



Packaging Manual for Import and Export of Aviation Materials



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Revision Control:

REV	DATE	CHANGES	RESPONSIBLE
1	nov/05	hazardous Materials	Vinicius Martins
2	mai/08	General review	Pedro Lima
3	out/08	Inclusion: Item 3 / 9.9 / 9.10 / 15 / Note the Item 8 / 10.3.4 Anexo 12 Table Subcontrato	Pedro Lima
4	jun/10	Type text or a website address or translate a document.: Changed: Items 9.6.1 a 9.6.4; 9.7; 9.20 / 10.2.3 / 10.2.9 / 10.2.10 / 10.2.12 / 10.3.1 / 10.3.4 / 10.3.5 / 10.8.8 / 10.8.15 / 10.8.23 / 11.1.5 / 11.2.1 a 11.2.3 / 11.2.4.1 / 11.2.4.2 / 12.1 / 14.8.2.1 / 14.8.3 / 14.8.3.1 / 15.3 / Annex 3 / Annex 8 / Annex 12 / Figure: 14; 16 A20; 21; 22; 23 Included: Items 9.6.5 a 9.6.6 / 9.10.1 / 9.20.1 A 9.20.3 / 10.2.4.1 a 10.2.4.2 / 10.3.2.1 / 10.3.5.1 a 10.3.5.2 / 10.3.6.1 a 10.3.6.3 / 10.3.10 / 10.8.15.2 / 10.10.1 / 4.8.1.3 a / 14.8.1.18 / 14.8.3.4 a 14.8.3.9; Figures 15a and 15b and 16b / Annex 13 Eliminated: 11.2.1.2 / 11.2.1.3 / 14.8.4 - Reference NE: 42-01	Pedro Lima
5	jun/11	Revisão geral	Juliana Lopes
6	nov/12	Normas removidas do documento: NE 01- 043 / NE 01-050 / NE 42-009 / NE 42.020 / NE 42-205 / NAS 412 / NBR ISO 9001 / ISO 15169 Item 6 – excluído / Inclusão Anex 3 / Inclusão item 7.1 / Inclusão figura 1 / Atualização item 4 / Atualização item 7.2.8 / Atualização item 8.2	Juliana Lopes
7	jan/15	General review	Cicero; Filipi; Julio; Renan; Pedro Lima
8	Out/17	Item 1- Note was: If these requirements are not met, the Company reserves the right to reject and / or refuse to receive this material. (You can also say this if you need to: Merchants and their suppliers should closely follow these guidelines. Failure to follow the following requirements may result in lost or damaged merchandise, delays, or additional charges (incurred as a Special Project, or in additional handling fees). Item 7.1 was: The packaging must ensure product integrity and have adequate volume and resistance to endure the handling and transportation of the material. Item 7.9 was: All packaging that contains wooden raw material must meet the requirements of the current phyto-sanitary treatment standards in ISPM No. 15 (see shipping policy, item 6). Item 7.12 was: Always apply the rule to replace the use of Styrofoam with biodegradable material Item 7.13 : Included note Item 7.19 : Included note Item 7.20 : Included note and changed figure Item 7.24 : Included note Item 7.41 : All empty returnable packaging should enable stacking whenever possible allow loaded stacking Item 7.44.10 - Note was: Secure the boxes to the pallet with plastic film or 'stretch' equivalent Item 8.1 was: Any new package design must be evaluated and approved by the Embraer Logistics department via a Contract Administrator. Item 8.2 was: Where applicable, the approval of a package design by Embraer does not constitute final approval, which will occur only after evaluation of the physical delivery of the material. Item 8.3 was: Embraer reserves the right to request changes or improvements in packaging, whenever defects and risks to people and materials are detected. Item 8.5 was: For questions regarding packaging (comments, suggestions for improvements, doubts regarding the Packaging Manual, packaging analysis, etc.) the supplier / subcontractor can use the email address: logistics@embraer.com.br Item 8.5 was: Irregularly shaped materials (sharp and pointed edges, etc.), composite material with the risk of delamination or breakage at the edges, must have the edges and weak points protected by cardboard, foam, bubble wrap or other material to ensure protection of the product until its use by Embraer. (See Figure 14) Item 10.1.3 was: Irregularly shaped materials (sharp and pointed edges, etc.), composite material with the risk of delamination or breakage at the edges, must have the edges and weak points protected by cardboard, foam, bubble wrap or other material to ensure protection of the product until its use by Embraer. (See Figure 14) Item 10.1.7: Included note Item 10.3.5 was: Collapsible structures (see section 7.34) must be designed to: Item 11.6.4 was: Materials with regular geometry and dimensions smaller than 1200x1000mm must be sent on pallets. Item 14.3.2 was: When necessary, the intermediate packaging must be placed in boxes for transportation. (See Figure 48) Item 15.1.6 was: All jagged, sharp or pointed parts must be protected with cardboard, foam or similar. Figure 15 was: Example of tilted product; the blue outline indicates the aircraft opening, the left black outline shows a box inappropriate for entry into the aircraft, the right diagram shows the same product tilted inside the container to enable loading into the aircraft. Included: Fig 1-A 14.3.7.1 ; 14.3.7.2 ; 14.3.7.3 ; 7.44.3.1 ; 7.46.4.1 ; 10.1.8 ; 12.2 ; 13.4 ; fig 45-A ; fig 45-B ; fig 45-C ; fig 45-D ; fig 45-E ; fig 45-F ; fig 46-A ; fig 51-A ; fig 51-B ; 14.2.5 ; 15.1.15 ; 15.1.16 ; 15.1.17 ; 15.1.18 ; fig. 58-A ; fig. 58-B ; 17 ; 7.40.1 ; 7.40.2 ; fig 05-A ; fig 05-B ; 16.1.9 ; fig 1-A ; fig 69 ; 11.6.6 Eliminated: Figure 43 ; 11.6.4	Pedro Lima Renan Gouveia Filipi Oliveira Cicero Conrado Milton Murata
9	Mar/19	7.44.3 was: Packaging must have a maximum height of 86 cm. 7.46.3.1 was: Serialized material must have its serial number in a label on the transportation box 7.46.4 was: The supplier is responsible for inserting the necessary identification according to the characteristics of materials. 12.2.3.7 was: IMPORTANT: The supplier must ensure the piled coils over the pallet are correctly aligned. Must not occur sobreposition of coils on the pallet. The side of coil NEVER can touch the wire of other coils on pallet 14.3.1 was: Serialized items or fragile items should be individually wrapped and placed in intermediate packaging unitary wood boxes. 14.3.2 was: The intermediate packaging must be placed in boxes for transportation. (See Figure 48) Included: Defin. ESD/ESDS; 7.44.7.1; fig 08-A; 7.19.1; fig 01-A; Fig 14-a na tab 1 ; 7.46.4.1; resol 5232 ; NE 80-065; 14.3.3.1; 7.46.3.2; Fig 12-A Eliminated: Item 7.1; Figure 1-A	Pedro Lima Renan Gouveia Filipi Oliveira Cicero Conrado
10	Mar/20	7.44.4 was: Packaging must resist stacking without crushing or bulging of the sides of the package. 7.46.2 was: Serialized items should contain bar codes of the serial numbers in format (CODE 128 subdivision B). Fig 45-D e fig 45-E: excluded logo from the photos Pag 2: excluded written and approved Included: Item 7.1 – included a new text ; item 7.46.4- included Obs2 ;	Pedro Lima
11	Fev/21	Item 4: text was "Electrical cables and wires" Fig 45-A e Fig 48: Included photos 14.2.1 was: This protection should be done with a plastic or conductive or antistatic container with sufficient conductivity to provide protection from electrostatic discharges for materials sensitive to them. Included: Definition "material radar"; Item 3- obs1; item 10.2.20- obs1; Item 12.2.4; item 14.3.7.4; Item 14.2.1- observations; Fig 45-G; Fig 45-H; Fig 46-B; Fig 51-C	Pedro Lima
12	Fev/22	Item 13.2.1 was: Dums, canisters, buckets, sacks and materials that have more than one volume should be palletized on plastic pallets and covered with stretch to facilitate ease of handling. (See Figure 46). 7.21 was: In the maritime transport of materials that can suffer corrosion, the supplier must wrap the product with aluminized film (or similar) and make use of desiccant in sufficient quantity to ensure full dehumidification of the package until the use of the item by Embraer. Item 11.6: REQUIREMENTS FOR FORGED ITEMS AND CASTINGS – Completely reworked Included: Item 7.21.1 ; 13.2.2; figura 02-A; fig 46-B;	Pedro Lima
12/A	May/22	Revisão não programada Included: Item 14.2.1.1 ; 14.2.1.2; 14.2.1.3; fig 46-C; fig 46-D	Pedro Lima
12/B	Jun/22	14.2.1.3 was: It is not obligatory the caution symbols on the external of the transportation boxes, mas is recommendable use it as a alert 16.1.3 was: They should be packaged preferably on plastic pallets or similar with nylon straps and covered with stretch film to facilitate handling. (See Figure 59)	Pedro Lima
13	Fev/23	10.2.14 was: The roof and sides of large packages (not bell-type) must have handles to facilitate handling of the lid parts and sides during disassembly. (See Figure 25) figure 25: Alterado 14.2.1.3 was: The most external layer of packings containing ESDS items or equipment shall have an external identification or code that indicates the packing contains ESDS items or equipment inside. In addition to the identification or code the external and intermediate packings may optionally display a caution symbol through an adhesive label as presented in Figure 46-D.	Pedro Lima
14	Fev/24	Introduction was: The Embraer Manual contains requirements for packaging of Aviation parts to Embraer and recommendations for the best packaging practices, which guarantee the quality of the product to the end consumer. Item 5.1 Secondary Packaging was: Packaging used to protect the primary packaging. Ensures the physical protection of the item in its primary packaging 5.2 Small was 20 Kg (Changed in all items of manual) 7.40.2 was: EMBRAER recommend to use one of the kind of screws showed bellow 7.44.4 was: Every cardboard Packaging must resist stacking without crushing or bulging of the sides of the package. 17 WAS: COMPOSITO MATERIAL AND TRANSPARENCY (GLASS AND ACRYLIC) 17.1 WAS: In addition to the requirements below, the requirements in Item 7 of this manual must be followed. 17.2.3.1 was: The item must have primary and secondary package individual. 8.3 included: "Opportunities of reducing wood waste in Packages (ESG)" Included: 7.46.4-included symbol 15 ; Item 7.46.6 ; figure 12-B ; figure 12-C ; Item 15.2 ; Item 15.3 ;	Pedro Lima
15	Apr/25	Item 7.7 was: Primary, secondary and final packaging must be designed in such a way as to enable safe removal and replacement of the contents without causing functional damage to the protection system or the packaging. Item 7.23 was: When a pallet is used, it should withstand climatic conditions such as humidity and different temperature ranges that may occur throughout the logistics cycle. Item 7.33 was: Packaging must have protection against corrosion to ensure weather resistance (sun, rain, snow and sea). Item 7.44.3.1 was: When using a cardboard box to a lot of items, the box must have the correct capacity to the size and weight of the lot Note: If necessary, to divide the lot of items in more boxes to ensure that the boxes be below the limit of weight and dimensions (see item 5.2- small boxes) Item 7.47.2 was: For air shipment of materials that are temperature controlled, you must: Item 10.2.8 was: The use of bell-type lids should be limited to the dimensions below or, in special cases, be analyzed by the Embraer plant Logistics area responsible for opening the package. Maximum height 2000 mm / Maximum width: 3000 mm	Pedro Lima

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15	Apr/25	<p>Item 12.2.1 was: Use pallets for transportation of plates and bars.</p> <p>Item 12.2.2 was: The maximum weight per pallet should not exceed 3 tons.</p> <p>Item 12.2.3 was: Use metal straps for tying and securing the load to the pallet on all four sides (see Figure39).</p> <p>Included: definition of primary part and MP included in item 2; included notes in item 7.8; item 7.46.4; item 11.1.1; item 11.1.2; item 11.5; item 11.6.5.1; item 12.1.2; item 12.2.3.5; item 15.1.2; item 16.1.2; item 17.2.1; item 18.4; item 16 da tabela1; standard MP/MEP in item 9; New items: Item 6.3; item 11.1.1.1; item 11.1.1.2; item 11.3.1.1; item 11.3.1.2; item 11.3.1.3; item 11.3.1.4; item 11.3.1.5; item 11.3.1.6; item 11.3.1.7; item 11.4.4; item 11.4.5; item 11.4.6; item 11.4.7; item 11.4.8; 11.5.4; 11.5.6; 11.5.7; 11.5.8; Item 12.2.3.8; Item 12.2.3.9; Item 17.2.6.1; item 12.3;</p> <p>Novas figuras: Fig 39-A; Fig 39-B; Fig 39-C; Fig 39-D; Fig 39-E; Fig 39-F</p> <p>Eliminated:: Item 11.4</p>	
16	Fev/26	<p>Included: notes in item 7.3; notes in item 7.44.4; item 4.46.4.2; notes 1 & 2 in item 7.47; included note in item 7.47.2. included MEP 09-066 in item 9;</p> <p>New figures: Fig. 12-A1</p>	Pedro Lima



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1. INTRODUCTION

The Embraer Manual contains requirements for packaging of Aviation parts to Embraer and recommendations for the best packaging practices, which ensure the quality of the product to the end Embraer receiving area. Following these guidelines will help ensure that you get the most value out of the material, and will prevent delays, additional charges, errors, and damaged product.

Note: If these requirements are not met, the Company reserves the right to reject and / or refuse to receive this material.

Where necessary, to improve internal processes and reduce risks, the Embraer will request changes in packaging, even if they are not yet specified in the manual.

2. DEFINITIONS

Aviation **Materials Category A:** Materials authorized by the Engineering Team, in accordance with technical specifications and certification standards, used in the manufacture, repair and maintenance of aircraft.

Electrical Hardware: These are materials supplied by external manufacturers with various functions for interconnection and / or protection of electrical / electronic circuits of aeronautical systems. Example: sensors, wiring, terminals, connectors, switches, pushbuttons, relays, capacitors, resistors, wire ropes, potentiometers, etc.

Mechanical Hardware: These are finished materials that do not require processing. They are provided by manufacturers and used as external mechanical fittings of a given set or mechanical system. **Example:** *Screws, washers, rivets, fasteners, pins, nuts, rings, bushings, etc.*

Equipment: Materials provided by outside manufacturers with specific functions and intended for the manufacture of aeronautical systems. **Examples:** *On-board instruments, Flight instruments, Navigation, Motors, Electronic Instruments, Hydraulic Systems, Ant-Ice and De-Icing Protection, Rain Systems, Generators, Batteries, Braking Systems, etc.*

Large items and structures: Parts weighing above 2000 kg or over 2000mm in length, which cannot be handled by a standard pallet. **Examples:** *Fuselage, Pylons, Stabilizers, Tail cone, Stubs, Fairings, Nacelle, Winglet, Radome, Wing finishing, Flaps, Spars, Ribs, APU, Rudder, etc.*

Interiors: Pieces and parts used inside the aircraft. **Example:** *Furniture, Panels, Seats / Chairs.*

Primary Part: Aircraft parts and components purchased for use in assemblies or manufactured from purchased raw materials.

Raw Materials: Materials provided by outside manufacturers that will require some processing before their final use. **Examples:**

- **Metallic:** Plates, sheets, rods, profiles, tubes, forgings and castings
- **Non-Metallic:** Pre-impregnated, adhesive film, adhesive foam, non-adhesive film and adhesive primer, fabrics, carpets and similar

Flammable / Hazardous: These are all solid, liquid or gaseous substances that, when out of their contents/containers, can cause danger to the people involved, and harm the environment.

Examples: *Explosives, compressed gases, flammable liquids as solvents, flammable solids, oxidizing substances, toxic and infectious substances, radioactive substances, corrosives, etc.*

Composite material: Are materials formed by two or more components or two phases and have different chemical properties from the components.

Example: Glass fiber, carbon fiber, etc



Wire: Electrical conductor, solid monofilament (solid section), generally cylindrical and made of copper, with insulation of plastic material.

Cabe: Electrical conductor, multifilament (formed by various wires), generally cylindrical and made of copper, with insulation of plastic material.

ESD – Electrostatic Discharge

ESDS – Electrostatic Discharge Sensitive

Radar Material – Homologated material (in accordance with technical standards and Embraer Engineering) to be used in manufacturing, repairs and maintenance of Radars.

MEP – Material Embraer Padronizado (Embraer's Standardized Material)

MP – Material Padronizado (Standardized Material)

3. APLICACIONES

The requirements of this manual apply to materials of aviation origin:

- Importing, domestic suppliers, or EMBRAER partners
- Return of maintenance or repair items
- International Subcontract
- Embraer Sites abroad

Note1: Apply the rules and requirements of this manual also to:

- "Ground support equipment" (EAS/GSE/AGE)
- Radar material

Note2: The logistics project area must be consulted regarding any material that does not fit these applications / definitions.

4. MATERIAIS AVIÃO CONTIDOS NESTE MANUAL

- Medium / Large items and structures
- Metallic Raw Materials
- Non-Metallic Raw Materials
- Flammable / Hazardous
- Hardware and Equipment
- Interiors
- Tires and Tubes
- Parts made of composite material
- Tubes and ducts
- Electrical cables and wires



5. GENERAL INFORMATIONS

5.1. PACKAGING DEFINITIONS

- **Packaging**

The term packaging is to be understood to all those materials used for wrapping, containment, protection, handling, delivery and presentation of goods, from the manufacturer to the end user (Embraer's assembly line), ensuring the integrity and quality of the material.

- **Primary Packaging**

Packaging that is in direct contact with the product. It is the unit of storage and consumption in the case of items used unitarily.

Note: Materials to individual protection are not considered as primary package. When an item request extra protection, primary package is the package with the protect item inside.

- **Secondary Packaging**

Packaging used to protect the primary packaging. Ensures the physical protection of the item in its primary packaging when the primary packaging does not ensure the necessary protection for the product.

- **Final or Transport Packaging**

Packaging used to expedite the transportation and provide protection to the secondary packaging. This packaging must meet the modal requirements used in transportation.

- **Mechanized Packaging**

These type of packages (*Mechanized Packaging*) that are allowed to be handled by forklifts, pallet trucks, mobile cranes, etc. They can be primary, secondary or final.

5.2. PACKAGING CLASSIFICATION

- **Small –**

Any package that can be handled by a single person. The weight of the package with the product shall not exceed 18 kg or 42 L (liters), whichever is applicable. None of the dimensions of the package should exceed 800 mm.

- **Medium –**

These are packages weighing between 18 kg / 42L and 300Kg (including the product) or packages that have any of the dimensions between 800 mm and 2000 mm.

- **Large –**

Any package weighing over 300 kg or does exceed dimensions of 2000mm.

6. EMBRAER RECOMENDATIONS

6.1. Whenever technically possible and economically feasible, give preference to the use of returnable packaging for the logistics of products.

6.2. With returnable packaging, the ownership of the package must be identified by displaying the name and supplier's logo in an easily seen location. (Would add that all labels, and drawings must be placed on the same side)

6.3. It is important that all packaging is protected from rain during loading and transportation. It is recommended to use a closed vehicle for transportation. If this is not available, use reinforced tarpaulins to cover the load.



7. GENERAL REQUIREMENTS

- 7.1. The acceptance of the packaging design by Embraer does not release the supplier from responsibility for the correct functioning of the packaging until the receipt inspection at Embraer.

