in order to prevent damage or deterioration.

7.2 This includes the use of Anti-ESD packaging (antistatic bags, packaging materials, etc.) for electronic components which may be sensitive to electrostatic discharge. ESD controls are further defined in SPX-00000874 Quality Clauses for PO’s.

7.3 Airtight vacuum or inert gas containers shall be used for those chemicals which may react with air or which are pyrophoric.