Figure 1-A: Eliminated – Revision 09

- 7.2. The selection of packaging materials is the supplier's responsibility. Such materials must be compatible with the transported product, must conform to the size and weight of the transported material and the mode of transportation used. (by sea, air or road).
All materials used must be chosen based on the ease of recycling and favor those that are less polluting (biodegradable) when disposed of.
- 7.3. All packaging must ensure the best ergonomic conditions in operations throughout the logistics cycle. Access to the packed material should be practical and safe, not presenting ergonomic and safety risks to operators.
Note: The weight, dimensions and shape of package MUST NOT be a risk of safety to people handling the package
- 7.4. The placement of the material within the package should facilitate the visualization of the part number (PN) during the process of physical verification.
- 7.5. The supplier must ensure that all packaging, regardless of size, is free of dirt or unfamiliar objects that could be characterized as "FO" (foreign object).
- 7.6. Packaging of parts containing fluid elements must be capable of containing the liquid, to prevent leakage.
- 7.7. Primary, secondary and final packaging must be designed to enable item safe removing from box and its returning to box without causing functional damage to the internal protection system or the packaging..
- 7.8. It is mandatory to send the quality documents (certificate and test report) together with the materials (see item 5 in the Shipping Policy: <https://www.embraersuppliers.com/esuppliers/#!/pt-BR/supplier-requirements>). together with the product .
Note: Quality documents (CofC, registration card, TAG) are mandatory for the release of the material for use. The absence of the necessary documents will result in the issuance of a CD note no. 20 (non-conformity of documents), which may generate penalties and the return of the material with expenses borne by the supplier (in the case of TAG 8130 - Certificate of Airworthiness).
- 7.9. All packaging that contains wooden raw material must meet the requirements of the current phytosanitary treatment standards in ISPM No. 15 (see manual "Embraer Wood Packaging material guidelines" -- <https://www.embraersuppliers.com/esuppliers/#!/pt-BR/supplier-requirements>).
- 7.10. Always use wood with certificate of origin, ensuring that wood from native forests is NEVER used.
- 7.11. In the manufacture of disposable packaging the use of recyclable or biodegradable materials should be given preference.
- 7.12. Avoid the use of Styrofoam EPS (isopor®), ever it's possible
- 7.13. Primary packaging MUST only contain items with the same part number (PN).
Note: In case of necessity of the Embraer assembly line, Embraer can request and authorize supplier to put more than a PN (different PNs) in the same package.
- 7.14. Different batches must not be placed in the same primary package
- 7.15. The closing of primary packaging with staples is not permitted because of the risk of FO.
- 7.16. Plastic bag should be heat-sealed or with adhesive tape.
- 7.17. Cardboard boxes should be sealed with adhesive tape. (See Figure 01)



Figure 01: Example of package sealed with tape

- 7.18. Materials must be secured within the container to prevent movement during shipping and handling.
- 7.19. For small containers locking must be done by filling the voids, which can be done with: bubble plastic, Kraft paper, air bags, bags made of polyethylene foam.
Note: Avoid using polyurethane expanded foam
- 7.19.1. Dimensions limit (minimum) for transportation packages as showed in the bellow figure



Figure 01-A: Minimum dimensions acceptable for transportation packages

- 7.20. The occupancy of the internal volume of the packaging cannot be less than 80%. (See Figure 02) Note: The volume occupied by the item (product) inside the box MUST be 80% (minimum) of package internal volume.
With the exception of equipment very fragile, that need more cushioning layers

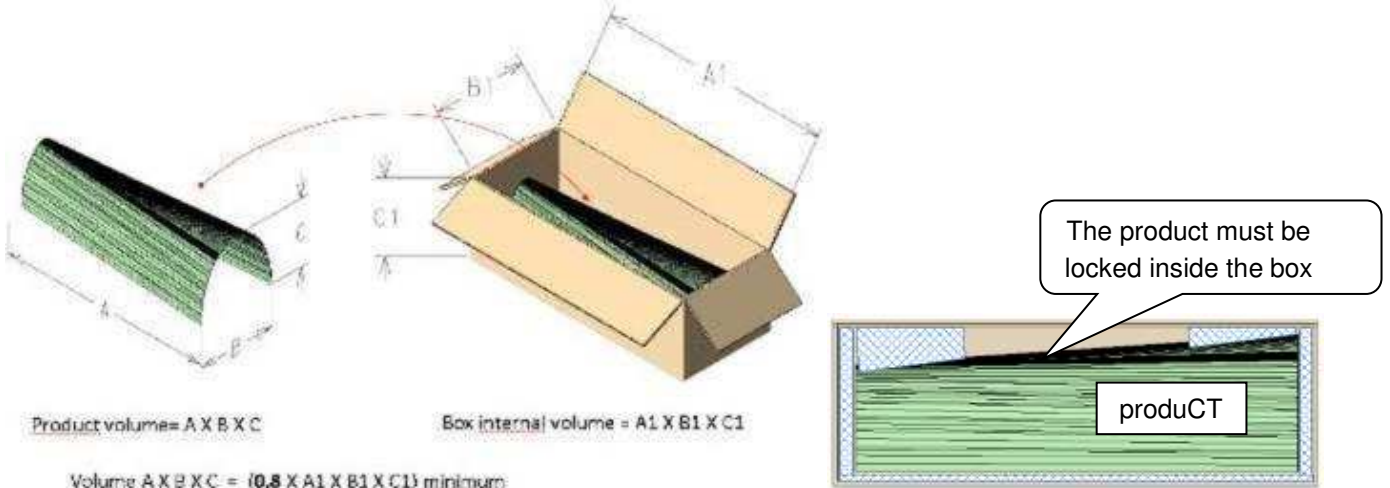


Figure 02: Example of package with occupation bigger than 80%



- 7.21. In the maritime transport of items (primary or final parts) with parts that can suffer corrosion, the supplier must wrap the product with aluminized film (or equivalent) and make use of a desiccant in sufficient quantity to guarantee the total dehumidification of the package until the opening of the packaging at Embraer.
- 7.21.1. Any product (primary or final parts) with parts subject to corrosion of any kind (ex: parts without painting or surface treatment), must have protective materials applied to these parts that guarantee the quality of the product during transport and for a long time of storage (up to 2 years). The protective material must be compatible with the material of the part. See NE standards on preservation in item 9 of this manual

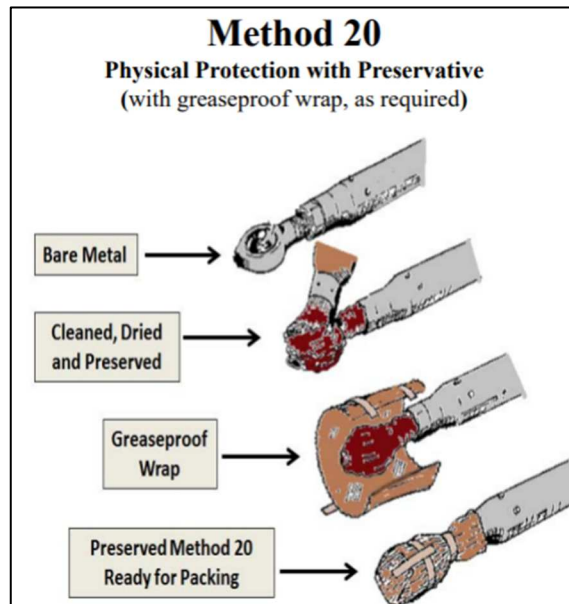


Figura 02-A: Exemplo de proteção de partes de peça sem pintura

- 7.22. Mechanized packaging must have supports for movement as shown below. (See Figure03)

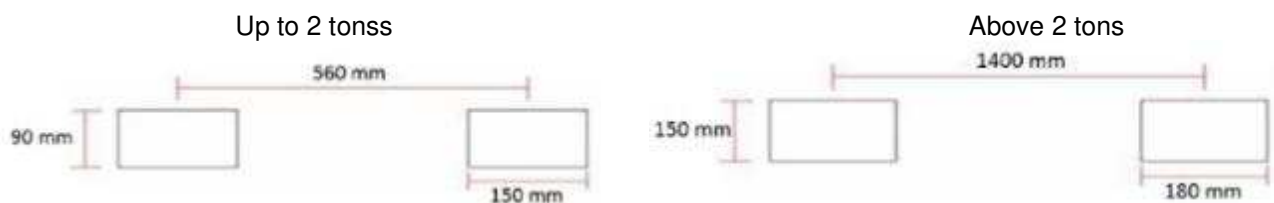


Figure 03: Example of fork guide for forklift

- 7.23. When using a pallet, it must withstand the weather conditions, such as humidity and temperature, encountered throughout the logistics cycle and be reinforced so as not to break under the weight of the material and handling with a forklift. Use enough quantity nails or staples to prevent any parts of the pallet from coming loose.
Note: It must not produce broken wood ends or nails that put people in danger.

- 7.24. When possible do not use wooden pallets, (see shipping policy, item 6)
Obs: "The Supplier agrees to provide NON-WOODEN skids for the utilization of mechanical handling equipment in case of any package (or unitized group of packages) weighs more than forty-five (45) kilograms or otherwise is not suited to manual handling. "

- 7.25. The dimensions of the palletized load must not exceed the pallet dimensions.



- 7.26. The pallet must ensure that the material does not suffer flexion above the limit of its maximum flexural strength.
- 7.27. The pallet must have at least two lateral entry points for handling by moving equipment.
- 7.28. Use nylon or polyester straps with corner protection for securing and fixing cardboard boxes on the pallet.
- 7.29. All palletized material must be secured with straps appropriate for the weight and type of product loaded in such a way as to prevent displacement on the pallet and any damage and accident risk.
- 7.30. Pyramid type loads are not accepted. (See Figure 04)

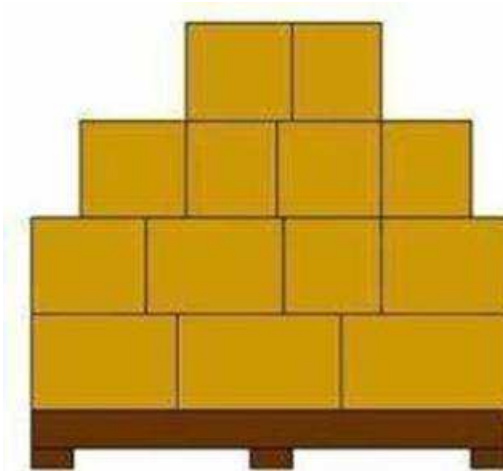


Figura 04: Exemplo de esquema de carregamento do tipo pirâmide

- 7.31. It is the supplier's responsibility, whenever necessary, to provide along with the package, a manual with instructions necessary for correct shipping, handling and opening of the package.
- 7.32. All returnable packaging must be made with suitable materials and treatments to withstand the type of transport (by air, sea, and road).
- 7.33. Returnable packaging must have corrosion protection that guarantees resistance to inclement weather (sun, rain, snow and sea spray).
- 7.34. Avoid the use of wood in the manufacture of returnable packaging
- 7.35. All returnable packaging must give priority to ease of cleaning
- 7.36. All returnable packaging should not hold water when exposed to rain (there should not be places where water accumulates)
- 7.37. Whenever possible returnable packaging with removable parts should be avoided.
- 7.38. Moving parts (parts with articulation) must be made so as not to put people at risk in setup operations (ensuring safety during assembly and dismantling)
- 7.39. All returnable packaging must ensure the best safety and ergonomic conditions in operations throughout the logistics cycle. Access to packed material should be practical and safe, not presenting ergonomic and safety risks to operators.
- 7.40. For wood packaging, screws at the closing / opening areas of the package must be used. The use of nails is only allowed for the assembly of structural parts of the box (see Figure 05)



Figure 05: Example of packaging sealed with screws

7.40.1. Never use different kinds of screws to close the same package

7.40.2. Only the screws model below are permitted at Embraer. Supplier MUST choose one of them and never mix different models on the same box



Figure 05-A: Screw type Phillips ou Frearson



Figure 05-B: Screw type internal Torx

7.41. All empty returnable packaging should enable stacking
 Note: Whenever possible allow loaded stacking

7.42. Whenever necessary, packaging must be designed to be collapsible (collapsible when empty) to reduce its size and facilitate reverse logistics (return to point of origin). (See Figure 06)

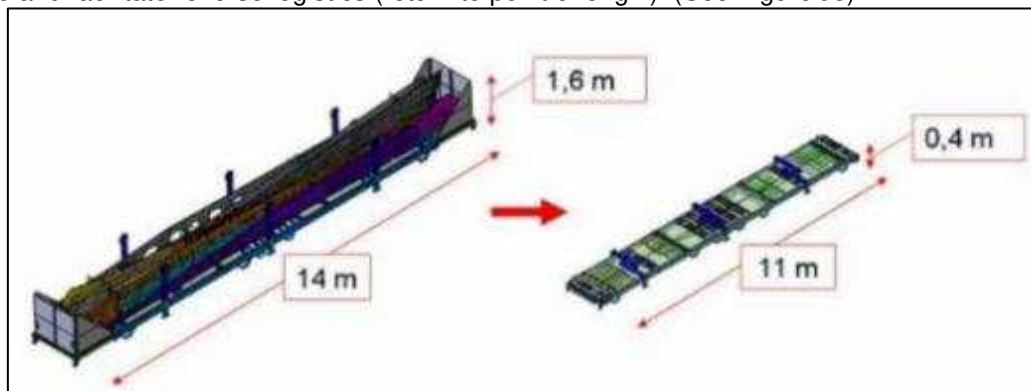


Figure 06: Example of collapsible packaging

7.43. For returnable containers that have movable parts, the handling instruction manual must be included.

The updated version of this document is available on the site. Any copy is intended for information only

Revisão 16 Data: 06 / 2026

7.44. CARDBOARD PACKAGING

7.44.1. Cardboard packaging must be made with "virgin" paper (Kraft) with pure fibers.

Note: cardboard packaging made with recycled material will not be accepted.

7.44.2. Use cardboard of thickness, weight and quantity of walls appropriate for the weight and size of the transported material and meets all the needs in the supply chain of transportation, handling and storage).

7.44.3. Packaging must have a maximum height of 86 cm.

Obs: Minimum dimensions in accordance with item 7.19.1

7.44.3.1. When using a cardboard box to a batch of items, the box must have the correct capacity to the size and weight of the batch

Note: If necessary, divide the batch of items in more boxes to ensure that the boxes be below the limit of weight and dimensions (see item 5.2- small boxes)

7.44.4. All cardboard packaging must withstand the indicated stacking without crushing or deformation that could compromise the material contained in the packaging.

Note: Stacking resistance must ensure that the products arrive in perfect condition at Embraer receive area, even if there is any bulging or small dents in the box (see item 7.1).

Note: Will NOT be accepted cardboard boxes that don't resist to be staked itself and with other boxes in the transportation and warehouse

7.44.5. Do not use staples in assembling and closing boxes, use only glue or tape.

7.44.6. For large packages, add internal cradles when necessary, according to the size of the products for better fitting. These cradles can be of corrugated cardboard with multiple walls. (See Figure07)



Figure 07: Example of cardboard packaging walls and internal cradle

7.44.7. Any medium or large package (over 40 kg) should have supports that allow mechanical movement using a forklift or pallet jack. (See figure 08)

7.44.7.1. If necessary, supports (foot) on the center of package base, Must be used entire feet as showed in the figure (see fig 08-A) to avoid damages to the central foot in handling

7.44.8. For medium or large packaging, the use of a box in 3 parts, consisting of base, side and cover secured with nylon or polyester straps is recommended. (See Figure8)

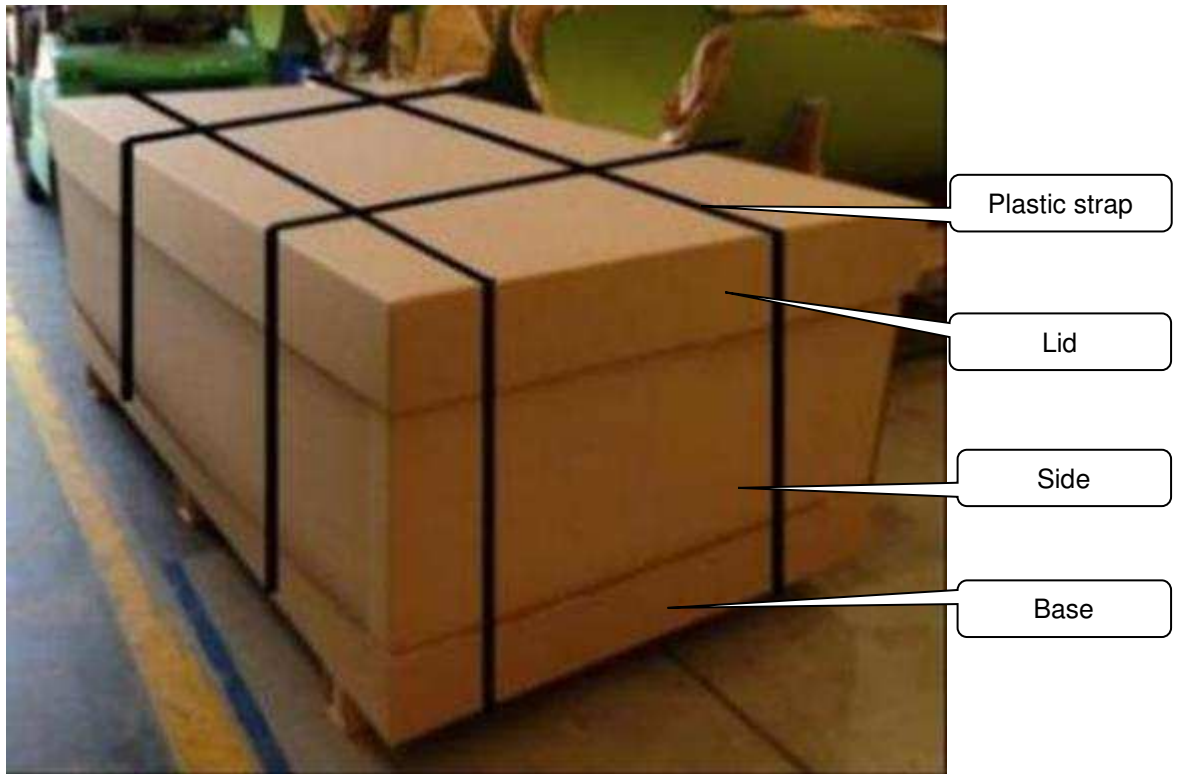


Figure 08: Example of cardboard packaging

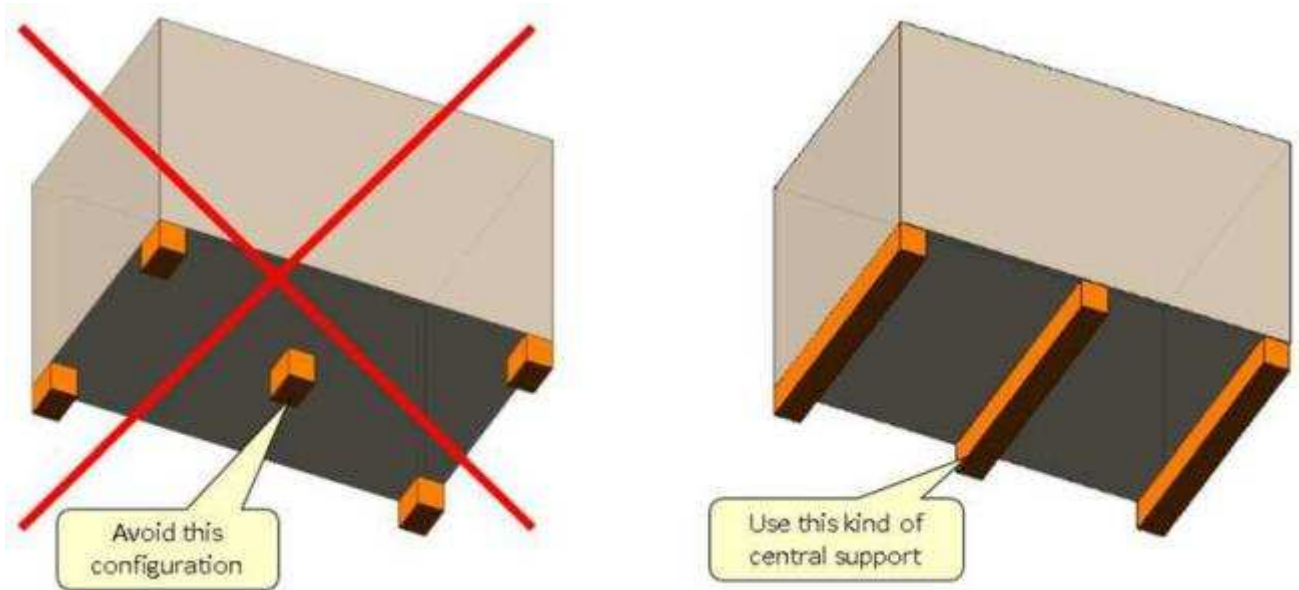


Figure 08-A: Example of cardboard package foot

7.44.9. When necessary use reinforcing structures to ensure the integrity of the package. (See Figure 09)



Figure 09: Example of cardboard box with reinforcement

7.44.10. Unitization of cardboard packages must:

- Secure the boxes to the pallet with plastic film, 'stretch' equivalent or belts (see item 7.29)
- Stacks must have edges aligned to ensure strength against compression (See Figure 10)

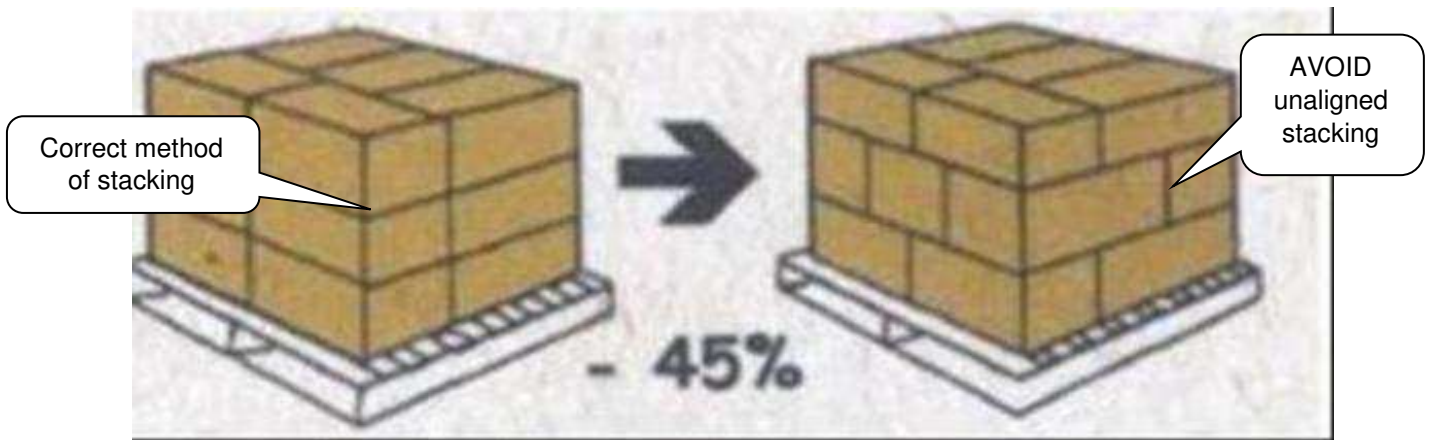


Figure 10: Exemple of stacking

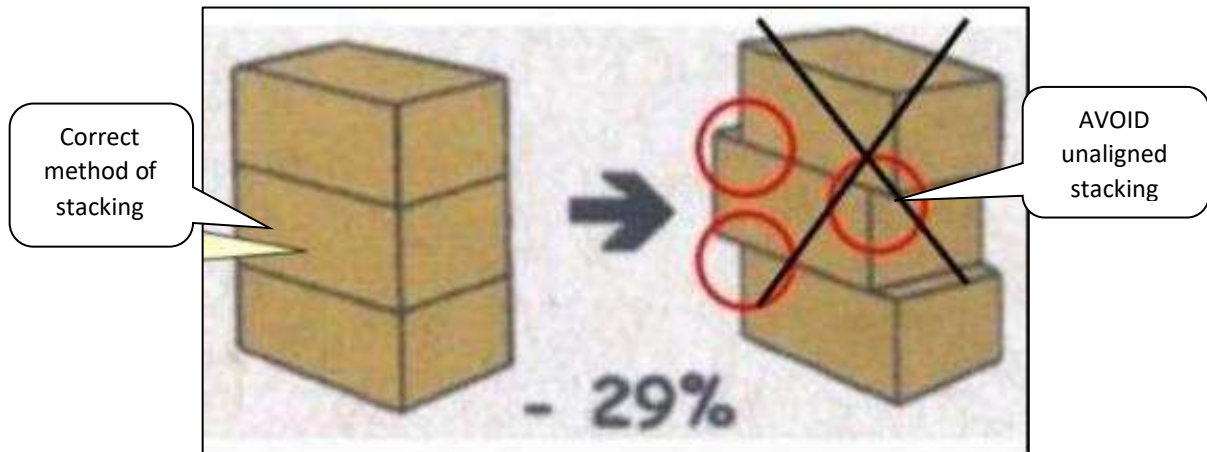


Figure 11: Alignment examples. Correct stacking on left - AVOID incorrect unaligned stacking shown on right

- Stay within the working area limit of the pallet so as not to lose compressive strength (see Figure 12)

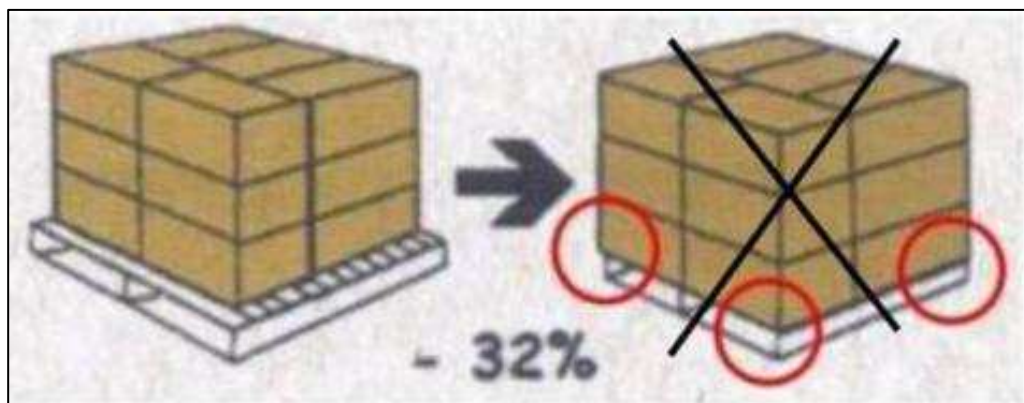


Figure 12: Examples of unitization

7.45. IMPACT DETECTION SYSTEM

- 7.45.1. Whenever appropriate, for fragile items, the supplier must attach impact indication labels to show possible damage locations during transport.
- 7.45.2. The supplier must select the labels, according to the need of each product, and according to the degree of fragility of the item.
- 7.45.3. The supplier must mark how many labels are required, at points on the packaging where they can be seen easily by handlers.
- 7.45.4. For examples of indicators (see <http://www.shockwatch.com.br/produtos.asp>)

7.46. PACKAGING IDENTIFICATION

- 7.46.1. All final packages or for transportation must be properly identified to allow their proper handling. These markings must be indelible, durable and legible and must contrast with the colors of the packaging.
- 7.46.2. Serialized items **MUST** contain bar codes of the serial numbers in format (CODE 128 subdivision B).
- 7.46.3. The packaging must be identified with its external dimensions in the following order, Length x Width x Height.
 - 7.46.3.1. Serialized material must have its serial number in a label on the primary box
 - 7.46.3.2. Material designated to use exclusively in prototypes **MUST** have an external label of identification as shown on fig 12-A



Figure 12-A: Prototype Label

- 7.46.4. The supplier is responsible for inserting the necessary identification according to the characteristics of materials.
 - Note 1: Any problem because of lack of minimum necessary information will be supplier responsibility
 - Note 2: The “do not stack” symbol must not be used for cardboard packaging, see item 7.44.4
 - Note 3: The “Keep dry” symbol is NOT valid for oversize packaging (Items above the dimensions of the standard 40’dry container)



<p>1 - Fragility</p> <p>Delicate Instruments Fragile</p>	<p>2 - Package top heavy</p>
<p>3 - Do not handle with hook</p>	<p>4 - This side up</p>
<p>5 - Do not stack</p> <p>DO NOT STACK "used for oversize crates"</p>	<p>6 - Maximum stockpile</p>
<p>7 - Do not apply concentrated loads</p>	<p>8 - Do not expose to humidity</p>
<p>9 - Do not expose to heat</p>	<p>10 - Electronic sensitive equipment</p>
<p>11 - Fragile -Do not agitate</p>	<p>12 - Lift point</p>
<p>13 - Do not expose to light</p>	<p>14 - Gravity center</p>
<p>15- Max Load capacity (Maximum load, evenly distributed, over the box)</p>	<p>16- Keep dry</p> <p>KEEP DRY</p>

TABLE 1: Examples of markings that indicate correct packaging handling

7.46.4.1. When the package has two different CG, one to empty package and another to full package, it is necessary adopt the condition below.



This mark (open cross) to the CG of empty package



This mark (cross inside the circle) to the CG of full package

7.46.4.2. Information about staking: Every package sending to Embraer **MUST** resist to be Staked in transportation and storage. The symbol 5 "do no Stack" from table 1 is accept **ONLY** to oversize boxes. That does not fit in container door



Small and medium-sized packages **MUST** withstand stacking.
 "Non-stackable" packages are not acceptable.
 Packages are stacked in containers and on aerial pallets and stored in piles in the warehouse.

Figure 12-A1: Rules to stack boxes

7.46.5. IDENTIFICATION LABELS

The information displayed on the package label must comply with the standards described in the Shipping Policy, available at <https://www.embraersuppliers.com/esuppliers/#/en-US/supplier-requirements>

7.46.6. Labels to identify Export controlled material.

7.46.6.1. These rules **MUST** be applicated to every item who is been sent to Embraer and is subject of international "export control" current rules at the moment of expedition of the item.

7.46.6.2. **MUST** be put outside the package, a label (see fig 12-B) to identify that the package contains an item subject of export control rules.

- The label dimensions **MUST** be made to facilitate the visualization of information in all operation with the package.
- The letters and background color of label **MUST** highlight the information from distance

7.46.6.3. This label **MUST** be put in, at least, two sides of package, preferable near the labels of item identification.

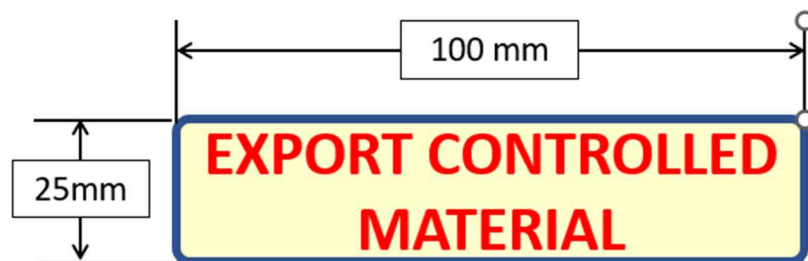


Figure 12-B: Label to controlled material.

7.46.6.4. Every level of packaging (primary, secondary, final) MUST have this label (see fig. 12-C)

7.46.6.5. FORBIDDEN mix controlled and NO controlled items in the same package.



figure 12-C: Example of labels in Every level of package

7.47. MATERIALS WITH CONTROLLED TEMPERATURE

Note: In addition to requirements below, the requirements of item 7 of this manual must be followed.

Note: It is mandatory to send the quality documents (certificate and test report) together with the materials, inside the box (see item 5 in Shipping Policy:-(<http://www.embraer.com.br/ShippingPolicy/brasil.html>))
Note: Quality documents (CofC, registration card, TAG) are mandatory for the release of the material for use. The absence of the necessary documents will result in the issuance of a CD note no. 20 (non-conformity of documents), which may generate penalties and the return of the material with expenses borne by the supplier (in the case of TAG 8130 - Certificate of Airworthiness).

7.47.1. Packaging must have identification of temperature required for the material (see figure 13)

Note: Identify on the sides on opposite sides visibly. (See Figure 13)



Figure 13: Examples of packaging with storage temperature indications

7.47.2. For shipment of materials that are temperature controlled, must:

- Use packaging with thermal insulation and moisture resistance.
Note: Use plastic or aluminum packaging preferably. Avoid steel packaging whenever possible. If using steel packaging, it must withstand moisture during transport and storage for a long time (the life of item) without any oxidation.
- Add dry ice to ensure the stability of the required temperature during the whole transportation process, according to NE 42-022
- Show identification in accordance with the IATA regulations.



8. ANÁLISIS / APROVAL OF PACKAGING

- 8.1. Any new package design must be evaluated and approved by the Embraer Logistics department via Embraer Quality department (via EPPAP) or a Contract Administrator.
- 8.2. Where applicable, the approval of a package design by Embraer will occur only after evaluation of the physical delivery of the material.
- 8.3. Embraer reserves the right to request changes or improvements in packaging, whenever:
 - Defects and risks to people and materials are detected.
 - Opportunities of improvement in the Embraer process are detected
 - Opportunities of reducing wood waste in Packages (ESG)
- 8.4. All packaging modifications will have to undergo a reassessment by Embraer Logistics. See item 8.1
- 8.5. For questions regarding packaging (comments, suggestions for improvements, doubts regarding the Packaging Manual, packaging analysis, etc.) use the email address: logistics@embraer.com.br.

9. STANDARDS - REFERÊNCIAS

GENERAL APLICATION:

- NAS 850 – General Packaging Standard
- NAS 851 – General Packaging Standard Indexes
- NAS 852 – Quality Assurance, General Guidance
- NAS 853 – Field Force, Protection From
- NAS 854 – Hazardous Material Packaging and Safety Data Sheet Preparation
- NAS 855 – Industrial Packaging Standard
- NAS 412 – Foreign Object Damage / Debris (FOD) Prevention
- IATA - Dangerous Goods Regulation of IATA - International Air Transport Association www.iata.org
- SAE AS9000 – Aerospace Basic Quality System Standard
- SAE AS9120 – Quality Management Systems- Aerospace Requirements for Stockist Distributors
- NBR ISO 9001 – Sistemas de Gestão da Qualidade – Requisito
- ISO 15169 – Aeroespacial – Prevenção de danos por objetos estranhos
- IMO – Dangerous regulations – International Maritime Organization www.imo.org
- NIMF 15 - Norma Internacional de Medidas Fito-sanitárias nº15 www.ippc.int
- Resolução nº 5232 - Instruções Complementares ao Regulamento do Transporte Terrestre de Produtos Perigosos
- NR 17 – ERGONOMIA (Brazil Federal regulatory Standard)

FEDERAL SPECIFICATION (GSA - USA):

- Série NAS 3400 a NAS 3454 – Packaging Specifications - Condições de embalagem por tipo de item a transportar (Hardware, Matéria-prima, Conjuntos, Metálicos e Não Metálicos, Materiais Perigosos etc).
- MIL-STD-1686 – ESD Control program for protection of electrical and electronic parts, assemblies and equipment.
- MIL-STD-773 - Electrostatic Discharge Control Handbook for Protection of Electrical and Electronic Parts, Assemblies and Equipment.
- MIL-HDBK-263 – ESD control handbook for protection of electrical and electronic parts, assemblies and equipment.
- ASTM-D6880 - Standard Specification for Wood Boxes.
- MIL-STD-2073-1E - standard practice for military packaging

EMBRAER REFERENCES

- NE 01-050 – Packings Identification
- NE 42-011 – Packing, Preliminary Requirements
- NE 42.020 – Materials and Equipments – Storage Conditions Shelf Life
- NE 42-025 – Item preservation against deterioration
- NE 42-022 – Pré-impregnado, filme adesivo, espuma adesiva, filme não aderente e primer adesivo - transporte, manuseio, armazenagem e revalidação
- NE 01-043 - Classification and Identification for Dangerous Materials
- NE 42-012 - Protection for Handling, Transport and Storage
- NE 42-015 - Dangerous Materials – Handling, Packing and Storage
- NE 80-065 - ELECTROSTATIC DISCHARGE CONTROL (ESD)
- MP 1.1.106 - RECTANGULAR EXTRUDED SHAPE, ALUMINUM ALLOY
- MP 1.4.101 - “ CUT TO SIZE ” - ALUMINUM ALLOY PLATES – KC390
- MEP 02-068 - ALUMINUM ALLOY, “THICK” EXTRUSION 7136-T76511
- MEP16-010 - LAMINADO DECORATIVO (FORMICA) / DECORATIVE LAMINATE (FORMICA)
- MEP 16-050 - WOOD VENEER STANDARD FOR DECORATIVE FINISHING OF EXECUTIVE AIRCRAFT MONUMENTS
- [MEP 09-066 - TWO COMPONENTS EPOXY PASTE AND LIQUID ADHESIVE FOR BONDING](#)

10. PACKAGING FOR MEDIUM AND LARGE ITEMS AND STRUCTURES

10.1. GENERAL REQUERIMENTS

- 10.1.1. In addition to the requirements below, the requirements of item 7 of this manual must be followed.
- 10.1.2. Whenever technically feasible, give preference to the use of returnable packaging for medium and large items; if it is not feasible, use disposable packaging
- 10.1.3. Irregularly shaped materials (sharp and pointed edges, etc.), composite material with the risk of delamination or breakage at the edges, must have the edges and weak points protected by cardboard, foam, bubble wrap or other material (See Figure 14) to ensure protection of the product until its use by Embraer (Assembly line-see 7.1) .

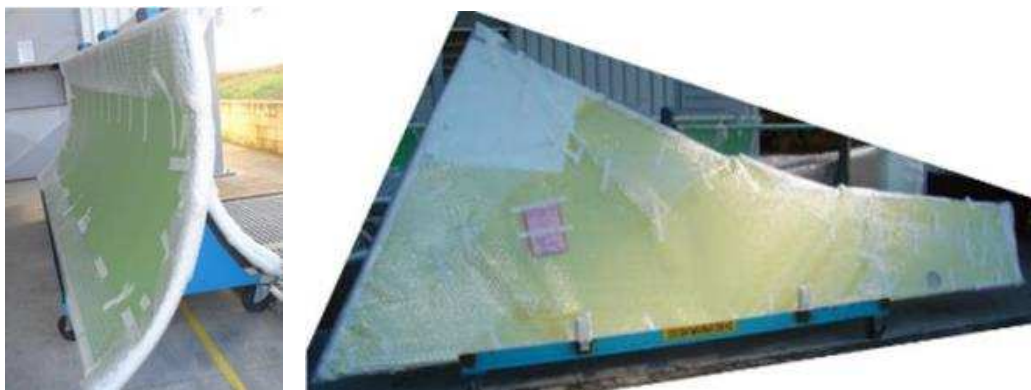


Figure 14: Examples of foam padding on the edges of material

- 10.1.4. Whenever the product does not fit in a dry container (closed), the possibility of tilting the product to reduce its dimensions should be examined. (See Figure 15)

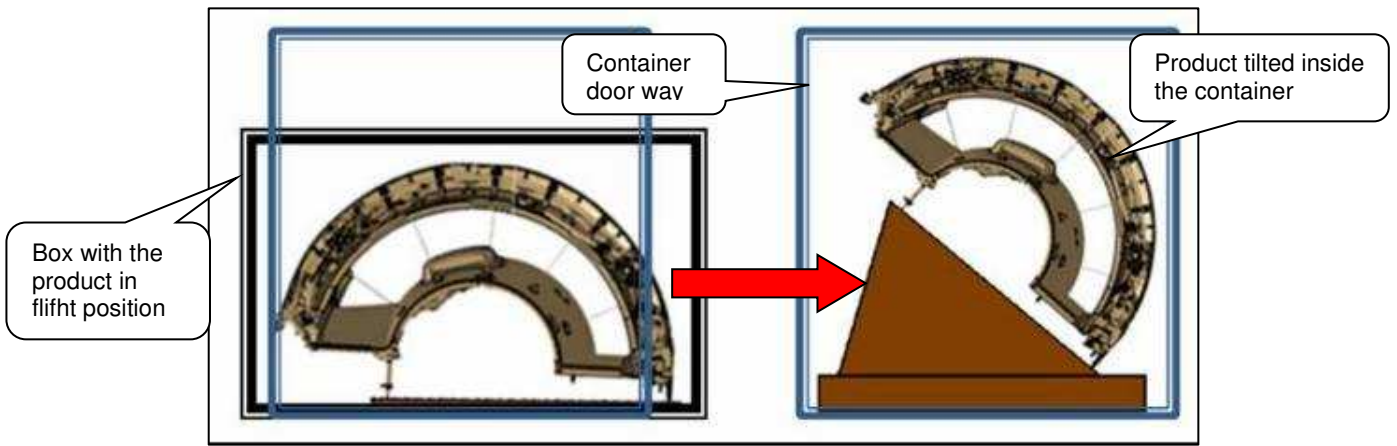


Figure 15: Example of tilted product

10.1.5. **IMPORTANT:** When the item is loaded in a dry container (closed), with free space, and is placed inside the container in the supplier's plant, the possibility of using a support base to carry out the transportation should be analyzed. (See Figure 16)



Figure 16: Example of base in a dry container

10.1.6. All packaging that is transported in a closed container should be designed to facilitate the removal operation from inside the container (see Figure 17)

The bellow picture shows a bevel for sliding into a container, and an entry point for forklift forks for moving the item

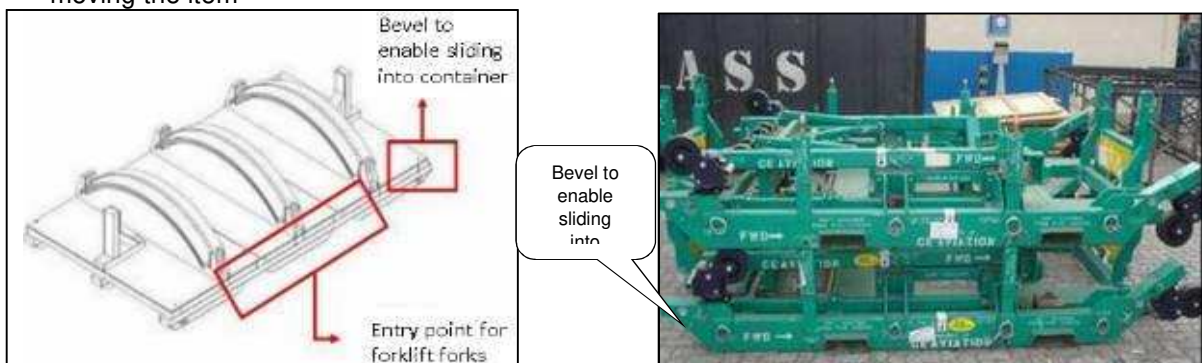


Figure 17: Example of packaging base for use in a closed container

10.1.7. When more than one item for packaging is necessary (Shipset), they will have to comply with Embraer's needs.

Note: In case of need of Embraer assembly line, Embraer may request and authorize the sending of more than one PN (different PNs) in the same packaging



10.1.8. In case of very large items, with protruding parts, it is necessary to study the possibility of disassembling the protruding part to reduce the size of the package. Disassembly of the product must only be done if it is a simple operation and presenting gains in the cost/benefit evaluation.

Note: In this case the disassembled part must be sent in the same packaging as the main part and can only occur with the agreement and approval of Embraer

10.2. DISPOSABLE PACKAGING

10.2.1. Packaging that does not fit into a dry container, must be fully closed with plywood (or similar) with enough thickness to ensure the product's safety.

Note: The thickness can vary according to the reinforcement structure of the walls, but should always ensure product safety.

10.2.2. The constructive form for disposable packaging, should always favor the ease of separation of the different materials for recycling and disposal.

Example: Ease of separation of foam glued to wood or cardboard

10.2.3. The product should be supported on bases (pallets) to allow (after the removal of the upper part) its transport with handling equipment, as per the example. (See Figure 18).

The package base must have adequately sized beams to withstand the forces applied during the transportation



Figure 18: Example of base for large packaging, with cradle for material.

10.2.4. Product support cradles must:

10.2.4.1. Protected at all times with polyethylene foam (or similar) of sufficient thickness to absorb vibration and impacts / shocks suffered by the item during shipping and handling of packages (Figure 19).

10.2.4.2. The cradle must have adequate width for maximum area of contact with the product with the aim of better distribution of loads on their supports.

10.2.5. Locking the product in the supporting cradles can be done with wooden cradles or straps, as shown in the example. (See Figures 19 and 20).

Note: The straps and locking cradles must allow release and easy re-securing of the item.(See Fig 20)



Figure 19: Example of securing large packaging made with plywood cribs



Figure 20: Example of securing large packaging done with straps

10.2.6. When necessary (sea transportation), the product should be wrapped in a sealed aluminum film.

10.2.7. Packaging with unitary and heavy parts must have Bell-type covers or lids. (See Figures 21 and 22)



Figure 21: Example of bell type packaging



Figure 22: Example of bell type packaging

- 10.2.8. The use of a bell-type lid must be evaluated by the Logistics area of the Embraer plant responsible for opening the packaging.
- 10.2.9. The packaging must have bell-type eyelets (lifting handle) attached to the sides or top of the lid (see Figure 23).
- 10.2.10. The ring must have a minimum internal diameter of 32 mm to be compatible with the Embraer load-lifting hook. (See Figure 24)



Figure 23: Examples of ringlets for bell type packaging.

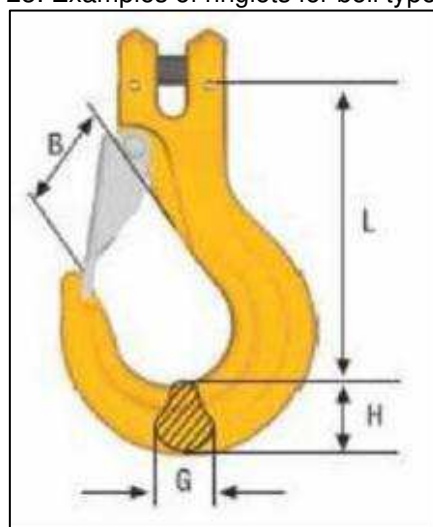


Figure 24: Example of lifting hook used by Embraer (height (H): 30mm)

- 10.2.11. The ceiling of large packaging must be structured to withstand a concentrated load of 100 kg during closing and opening operations of packaging.
- 10.2.12. Use reinforcement beams under the housing cover to prevent the middle sinking and accumulating water.
- 10.2.13. Use plywood with 15mm thickness for the cover
- 10.2.14. The roof and sides of large packages (not bell-type) must have handles to facilitate handling of the lid parts and sides during disassembly. (See Figure 25) The handles must:
- Be positioned so that they will not be crushed/cut if the box is stacked
 - Be large enough to a forklift's fork to enter, have proven resistance to the weight of the box part, and be strongly fixed.
- Note: The fastening of the strap in the box must withstand a load above the breaking load of the strap



Figure 25: Example of handles to facilitate handling of lid parts. Handles with capacity label

- 10.2.15. Use screws at the points for closing / opening the package. The use of nails is only allowed for assembly of structural parts of the box. (See Figure 26).

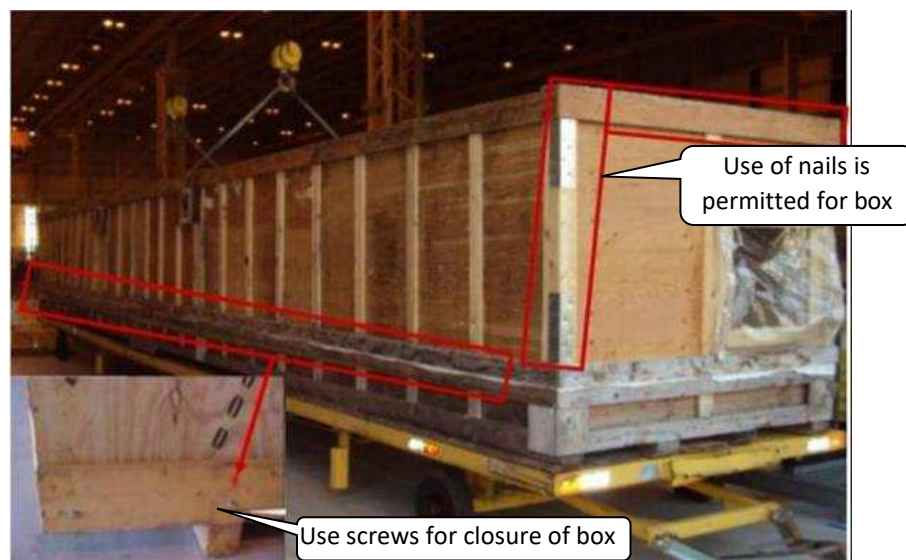


Figure 26: Example of screws for fixing the upper part; the inset shows screws used for closing the container, and the main picture shows the permitted use of nails for the construction of the container.

- 10.2.16. One should mark the screws to be removed when opening the package. The mark must be made, circling the screw with paint that contrasts with the color of the packaging. (See Figure 27)

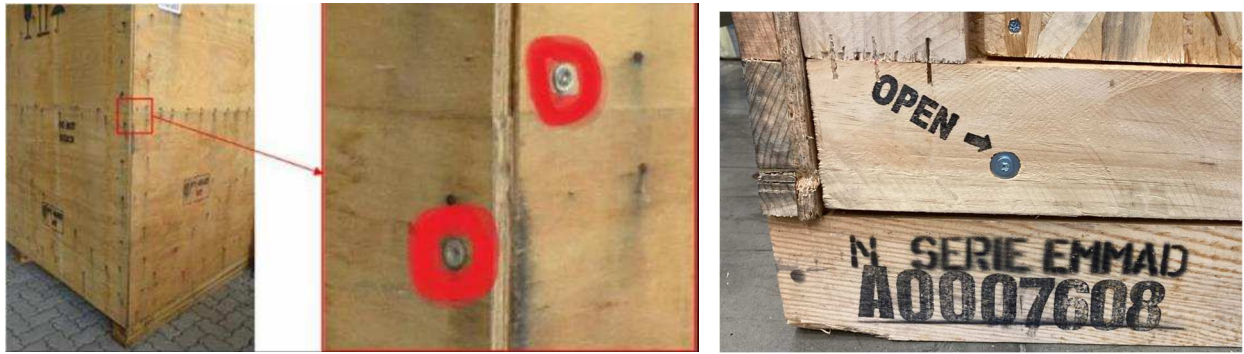


Figure 27: Example of fixing screws marked with ink (courtesy of Emmad S.A- PT)

10.2.17. For large containers must use two inspection windows on opposite sides of the box, with a 400 x 400 mm size. (see Figure 28).

10.2.17.1. It is allowed to small variations in dimensions, if necessary.

10.2.17.2. The closing of the window can be made with the same wood used in packaging and must be fixed with screws



Supporting surface and attachment of the window

Figure 28: Example of inspection window

10.2.18. The packaging should have vent holes in the sides of the box. The holes should be protected against the ingress of water. (see Figure 29).

10.2.19. Packages that are in a flat rack container must have eyelets that facilitate attachment in the flat rack container.

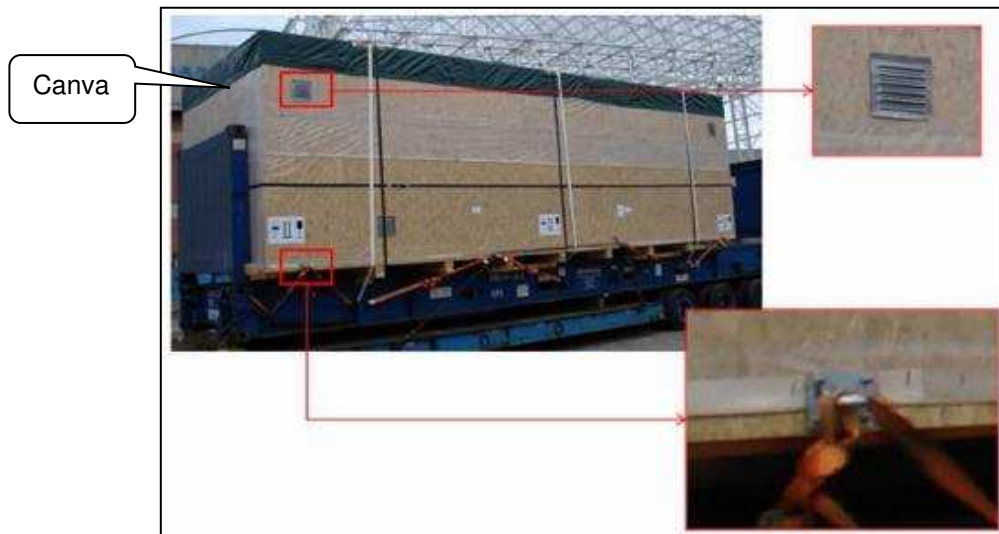


Figure 29: Example of ventilation holes and eyelets in large packages.

10.2.20. Packaging sent in open containers (flat rack) should have a waterproof canvas cover fixed (stapled) to the side of the package. The canvas must not be attached on the upper part of the packaging, to avoid infiltration through the canvas. (See Figure 29).

Obs1: Canvas must also be used to imported items transported only on trucks. The canvas must cover the ceiling and part of the side of the box (approximately 10% to 20% of the height of the box).

10.2.21. The canvas must not cover the stamps indicating phyto-sanitary treatment and other information displayed on the package.

10.2.22. Large packages must have external signs (symbols). (See Figure 30)

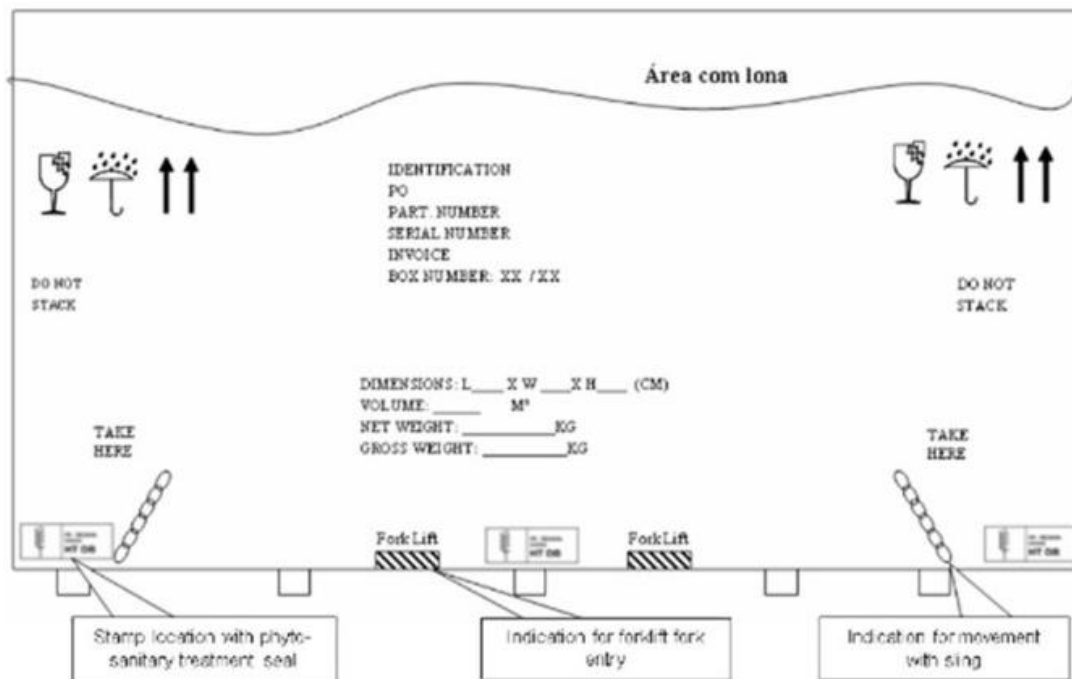


Figure 30: Example of identification on large packaging.

NOTE: the markings should be identical on opposite sides of the package. Use capital letters, legible and proportional to the available space. Markings must be made using black ink, resistant to rain and sun.

10.3. RETURNABLE PACKAGING

10.3.1. Avoid the use of wood in the manufacture of returnable packaging.

10.3.2. Locking the product in the support cradles can be done with straps or a cradle fixing system that ensures the safety of people in operations and allows release and securing the product again without losing ease of fixing. (See Figure 31).



Figure 31: Example of product in transportation cradle, showing attachment strap with ratchet, attachment strap, support cradle with EVA, and forklift fork guides

10.3.3. When necessary, the possibility should be examined of:

- Tilting the product to reduce its dimensions so that the final size of the package fits into the transport vehicle or the container

Note: In the returnable packaging design, the maximum dimensions of transport vehicles must be considered. (see Figure 32)



Figure 32: Example of packaging with tilted product, in order to reduce dimensions.

- Evaluating the possibility of disassembling parts of the product to reduce its dimensions so that the final size of the package fits into the transport vehicle or container. The product disassembly should only be done if it is a simple operation and demonstrates gains in evaluating the cost / benefit.

10.3.4. The structure of the packaging must protect the parts carried so as not to allow the pieces to touch the walls of the transport vehicle or container. (See Figure 33)



Figure 33: Example of transportation cradle, showing product with protection on all sides

10.3.5. Collapsible/ foldable packages (see section 7.42) must be designed to:

- Where applicable, allow the stacking of packages in stock and transportation.
- Stack the packaging when empty
- Protect the sides and the top of the product when it is loaded
- Reduce the dimensions (length and height) when empty, so that they can be stacked inside of the container (see Figure 34)
- All moving parts (collapsible) must be easy to assemble and disassemble (easy setup)
- Moveable parts must be made so as not to put people at risk in setup operations (ensuring safety during assembly and dismantling)

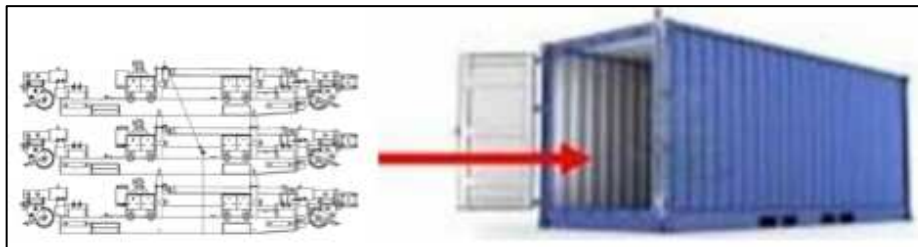


Figure 34: Example of stacking inside the container

10.3.6. Packaging sent in an open container (flat rack) must have a waterproof canvas cover attached to the packaging. The canvas should completely cover the product, but must leave visible the packaging identification. (See Figure 35)



Figure 35: Example of returnable covering for container

10.3.7. The packaging must always be made in a way to facilitate the handling process

10.3.8. The packaging must have adequate size casters for the dimensions and weight of the packaging, whenever possible

10.3.9. The packaging must have forklift fork guides (see Figure 03)

10.3.10. The packaging must have trailer coupling for towing when required by Embraer

10.3.11. The packaging must have lifting points (eyelets) when required by Embraer

10.3.12. Where possible, packages that are transported together must have standard dimensions so that they can be stacked. (See Figure 36)

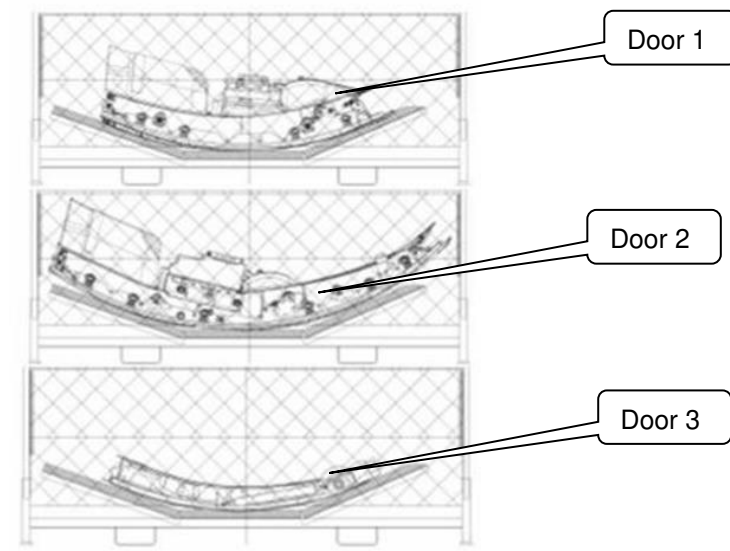


Figure 36: Example of standardization of dimensions, showing three dissimilar products inside identically-sized packaging

10.3.13. When necessary, a User's Instruction manual should be provided along with the packaging or training for usage.

10.4. KITS OF COMPLEMENTARY PARTS

10.4.1. Large dimensioned items (fuselages, doors, stabilizers, control surfaces, nacelles, etc.) that require kits of complementary components must meet the following requirements:

- Kit parts must NOT be placed in the same box as the item to which they belong. They must be placed in their own package, separated from the large item.
- The parts must be packed in accordance with the requirements of Section 7.

11. METALLIC RAW MATERIALS

11.1. GENERAL REQUIREMENTS

11.1.1. In addition to the requirements below, the requirements of Section 7 of this manual must be followed.
 Note: Sending items without adequate packaging will result in the issuance of a CD note applic 19 (packaging non-conformity) and may generate penalties for the supplier.

11.1.1.1. In addition to the requirements of this chapter, it is necessary that, for each type of raw material, the MP/MEP standard (see item 9) indicated for the type of material be consulted. The protections indicated in the MP/MEP (cleaning, protective oil, individual coating, separator, etc.) must be met.

11.1.1.2. Packaging containing raw materials must have an indication on the outside to prevent the packaging from being exposed to rain.

- The inscription “KEEP DRY” must be written on the outside of the box.
NOTE: The markings must be the same on opposite sides of the packaging. Use capital letters, legible and proportional to the available space. The markings must be in black ink, resistant to rain and sun.
- It is important that all packaging be protected from rain during loading and transportation. It is recommended to use a closed vehicle for transportation. If this is not available, use reinforced tarps to cover the load (item 6.3)

11.1.2. It is mandatory to send the quality documents (certificate and test report) together with the materials, inside the box (see item 5 in Shipping Policy:-(<http://www.embraer.com.br/ShippingPolicy/brasil.html>)
Note: Quality documents (CofC, registration card, TAG) are mandatory for the release of the material for use. The absence of the necessary documents will result in the issuance of a CD note no. 20 (non-conformity of documents), which may generate penalties and the return of the material with expenses borne by the supplier (in the case of TAG 8130 - Certificate of Airworthiness).

11.1.3. All batches must be packed separately.

11.1.4. Where it is not possible to package separately, batches must be strictly grouped in a sequential way. (see Figure 37).



Figure 37: Example of batches grouped in sequence

11.1.5. Packages must ensure the integrity of the product and have volume and resistance appropriate for the material being transported.

11.1.6. Clearly Identify on the packaging the maximum stacking capacity.

11.1.7. The material must not exceed the physical limitations (dimensions) of the pallet. (see Figure 38)

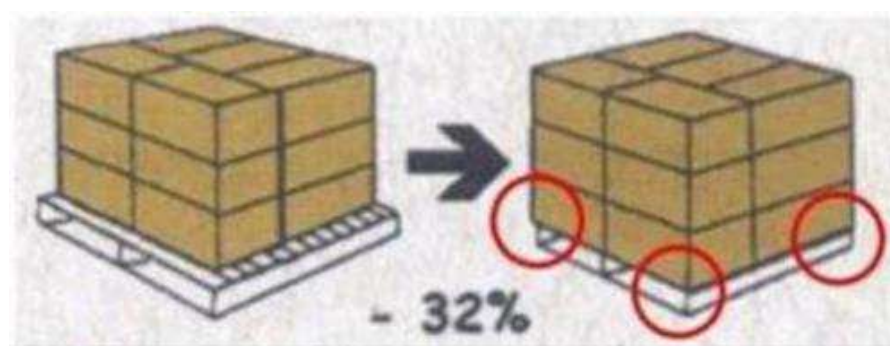


Figure 38: Example of materials not exceeding the limits of the pallet

11.1.8. The pallet must ensure that the material does not undergo flexion above its limit of flexing resistance.
NOTE: The maximum flexion of the pallet must be less than the maximum flexion that the material can withstand.

11.2. REQUIREMENTS FOR PLATES, SHEETS AND BARS (Ti-Titanium, Al-Aluminum and Steel).

11.2.1. In addition to the items below, the requirements of items 7 and 11.1 of this manual must be followed.

11.2.2. Items sent without packaging will NOT be accepted (see fig. 39-F).
Sending items without adequate packaging will result in the issuance of a CD note applic 19 (packaging non-conformity) and may result in penalties for the supplier

11.2.3. The maximum weight limit per pallet for aluminum sheets must not exceed 1 ton..

11.2.4. The maximum weight limit per pallet for Titanium and Steel sheets must not exceed 0.5 tons

11.2.5. Mirrored or polished sheets must be transported and packaged in accordance with the provisions of Embraer standard NE-42-017.

11.2.6. To Plates, sheets and flat bars

11.2.6.1. Use a pallet for plates, designed to withstand stacking (see fig. 39-C) and the forces of being dragged when loading and unloading in a 40' dry container.
NOTE: For thick plates, limit the weight of the load to 3 tons or 1 plate.

11.2.6.2. The dimensions of the palletized load must not exceed the dimensions of the pallet (see 7.25)

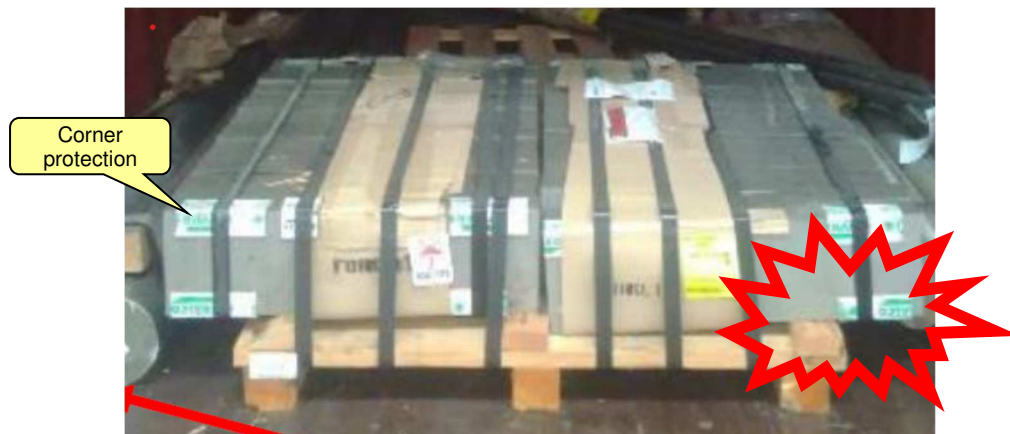


Figure 39: Plate outside pallet. Forbidden (dangerous)

11.2.6.3. If the length of the load is greater than 2.2 meters, it is mandatory that the pallet has lengthwise, skid-type feet, beveled to enter and exit the container by sliding. It must be possible to use the forklift at the end of the pallet to drag the load in and out of the container (see fig. 39-C). The pallet must withstand the stresses of the operations

11.2.6.4. Use steel straps to secure the load to the pallet (see fig. 39-C).

- The straps must be reinforced and in sufficient quantity so as not to break during handling and transportation.
- The load on the pallet (stack of sheets/plates/flat bars) must have protection at the corners where the steel strap passes. The protective corner may be made of cardboard, plastic or other resistant material, suitable for the load on the pallet (see fig. 39).

11.2.6.5. In addition to the protection surrounding the batch of sheets on the pallet (39-B), the load (pallet with sheets) must have protection over it (plastic, tarpaulin, etc.) to protect against rain and internal condensation of the container (39-H). The protection must involve the top and sides of the load.



Figure 39-A – Condensed moisture in the container ceiling

Fonte: https://www.hapag-loyd.com/content/dam/website/downloads/press_and_media/publications/Container_Packing_Broschuere_engl.pdf



Figure 39-B: Example of palletized material fixed using strapping

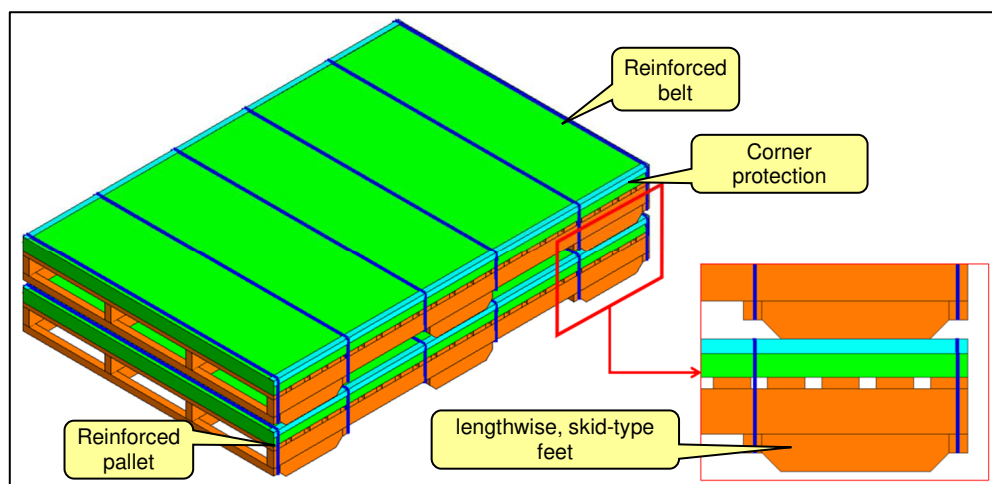


Figure 39-C: Example of palletized material, stacked and joined with a strap – Skid Pallet

11.2.6.6. If the cargo will be transported in a Flat Rack container Must be necessary:

- Primary protection in accordance with the MP/MEP standard indicated for the material
- Paleta with high of feet to permit uses a forklift (see item 7.22). Must permit move each palet from the pile using forklift
- Material Must be fixed to pallet with steel belts (see 11.2.6.4)
- Must have protection at the corners where the steel belt pass
- When stacking pallets, they must be secured together with steel straps
- The load must be wrapped in reinforced heat-shrinkable film (fig 39-E) to ensure protection against rain during the entire transport

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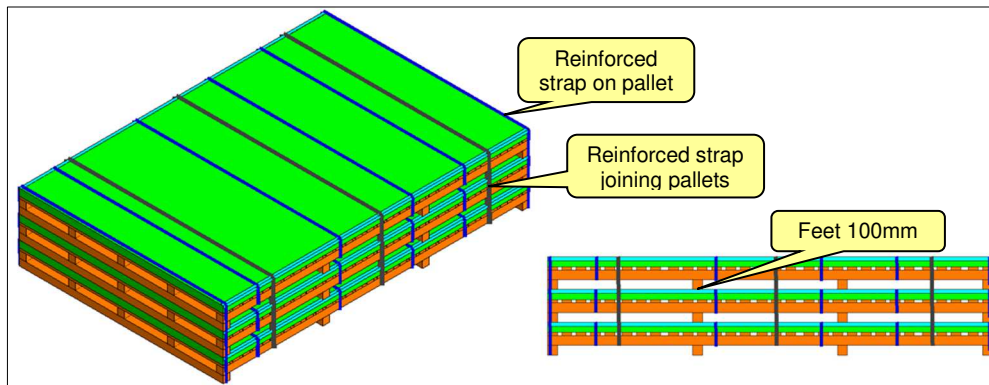


Figure 39-D: Example of pallet with feet to permit entrance of forklift



Figure 39-E: Example de protection over pallet on flat rack container (protective white shrink film)

11.2.6.7. For shipping thin or more fragile sheets, the following must be used:

- Primary protection in accordance with the MP/MEP standard indicated for the material
- Closed box, resistant to stacking
- The lid must be reinforced to allow stacking and must be fixed with screws (see item 7.40)
- The base of the box must follow the rules above (11.2.6.3) for pallets. If the length is greater than 2.2 meters, it must have lengthwise, skid-type feet, (Fig 39-C)
- The batch of sheets must be wrapped in waterproof protective material (see fig 39-B), as required by the MP/MEP standard for the material.
- In addition to the protection covering the batch of sheets, the box must have protection over it (plastic, tarpaulin, etc.) to protect against rain and internal condensation of maritime container (see fig 39-H). The protection must cover the top and sides of the box. Without covering the phytosanitary treatment stamps.

11.2.7. To round bars

11.2.7.1. Items sent without packaging will NOT be accepted.

NOTE: Sending items without packaging will result in the issuance of a CD note applic 19 (packaging non-conformity) and may result in penalties for the supplier.

	<p>Example of round bar without package</p> <p>Bars without package, cargo in pyramid</p> <p>Problems:</p> <ul style="list-style-type: none"> - Do not permit stack (low occupation of maritime container) - Do not resist to be dragged on load / unload of container - High risk to people working in the handling of items
--	--

Figure 39-F: Bars in pyramid (FORBIDDEN)

11.2.7.2. To use closed wooden box with a reinforced structure to support:

- The weight of the batch of bars
- Stacking the box with other loads inside the container
- Being pushed and pulled (dragged) from the container with a forklift (fig. 58-F)
- Be lifted by the tip with the forklift without suffering any damage to the structure (fig. 58-H)



Figure 39-G: Example of round bar in reinforced wood box

- 11.2.7.3. If the length of the box exceeds 2.2 meters, it must have lengthwise, skid-type feet, beveled to slide in and out of the container. It must be possible to use the forklift at the end of the pallet to drag it in and out of the container (see fig. 39-C). The box must withstand the stresses of the operations
- 11.2.7.4. It is mandatory that the bars be fixed inside the packaging to prevent accidents during handling and transportation.
- 11.2.7.5. The weight limit per box must not exceed 1 ton. If the weight of the batch of bars is greater than 1 ton, divide the batch equally into several boxes, less than 1 Ton, ensuring that the boxes can withstand stacking.
Note: If a bar exceeds 1 ton, it must be placed in a unit box. This box must follow the same of others
- 11.2.7.6. The box must have reinforcements on the lid, columns and feet, aligned so that they can be stacked safely during transportation and storage. See example in fig. 44-C. The box must meet items 7.40
- 11.2.7.7. The lid must be reinforced to allow stacking and must be fixed with screws (see item 7.40)
- 11.2.7.8. The box must have protection over it (plastic, canvas, etc.) to protect against rain and internal condensation in maritime container (see fig. 39-A). The protection must cover the top and sides of the box. Without covering the phytosanitary treatment stamps



Plastic protection against condensation of the container (Fig 39-A). Also helps in Transportation

Figure 39-H: EXAMPLE of box protected inside Maritime container



11.3. REQUIREMENTS TO PROFILES

11.3.1. Use closed boxes for transportation

11.3.1.1. It must have primary protection in accordance with the MP/MEP standard indicated for the material

11.3.1.2. Use a closed wooden box, with a reinforced structure to support:

- The weight of the batch of bars
- Stacking with other loads inside the container
- Be pushed and pulled from the container with a forklift (fig. 58-F)
- Be lifted by the tip with the forklift without suffering any damage to the structure (fig. 58-H)

11.3.1.3. If the length of the box exceeds 2.2 meters, it must have lengthwise, skid-type feet, beveled to slide in and out of the container. It must be possible to use the forklift at the end of the pallet to drag it in and out of the container (see fig. 39-C). The box must be able to withstand the stresses of operations

11.3.1.4. It is mandatory that the bars be fixed inside the packaging to prevent accidents during handling and transportation

11.3.1.5. The weight limit per box must not exceed 0.5 tons. If the weight of the batch of bars is greater than 0.5 tons, divide the batch equally into several boxes, ensuring that the boxes can withstand stacking.

11.3.1.6. The box must have reinforcements on the lid, columns and feet, aligned so that they can be stacked safely. See example in fig. 44-C. The box must meet items 7.40

11.3.2. Sharp or pointed edges must be protected to ensure the protection of the product during transportation.

11.3.3. The packages must have enough strength to avoid flexion that could cause warping of the material.

11.3.4. The lid of the package must be secured with screws. (DO NOT USE NAILS FOR CLOSING CONTAINERS)

11.4. Eliminated in revision 15 (see item 11.2)

11.5. REQUIREMENTS FOR TUBES

NOTE: In addition to the items below, the requirements of items 7 and 11.1 of this manual must be followed.

11.5.1. Primary packaging for tubes should contain only one batch.

11.5.2. For materials with walls up to 3mm, the supplier must pack in cylindrical tubes or rectangular cardboard or wooden boxes. (see Figure 40).



Figure 40: Examples of packaging in cylindrical and rectangular shape

11.5.3. For materials with walls above 3mm, the supplier must pack in a wooden box. (See Figure 41).



Figure 41: Example of wooden packaging

11.5.4. Tubes sent in larger batches must be packed in a closed wooden box, reinforced to support:

- The weight of the batch of pipes
- The stacking of the box with other loads inside the container
- Be pushed and pulled from the container with a forklift (fig. 58-F)
- Be lifted by the tip with the forklift without suffering any damage to the structure (fig. 58-H)

11.5.5. If the length of the box exceeds 2.2 meters, it must have lengthwise, skid-type feet, beveled to slide in and out of the container. It must be possible to use the forklift at the end of the pallet to drag it in and out of the container (see fig. 39-C). The box must be able to withstand the stresses of operations

11.5.6. It is mandatory that the bars be fixed inside the packaging to prevent accidents during handling and transportation

11.5.7. The weight limit per box must not exceed 0.5 tons. If the weight of the batch of bars is greater than 0.5 tons, divide the batch equally into several boxes, ensuring that the boxes can withstand stacking.

11.5.8. The box must have reinforcements on the lid, columns and feet, aligned so that they can be stacked safely. See example in fig. 44-C. The box must meet items 7.40

11.6. REQUIREMENTS FOR FORGED ITEMS AND CASTINGS

Note: ENSURE compliance with the general requirements (item 11.1) before proceeding.

11.6.1. For materials/parts with irregular/complex geometries and weight over 40 kg, use wooden unit packaging and bell-type lid (see figure 41, see item 10.2.7). The part must be fixed to the base of the box with wooden locking, steel straps (or equivalent)



Figure 41-A: Example of unitary bell-type packaging

11.6.1.1. Limit the maximum weight of each package for safe handling

11.6.2. Materials below 20 kg, must be packed in boxes with internal dividers. (see Fig. 42). Limit the total weight of the package to 100 kg, split the load if necessary. The packaging must support being stacked in the warehouse (see item 44-C)



Figure 42: Example of box with separators

11.6.2.1. For materials/parts over 20 kg, limit the number of parts in each package so that the total weight of each package never exceeds 300 kg. Divide the load if necessary. The packaging must support being stacked in the warehouse (see item 44-C)

11.6.2.2. For materials/parts over 100 Kg, use unit packaging and bell-type lid (see 11.6.1). The packaging must support being stacked in warehouse (see item 44-C). The part must be fixed to the base of the box with wooden locking, steel straps (or equivalent)

11.6.3. For small and lightweight materials, cardboard boxes with separators should be used (see Fig 43). The load must be suitable for the capacity of the box used. It must not exceed 20 kg per package, and must be divided equally into two or more boxes if the weight exceeds 20 kg

Figure 43: Eliminated (Revision 8)

11.6.4. Eliminated (Revision 8)

11.6.5. Materials with irregular geometries and dimensions larger than 1200x1000mm must be packed with cardboard strapped in 2 units and contain wedges to facilitate handling. (See Figure 44)

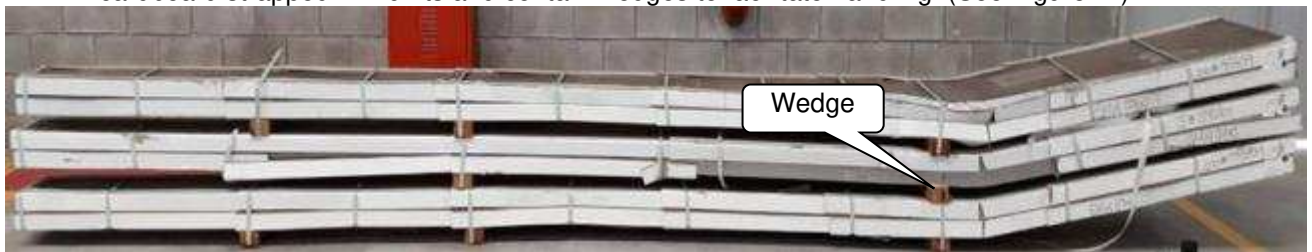


Figure 44: Example of regular material above 1200x1000mm

11.6.5.1. The primary protection of the material must follow the Embraer MP/MEP standard indicated for the material.

11.6.6. For irregular shaped materials sent in wood box is necessary:

11.6.6.1. Must have a reinforced box in accordance with material weight. The packaging must have a constructive design that guarantees resistance and durability for the time necessary for the consumption of its contents (see fig 44-C)

11.6.6.2. Packaging height must be limited in 800mm. If necessary divide the load into more boxes. Obs The weight in each package must not exceed the limits of box resistance (seer item 11.6.2)

11.6.6.3. The box lid must be fixed with screws (see 7.40).

11.6.6.4. The positioning of the items inside the box must make easy to take off the items. It must not bring ergonomic risks to people in the operation

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11.6.6.5. The internal locking of parts must be fastened with screws and easy to remove (fig 44-A). It is mandatory that the parts are fixed inside the packaging to avoid accidents in handling and transport (see fig 44-B)



Figure 44-A: Example of internal locking of forged items

11.6.6.6. The screws that fixes the locking must be marked outside the box (see 10.2.6) to make it easy to remove the locks

11.6.6.7. Avoid chamfers (bevel) on the crates feet (see fig 44-B)

11.6.6.8. Irregularly shaped materials that can generate concentrated point loads at the bottom of the package must have the bottom of the box adequately reinforced to support the concentrated weight without breaking or flexing (see fig. 44-C)

11.6.6.9. The box must have reinforcements on the lid, columns and feet, aligned so that they can be safely stacked.

11.6.6.10. Place as many feet as necessary to ensure the loading and stacking capacity of the boxes. The distance between the feet must ensure that the bottom of the box can withstand concentrated loads.

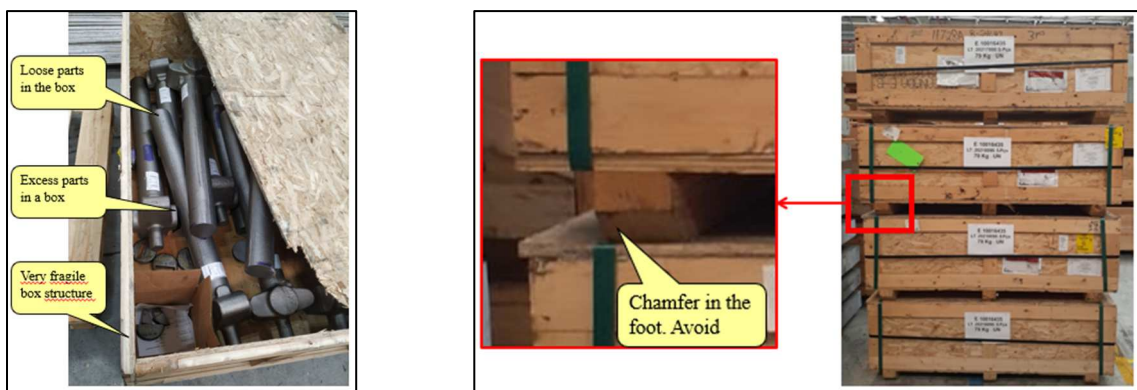


Figure 44-B: Example of a bad box, danger of accidents – FORBBIDEN

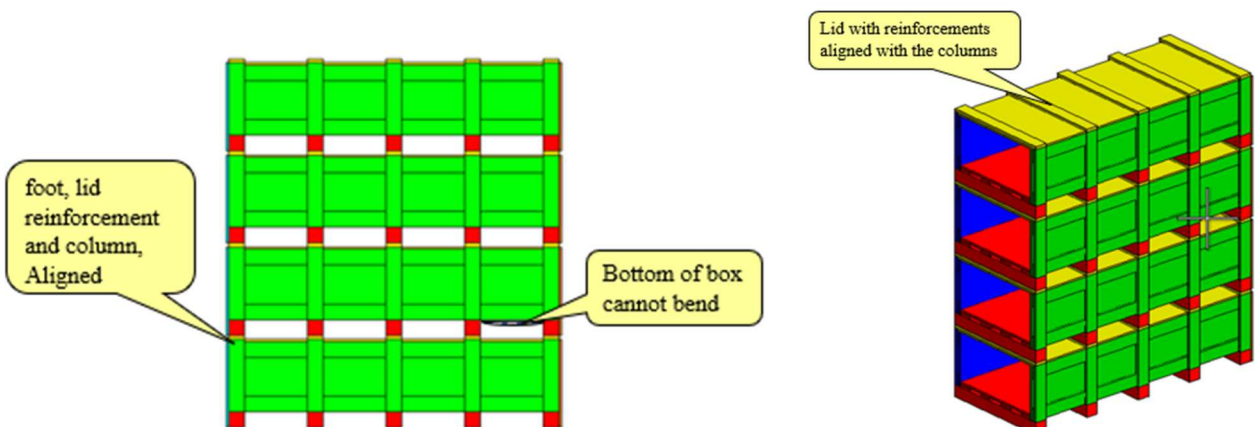


Figure 44-C: Example of a good box (aligned columns)



12. NON-METALLIC RAW MATERIALS

12.1. GENERAL REQUIREMENTS

12.1.1. In addition to the requirements below, the requirements of Section 7 of this manual must be followed.

12.1.2. It is mandatory to send the quality documents (certificate and test report) together with the materials (see Item 5 in the Shipping Policy - (<http://www.embraer.com.br/ShippingPolicy/brasil.html>) together with the materials. Note: Quality documents (CofC, registration card, TAG) are mandatory for the release of the material for use. The absence of the necessary documents will result in the issuance of a CD note no. 20 (non-conformity of documents), which may generate penalties and the return of the material with expenses borne by the supplier (in the case of TAG 8130 - Certificate of Airworthiness).

12.1.3. The primary packaging must only contain items of the same part number (PN)

12.1.4. Identify on the packaging the maximum stacking capacity. (See Table 1)

12.1.5. Use plastic bags for primary packaging.

12.1.6. Use a cardboard box for secondary packaging. (see Figure 45).

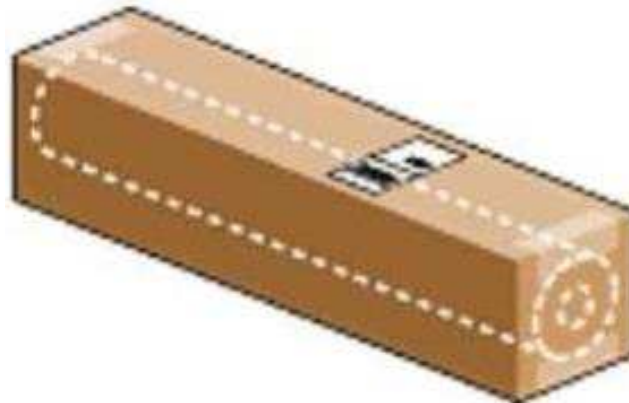


Figure 45: Example of secondary packaging

12.1.7. Items that are kept at low temperatures must have appropriate packaging for the temperature and humidity to which they will be exposed.

12.1.8. For packaging pre-impregnated materials, adhesive film, adhesive foam, non-adhesive film and adhesive primer must meet the requirements of Embraer NE 42-022 standard.

12.2. ELETRIC WIRES AND CABES

12.2.1. In addition to the requirements below, the requirements of Item 7 in this manual must be followed

12.2.2. Electric wire coil.

12.2.2.1. Must have primary protection to avoid humidity and dirt

12.2.2.2. Limit the weight of electric wire coil in 20 Kg
Note: In case of the weight pass the limit (20Kg), the cardboard box must have handles for easy handling by two people. The box must never pass 40 Kg

12.2.2.3. The protected coils must be in reinforced cardboard box (see 7.44). The cardboard boxes must resist to be piled in the transportation and ensure the material integrity



Figure 45-A: Wire coil placed in the box with primary protection

12.2.2.4. The boxes with coils must have handle points to make easy the handling Obs.: This handle points can be holes or straps



Figure 45-B: Holes to handle the cardboard box

12.2.2.5. To transportation, the cardboard box must be put over reinforced pallets, fixed on the pallet with belts or plastic film or 'stretch' equivalent (see 7.44.10)



Figure 45-C: Pallet with wire coils inside boxes

12.2.3. Electric cable coil

12.2.3.1. Electric cables and similar must be in reinforced wooden coils

12.2.3.2. The wooden coils must resist to be piled in the transportation and storage

12.2.3.3. Must have primary protection to avoid humidity and dirt

12.2.3.4. Cable coils above **18Kg** must be Strong enough to be handled by forklift

12.2.3.5. To transportation, the cable coils must be put over reinforced pallets, fixed on the pallet with belts
 Note: The pallet must have correct dimensions. The coils must be inside the area of pallet
 Note: The coils must be fixed on the pallet with at least 2 crossed belts as showed bellow (see item 12.2.3.6 and fig 45-F)

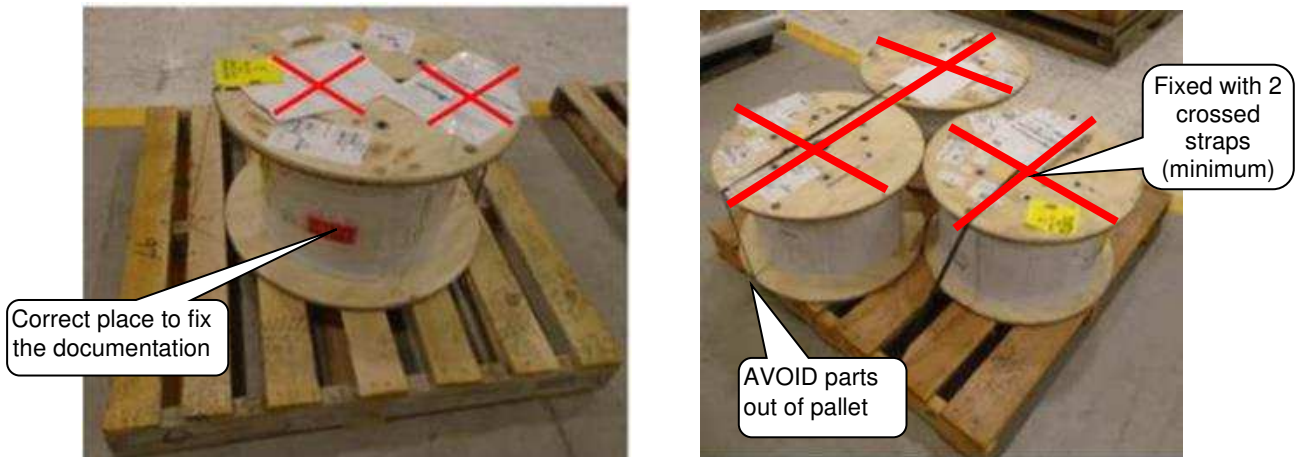


Figura 45-D: Cabe coil on pallet

12.2.3.6. The documents that goes with the wooden coil must be put inside a reinforced plastic bag closed and fixed in the internal part of the coil (see fig 45-C)

12.2.3.7. **IMPORTANT:** The supplier must ensure the piled coils over the pallet are correctly aligned. Must not occur overlap of coils on the pallet. The side of coil **MUST NEVER** can touch the wire of other coils on pallet



Figure 45-E: Coil on pallet – INCORRECT WAY - FORBIDDEN

12.2.3.8. Coils or stacks of coils must be secured with reinforced straps, in a configuration that prevents any movement of the coils on the pallet. Use at least 2 crossed straps on each stack of coils (see fig. 45-F)

12.2.3.9. The number of coils stacked on the pallet must respect the size and strength of the coil to ensure safety when moving the pallet. The total height of the stack (coil + pallet) must not exceed the maximum height of 2 meters

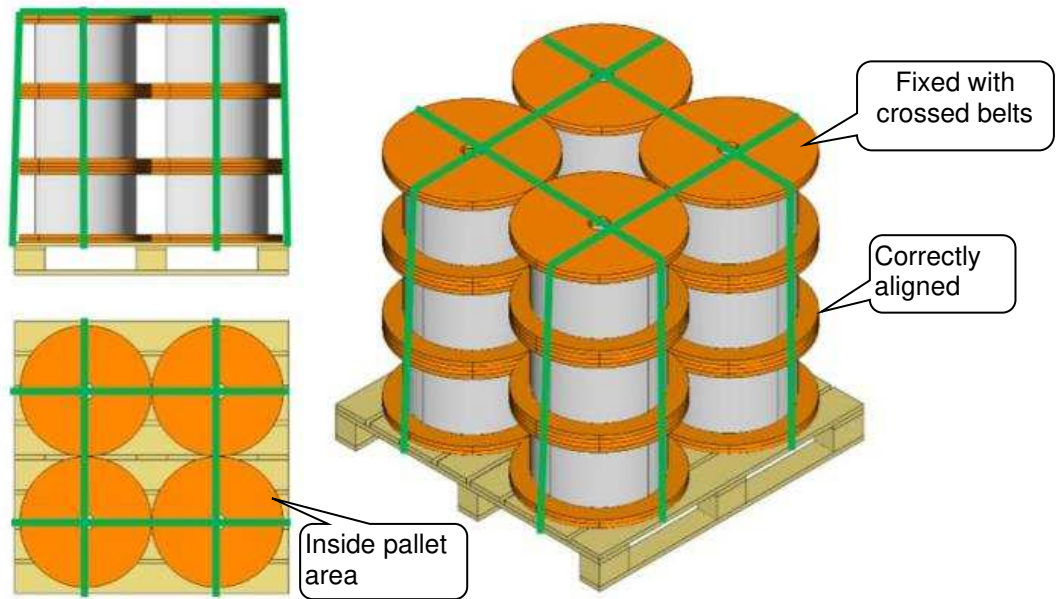


Figure 45-F: Coils on pallet – CORRECT WAY

12.2.4. Heat shrinks protections.

12.2.4.1. Pipes/hoses of heat shrink material MUST be supplied in coils

12.2.4.2. Forbidden “folders or creases” in the material that can compromise the product quality

12.2.4.3. In a case of a fractionated delivery (out of a coil). It is OBRIGATORY the package used ensure that the material arrive at Embraer without any folders or crease on the heat shrink



Figure 45-G: Example of coil to heat shrink protection



Figure 45-H: Example of What MUST be avoid. Heat shrink material with folders and creases

12.3. DECORATIVE LAMINATES (Laminates - veneer)

12.3.1. In addition to the requirements below, the requirements of item 7 of this manual must be followed.

12.3.2. It must have primary packaging in accordance with the MEP standard indicated for the material and meet the requirements below

- Black plastic eliminates the incidence of direct light on the product.
- The plastic must be **sealed** to prevent moisture from entering
- It must be thick and strong enough to withstand all transportation and handling of the packaging
- Only items of the same PN must be in the primary packaging (see 7.13)
- The packaging must be correctly identified (see 7.46)

12.3.2.1. Limit the weight of the primary packaging to 18 kg.

If necessary, divide the batch into several primary packages, correctly identifying each one.

Note: The weight must allow two people to handle the primary packaging without ergonomic risks.

12.3.3. In the secondary package can be piled primary packages of different PN

12.3.3.1. Use a closed pallet (fig 46-A), reinforced, with top protection (fig 45-J) to support:

- The weight of batches of parts in primary packaging
- The stacking of other boxes on top of the packaging during transport and storage
- Be lifted on both sides with a forklift without suffering any damage to the structure (fig 45-I)
- Do not undergo bending that could damage the product
- Have the bottom lined to protect the primary packaging (example fig 58-B)
- The area of the pallet must be larger than the area of the product, the product CANNOT protrude beyond the pallet (see 7.25)
- It cannot break and generate edges that put people at risk (item 7.23).

12.3.3.2. The pallet must allow forklift forks to enter from two sides.



Figure 45-I: Example of pallet with entrance on two sides

12.3.3.3. The upper protection must ensure the safety of the load:

- The structure (frame) must be a single piece, assembled with staples or nails. The parts of frame must be reinforced to DO NOT break with other boxes over it
- No nails in the structure may be exposed and put the product or people at risk
- There must be a lining between the stack of product and the upper protection (frame). The thickness of the lining must ensure that it does not generate concentrated loads on the sheets
- It must ensure the strength of the packaging to withstand stacking of other boxes on top of it during transport

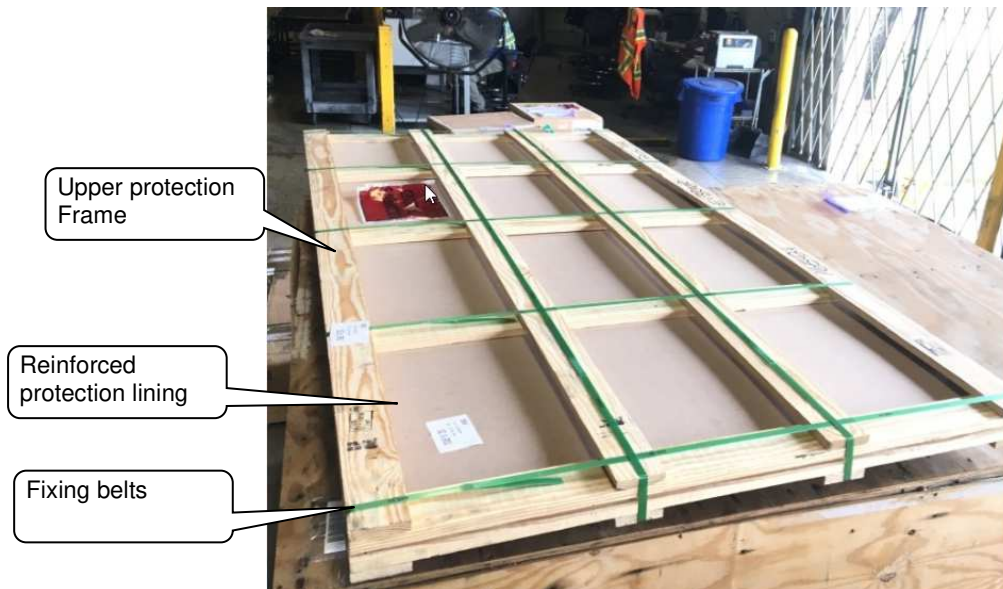


Figure 45-J: Example of verner packaging

12.3.3.4. The packaging parts (pallet, stack of primary packs and top protection) must be secured with reinforced straps in a quantity that guarantees the integrity of the packaging and the load safety

13. INFLAMÁBLE / HAZARDOUS ITEMS

13.1. GENERAL REQUIREMENTS

13.1.1. In addition to the requirements below, the requirements of Item 7 in this manual must be followed.

13.1.2. Follow the standards shown below:

- **IMO** - Dangerous Regulations - International Maritime Organization
- **IATA** - "International Air Transport Association"
- **RESOLUTION No. 420** - Complementary Instructions to the Regulation of Land Transportation of Dangerous Products
- **NE 01-043** - Classification and Identification for Dangerous Materials
- **NE 42-012** - Protection for Handling, Transport and Storage
- **NE 42-015** - Dangerous Materials - Handling, Packing and Storage

13.2. PACKAGING TYPES

- **Drums** - Liquids Materials
- **Plastic Containers** - Liquid Materials
- **Buckets** - Liquid Materials
- **Sacks** - Solid Materials
- **Boxes** - Liquid and Solid Materials such as paint, solvents, sealants, etc.

13.2.1. Drums, canisters, buckets, sacks and materials that have more than one volume must be palletized on plastic pallets and secured to the pallet with stretch film or polyester straps to facilitate handling. (see figure 46).

13.2.2. **IMPORTANT:** Do not use stretch film on volatile products that can accumulate explosive gases (see fig 46-B)



Figure 46: Examples of palletized and filmed packaging (stretch)

13.3. All packaging must be properly identified in accordance with international standards IMO / IATA.

13.4. **IMPORTANT:** To transportation of sacks is **MANDATORY** the use of closed pallet (see fig46-A)



Figure 46-A: Examples of closed pallets



Figure 46-B: Example of drum with volatile products, without stretch

14. HARDWARE AND EQUIPMENTS

14.1. GENERAL REQUIREMENTS

14.1.1. In addition to the requirements below, the requirements of Item 7 in this manual must be followed.

14.1.2. It is mandatory to send the quality documents (certificate and test report) together with the materials (see Item 5 in the Shipping Policy - <http://www.embraer.com.br/ShippingPolicy/brasil.html>) together with the product.

Note: Quality documents (CofC, registration card, TAG) are mandatory for the release of the material for use. The absence of the necessary documents will result in the issuance of a CD note no. 20 (non-conformity of documents), which may generate penalties and the return of the material with expenses borne by the supplier (in the case of TAG 8130 - Certificate of Airworthiness).

14.2. SPECIAL PROTECTION

14.2.1. Electrostatic Protection (ESDS)

This protection should be done with a shielded recipient, plastic bag or conductive or antistatic container with sufficient conductivity to provide protection from electrostatic discharges for materials sensitive to them.

Obs: Recommendable that the plastic used be transparent to make ease to see the product inside it

The padding used must provide reasonable protection against such discharges and must be made of non-corrosive material. See standard NE 80-065

Obs: The protecting material Must not have chemical elements that can attack chemically the product inside the package



Figure 46-B: Example of shielded antistatic package (ESD)

14.2.1.1. The first ESD protective packing layer directly enclosing the ESDS equipment shall be externally identified by means of standard ESD caution symbols (as illustrated in Figure 46-C)



Fig 46-C: Caution symbols ESD

14.2.1.2. Besides the caution symbols used, it is recommended also a caution placard alerting the user in relation to the cares to be taken, as presented in Figure 46-D



Fig 46-D: Caution placard ESD

14.2.1.3. The outer package containing ESDS items or equipment must have a external identification with de symbology (fig 46-C) indicating that the package contain ESDS items or equipment inside. In addition, the external and intermediate packings must have a caution symbol through an adhesive label/placard as presented in Figure 46-D.

14.2.2. Electromagnetic Protection

This protection is done by adding a new layer of protection to the antistatic plastic, laminated sheet or aluminum bag, in accordance with the standard NAS853.

The laminated film bag must be constructed from a single centerfold of an appropriately sized aluminum foil, as indicated in the illustration. (see Figure 47)
 The aluminum foil must not, under any circumstances, be in direct contact with the product.

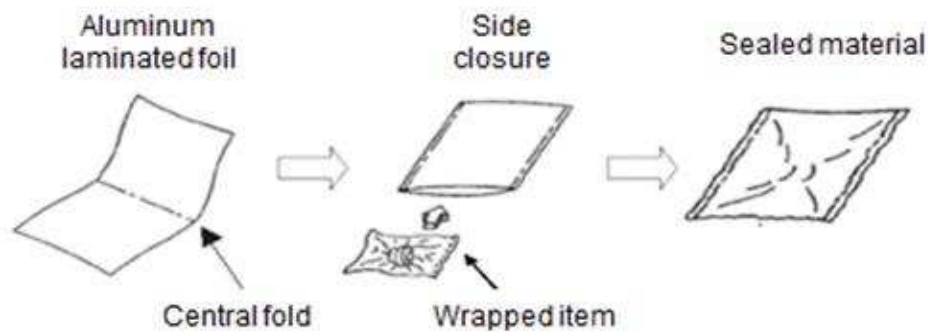


Figure 47: Example of electromagnetic protection, showing the central fold first, then the previously wrapped product inserted into the package

14.2.3. Magnetic Protection

Magnetic protection must be made with metal or ferrous alloys and must fully enclose the item. Its thickness should be sufficient to provide adequate protection for the material.

This protection can be used as an addition to electrostatic protection, but not replace it.

14.2.4. Radioactive Protection

Radioactive sources must be completely wrapped and protected with lead or alloys containing lead. The thickness of the covering must comply with the required degree of protection.

Radioactive protection can be used in addition to electrostatic and magnetic protection, but cannot be replaced.

14.2.5. Protection against light (UVA / UVB rays)

14.2.5.1. Items sensible to direct light rays UVA/UVB (elastomers) must have primary package made with opaque material, mainly to bulk materials.

14.2.5.2. Assembly items that uses elastomers parts must have primary package made with opaque material, Note: the primary package material must eliminate the pass of light

14.3. EQUIPMENTS

14.3.1. Serialized items or fragile items must be individually wrapped and placed in secondary unitary boxes.

14.3.2. The secondary packaging must be placed in boxes for transportation. (See Figure 48)



Figure 48: Example of packing for serialized or fragile items, or that are sent individually to production.

14.3.3. Electronic boards

The item must be individually wrapped with anti-ESD plastic, placed in cardboard box with adequate safeguards. The box should have indications (label) of ESD item. (see Figure 49)



Figure 49: Example of tension individually packed with anti-ESD plastic

14.3.3.1. IMPORTANT: When the assembled item has any ESDS component inside (See NE 80-065):

- All the assembled items must be correctly identified as a ESDS item.
- The assembled item must have all the necessary protections (ante ESD and others) I accordance with the necessity.
- The package with the assembled item must have all the necessary external identifications (see item 14.2.1.1) to ensure the correct handling of product.

14.3.4. Hardware

14.3.5. Bulk materials must be packed in plastic bag (primary package) of adequate strength limited in 5kg or 3dm³. (see Figure 50)

14.3.6. Bulk materials of secondary packaging, boxes should be strengthened to allow stacking onshipping. (see Figure 50)



Figure 50: Items of packaging Example bulk

14.3.7. Items with thread, stretch marks, and special pins etc, requiring special protection, must be individually wrapped using caplug, safety net, hose and etc. (see Figure 51)



Figure 51: Example of items with individual protection

14.3.7.1. Note: The Caplug used must be compatible (dimension, chemical) and must be correctly assembled so that it does not loosen during use

14.3.7.2. Forbidden to use standard Caplug NAS 817 (aluminum cap / rubber seal). Risk of F.O.

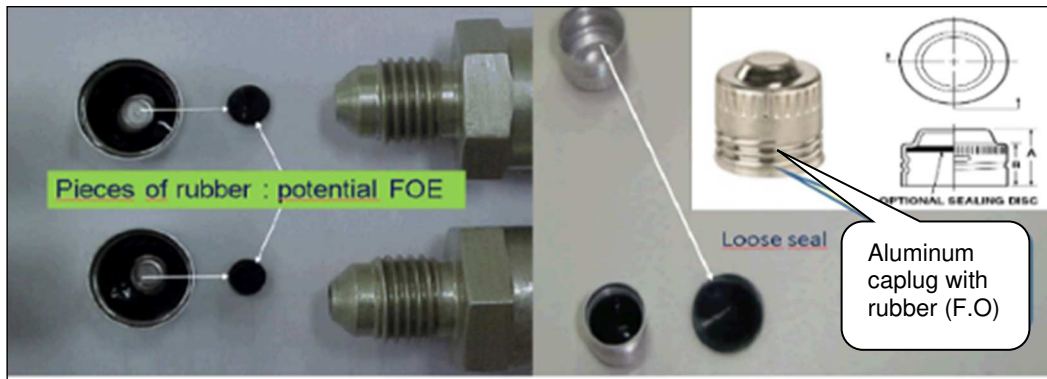


Figure 51-A: Standard Caplug NAS817- NOT allowed

14.3.7.3. It's not allowed to use safety net to protect entrance of connectors and tubes. Risk of F.O.



Figure 51-B: Safety net – NOT allowed for tubes and connections.

14.3.7.4. Forbidden the use of any protection (tape, film, adhesives, etc) that permit installation of item with the protection
 In case the protection is necessary on any part of item, this protection MUST avoid the installation of item without take off the protection
 Besides it, the protection MUST be identified showing the obligation of removing this protection before item installation

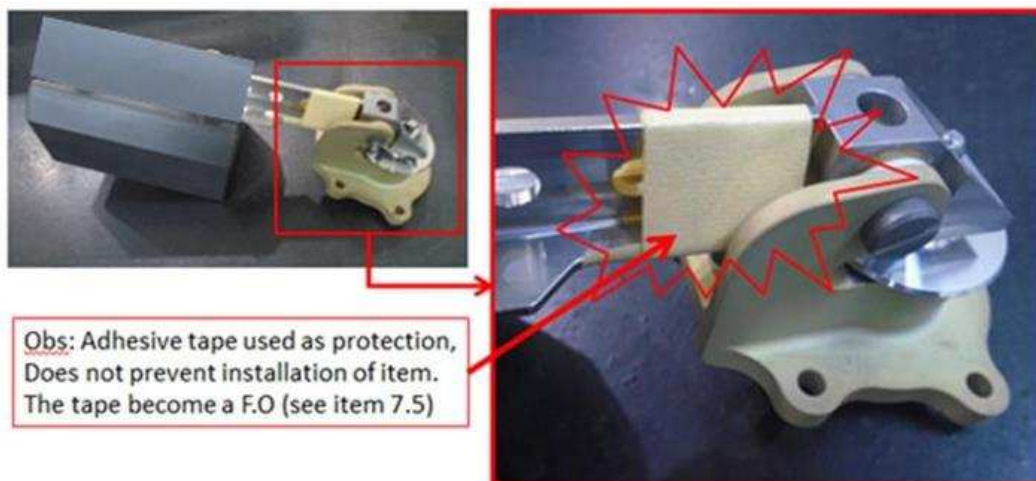


Figure 51-C: Adhesive tape that do not prevent installation - **FORBIDDEN**.

15. INTERIORS

15.1. GENERAL REQUIREMENTS

15.1.1. In addition to the requirements below, the requirements in Item 7 of this manual must be followed.

15.1.2. It is mandatory to send the quality documents (certificate and test report) together with the materials (see item 5 in the Shipping Policy – <http://www.embraer.com.br/ShippingPolicy/brasil.html>) together with the product.

Note: Quality documents (CofC, registration card, TAG) are mandatory for the release of the material for use. The absence of the necessary documents will result in the issuance of a CD note no. 20 (non-conformity of documents), which may generate penalties and the return of the material with expenses borne by the supplier (in the case of TAG 8130 - Certificate of Airworthiness).

15.1.3. When necessary, packaging for transportation of fragile items must contain impact labels.

15.1.4. Cardboard packaging longer than 1.5 m must have a reinforced pallet and be secured to the pallet with nylon straps and corner reinforcement. (see Figure 52)



Figura 52: Exemplo de embalagens com palete e cantoneira de reforço

15.1.5. When necessary, the packaging needs to have an indication of the correct side for opening. (See Figure 54)

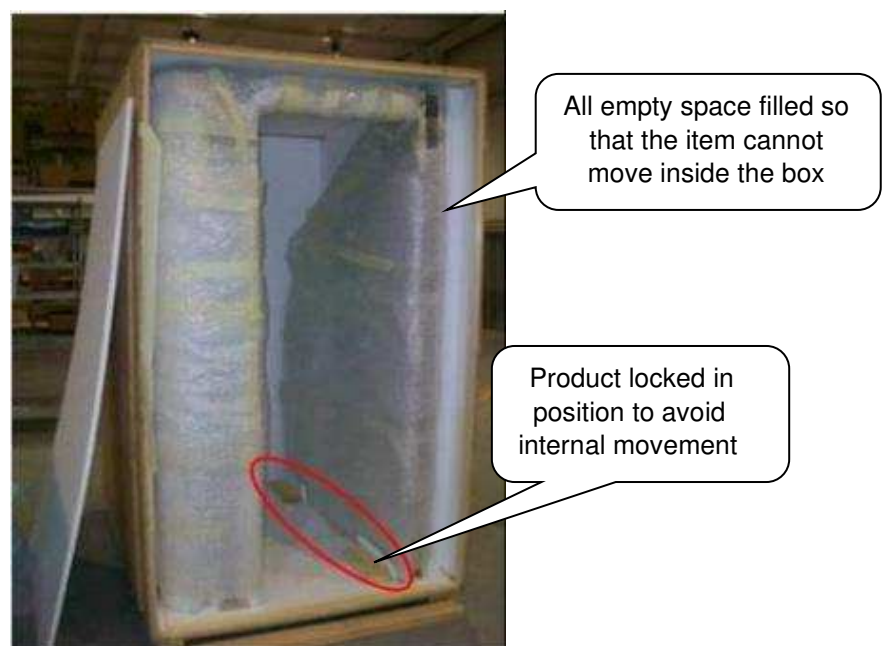


Figure 54: Example of items with individual protection, showing that all empty space is filled so that the item cannot move inside the box, and product locking, to avoid internal movement.

15.1.6. All jagged, sharp or pointed parts must be protected (see 10.1.3).

15.1.7. Cables / hoses installed in the product must be secured.

15.1.8. The internal securing of the product must be done, filling the gaps with foam. For large spaces, the supplier must put locking with wooden blocks (or similar) adequately protected at the points of contact with the product. (See Figure 54)

Note: The item cannot move inside the box, even if it is tilted 45 ° to in any direction. (see fig. 58-H).

15.1.9. Materials finished with veneer must contain primary protection with sheeting and secondary protection with bubble wrap. (See Figure 55)

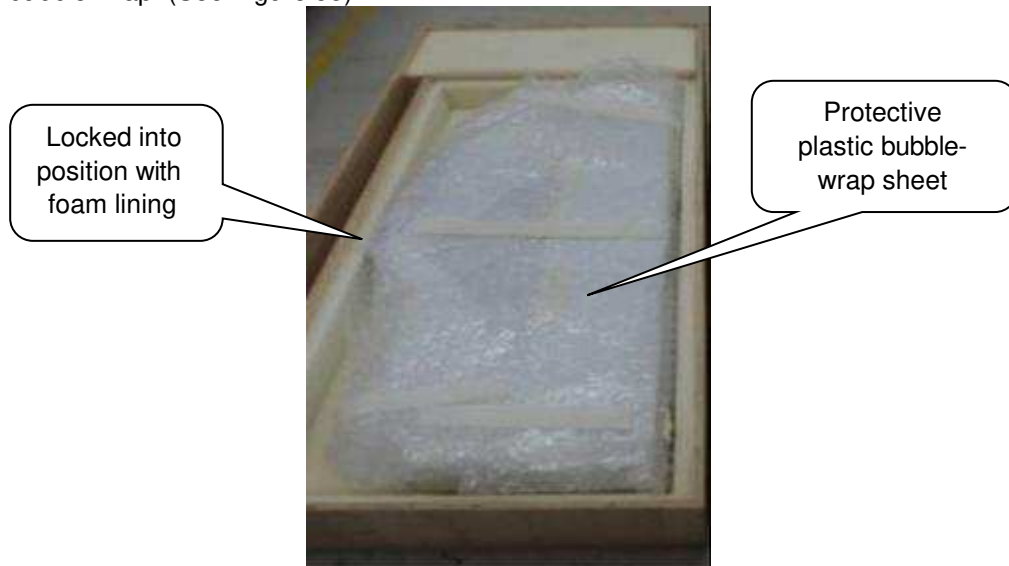


Figure 55: Example of protection with plastic bubble-wrap sheet, showing foam filling

15.1.10. Polished parts, plating, Corian® must be protected with films of a material that does not leave any residue after removal.

15.1.11. The materials should comply with the following standard of placement:

- Panels and partitions should be packed horizontally (see Figure 56)



Figure 56: Examples of horizontal panel

- Large volume items (monuments) must be carried in the flight position (see Figure 54)

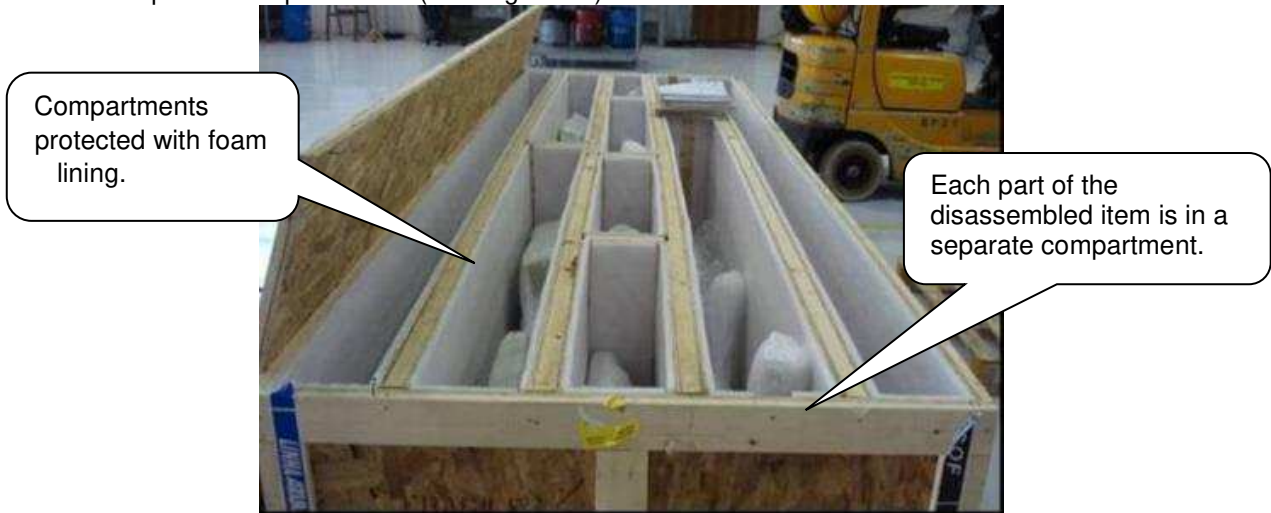
15.1.12. To close the wooden packaging fast clips must be used for easy opening and closing. (See Fig 57)



Figure 57: Example of closure with fast clips

15.1.13. For fabrics, carpets and the like, see items 12.1.5 and 12.1.6

15.1.14. When more than one item (disassembled furniture) is in the same package, the parts must be placed in separate compartments. (See Figure 58)



Compartments protected with foam lining.

Each part of the disassembled item is in a separate compartment.

Figure 58: Example of box with dividers, showing compartments protected with foam, and each part of the disassembled furniture is in a separate packing compartment

15.1.15. It's not allowed to mix small items with large and fragile panels in the same box



Loose pieces in the box damage the panels

Figure 58-A: Example of box mixing Panels and small items - **FORBIDDEN.**

- 15.1.16. Large items (lateral panels, etc.) that goes inside reinforced cardboard box over pallet, must use closed pallet (see fig 46-A)
- 15.1.17. The cardboard box must be strong enough (have the necessary quantity of walls) to resist to be piled without kneading the sides or sinking the lid
Note: If necessary, the supplier must include reinforcements inside the box or change for a wooden box (see item 15.3)
- 15.1.18. The pallet used with the cardboard box must be strong enough to withstand all the forklift handling without lose any nail in it structure. The pallet must withstand the efforts of operations

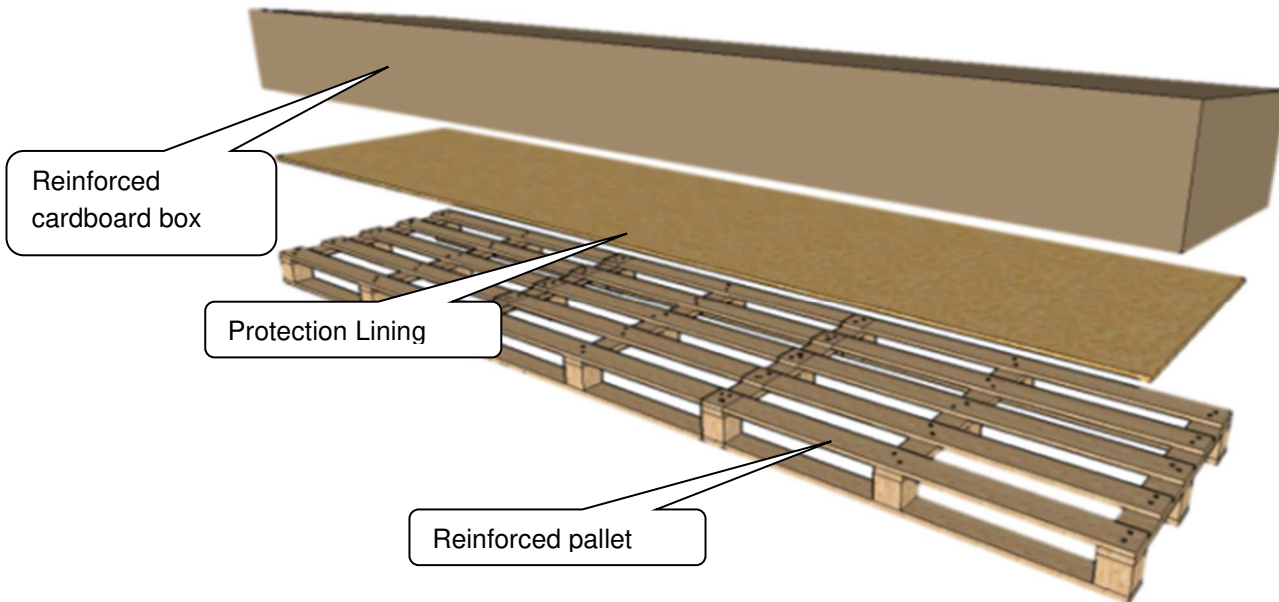


Figure 58-B: Example of cardboard box over pallet for panels

15.2. ITEMS MADE UP OF SET OF PARTS (KITS)

- 15.2.1. In addition to the requirements below, the requirements in item 7 of this manual must be followed.
Note: If the items are made of composite, item 17 must also be observed in the definition of the packaging Project
- 15.2.2. KIT is an item made up of a set of different parts. This KIT is registered in the “DIP” or ERP-SAP Embraer, where the different parts form a single code used in the Invoice.
Note: For “Complementation KIT”, see item 10.4
- 15.2.3. When the KIT is made up of small, light parts:



Figure 58-C: Example of package of KIT “KIT box” - secondary

- 15.2.3.1. Small and light kit refers to KITs of parts that, together, meet the small package classification (see item 5.2)

- 15.2.3.2. Each piece of the KIT must be packaged individually (primary), this packaging must have as many layers of protection (bubble plastic, foam, etc.) as necessary to guarantee the safety of the piece inside the “KIT box”
- 15.2.3.3. The KIT parts, packaged individually, must be placed together in a cardboard box to keep the KIT unitized.
- 15.2.3.4. Never mix parts from different KITs in the same secondary “KIT box”
- 15.2.3.5. The parts of the KIT, protected, must occupy at least 80% of the internal volume of the box (item 7.20) and must be fixed inside the box (see item 7.19)
- 15.2.3.6. The KIT box can be sent inside a transport box, consolidating with other KITs and other parts (non-KIT) to optimize transport or when necessary the “KIT box” can be sent alone, without consolidating in the transport box, but must ensure the safety. The method that best guarantees the safety of the load must be selected.

15.2.4. When the KIT is made up of medium and light parts:

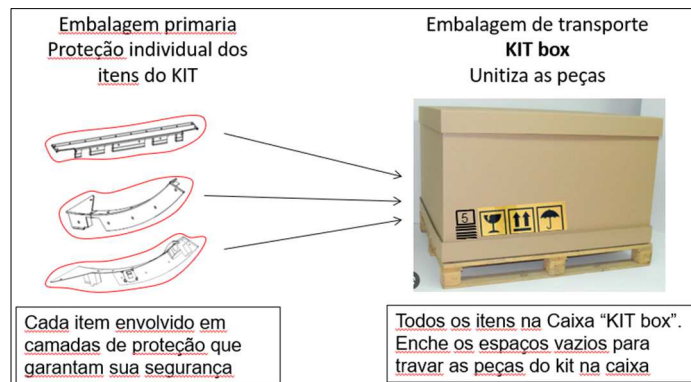


Figure 58-D: Example - package of KIT of parts “KIT box”, mechanized

- 15.2.4.1. Medium and light kit refers to KITs of parts that, together, meet the medium packaging classification due to their dimensions (see item 5.2)
- 15.2.4.2. Each part of the KIT must be packaged individually (primary), this primary packaging must have as many layers of protection (bubble plastic, foam, etc.) as necessary to guarantee the safety of the piece inside the “KIT box”
- 15.2.4.3. Never mix parts from different KITs in the same secondary “KIT box”
- 15.2.4.4. The protected parts of the KIT must occupy at least 80% of the internal volume of the box (item 7.20) and must be fixed inside the box (see item 7.19)
- 15.2.4.5. In this case (fig 58-D) the “KIT box” must be the mechanized transport packaging (see 5.1). This box can be made of cardboard or plywood, as long as it is robust and meets the requirements of the manual
- 15.2.5. If one or more items in the KIT are very fragile panels or very large items, they must be analyzed and if necessary follow item 15.3
- 15.2.6. If the Kit is made up of parts with reinforced primary packaging (cardboard tube, cardboard box), it is accepted that the KIT is unitized with a reinforced plastic bag that ensure separation between the different kits placed in the transport packaging

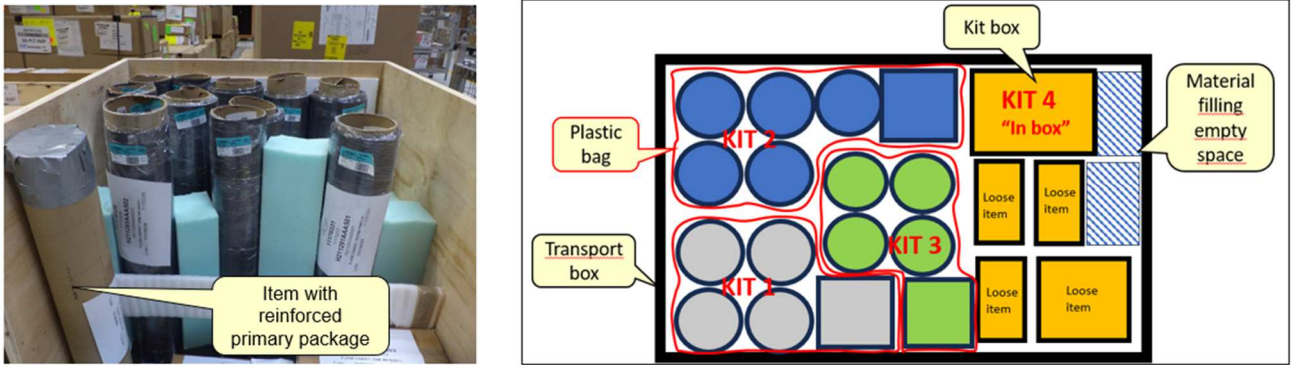


Figure 58-E: Example de KIT parts that can be sent in a plastic bag

15.3. LARGE INTERNAL FINISH PANELS

15.3.1. In addition to the requirements below, the requirements in item 7 of this manual must be followed.
 Note: If the items are made of composite, item 17 must also be observed in the definition of the packaging project

15.3.2. M For large panels, wooden packaging must be used, reinforced to resist to movement with a forklift and stacking inside the container and in stock.
 Note: Large panels are: Side panels, ceilings, etc. that require large boxes where the use of cardboard boxes becomes inefficient to guarantee product safety.

15.3.2.1. Use a closed wooden box, with a reinforced structure to support:

- Stacking inside the container
- Being pushed and pulled from the container with a forklift (fig. 58-F)
- Be lifted by the tip with the forklift without causing any damage to the structure (fig 58-H)



Figura 58-F: Caixa de madeira empurrada para dentro do container

15.3.2.2. The feet of the box must be aligned with its length, have space for the forklift to lift the box from the side and the tip (see fig 58-G) and be chamfered at the ends to slide on the container floor (fig 58-H)

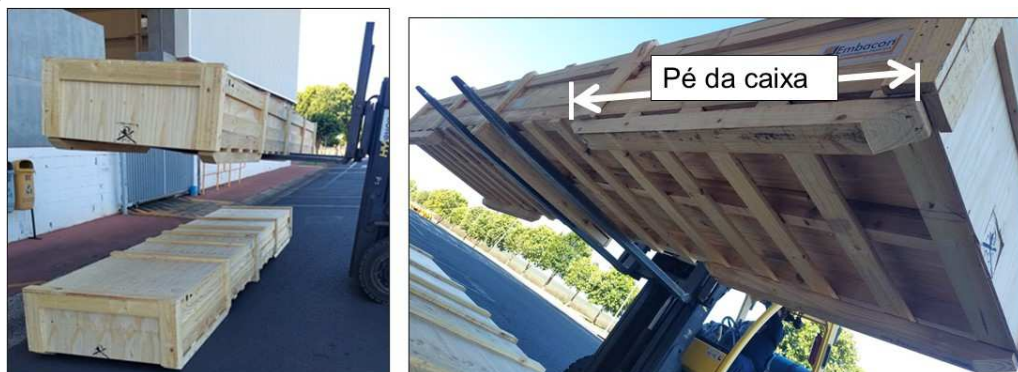


Figure 58-G: Wood box pushed inside container

- 15.3.2.3. It must be structured from below (fig 58-H) so that the forklift fork never touches the box bottom closure.
- 15.3.3. The parts must be fixed inside the box so that they do not move during transport, according to item 15.1.8
- 15.3.3.1. The panel placed in the packaging must have all the necessary protections to ensure safe transportation
- Only one panel in wooden packaging
 - The part must have primary packaging to avoid dirt and saltiness (see item 17.2.3.3).
 - The part must have reinforced protection at fragile points (see item 17.2.3.2)
 - Must respect the minimum internal box occupancy of 80% (see item 17.2.2.1)
 - If necessary, place additional protections (see item 15.1.10)
 - The packaging must have all the necessary external information (see item 7.46)

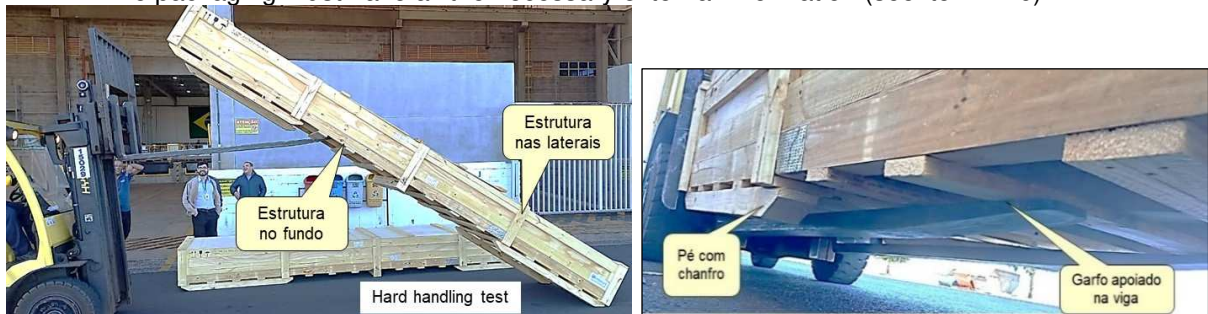


Figure 58-H: Example wood box to large panels (fork never touch bottom of box)

16. TIRES AND INNER TUBES

16.1. GENERAL REQUIREMENTS

- 16.1.1. In addition to the requirements below, the requirements in Item 7 of this manual must be followed.
- 16.1.2. It is mandatory to send the quality documents (certificate and test report) together with the materials (see item 5 in the Shipping Policy – <http://www.embraer.com.br/ShippingPolicy/brasil.html>) together with the product.
 Note: Quality documents (CofC, registration card, TAG) are mandatory for the release of the material for use. The absence of the necessary documents will result in the issuance of a CD note no. 20 (non-conformity of documents), which may generate penalties and the return of the material with expenses borne by the supplier (in the case of TAG 8130 - Certificate of Airworthiness).
- 16.1.3. They should be packaged on plastic pallets or steel pallets with nylon straps and covered with stretch film to facilitate handling. (See Figure 59)
 Obs: Avoid wood pallets, it can have slivers that can damage the tires
- 16.1.4. The pallet used for transport must be free of sharp edges or tips (nails, staples, sharp edges, etc.) that could damage the product.
- 16.1.5. Do not pack tires of different sizes on the same pallet.
- 16.1.6. The stacking of tires on the pallet must follow the values recommended by the manufacturer of the tires. As a recommendation, if there is no restriction demanded by the manufacturer, it should follow the table below: (see table 02)

Tire Diameter	Stackable amount
Up to 100 cm	5
From 100 cm to 125 cm	4
Above 125 cm	3

Table 02: Tire Stacking limits

Note: If there is restriction, you should contact Embraer Logistics via the Contract Administrator.

16.1.7. A copy of the certificate must be attached to the external surface of the tire

16.1.8. Identifications (PN and N / S) must be fully visible without the need to unpack (see Figure 59)

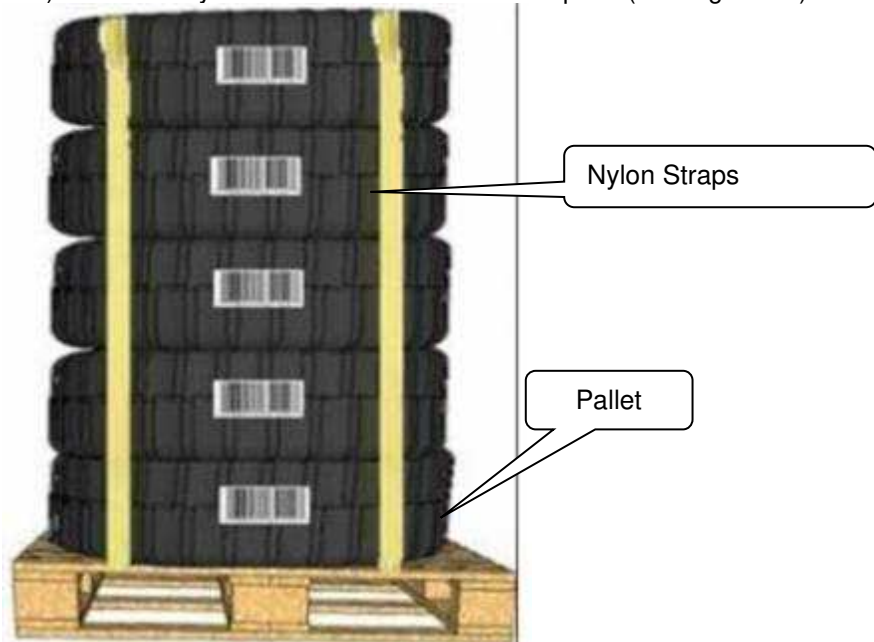


Figure 59: Example of packed tires, secured with nylon straps on pallet and bearing attached certificates.

16.1.9. Every tire must have primary package made of opaque material (see 14.2.5) to protect against UV rays.

17. COMPOSITE MATERIAL AND ITEMS WITH TRANSPARENCY (GLASS AND ACRYLIC)

17.1. In addition to the requirements below, the requirements in Item 7 of this manual must be followed. And in the case of large internal finishing panels, item 15.3 must also be observed when defining the packaging project

17.2. PARTS OF COMPOSITE MATERIAL

17.2.1. Small and lightweight parts made in batches

Obs 1.: Parts up to 600mm and weight up to 5 Kg

OBS-2: In some special cases, this item (17.2.1) may, at Embraer's discretion and acceptance, be used for parts with a simple profile, above 600mm.

17.2.1.1. Must have reinforced protection on fragile and sharp parts of item, when necessary

17.2.1.2. These items must have primary protection made of bubble plastic. Must be used the amount of bubble layers required to ensure the safety of the item

17.2.1.3. Put the protected item batch in a cardboard box. The box must have the correct size (see 7.44.3.1)

17.2.2. Limit the weight of the cardboard box in 18 Kg (see 5.2). If necessary, split up the batch EQUALLY into several boxes to respect the weight limit (see 7.44.3.1)

17.2.2.1. Cardboard box must be compatible with the material dimensions. The batch of items must occupy 80% of the internal volume of the box (see 7.20)

17.2.2.2. The box must be strong enough to resist to be piled (regardless of the weight of the items)

17.2.2.3. Different batches must not be placed in the same box

17.2.2.4. Locking the batch of items inside the box by filling the voids (see 7.19)

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Revisão 16 Data: 06 / 2026

17.2.3. Larger item, unitarily manufactured
 Obs.: Parts above 600mm or weight above 5Kg

17.2.3.1. The item must have primary package and secondary package (box) individual.

17.2.3.2. Must be put protection at the edges and fragile points of the item (see 10.1.3 / see fig 60-61)



Figure 60: Example of foam to protect the edges

17.2.3.3. Wrap the item with bubble plastic (or similar) to protect. Must be used the amount of bubble layers required to ensure the safety of the item

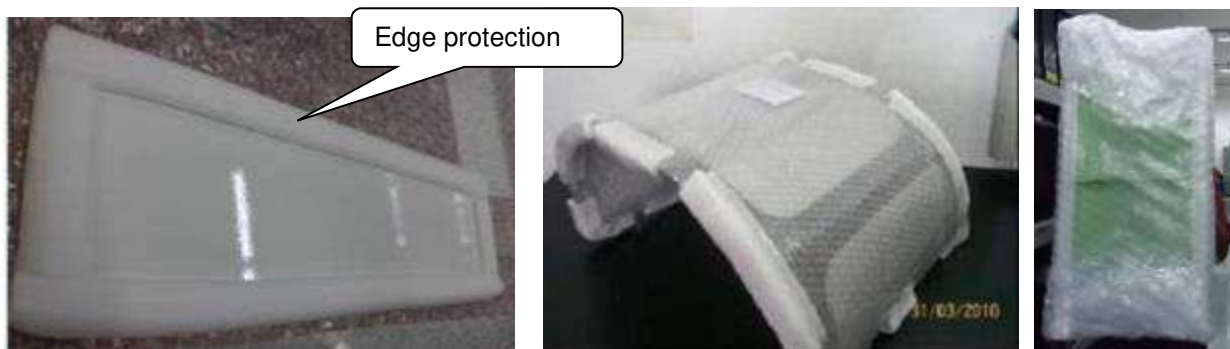


Figure 61: Example of protection on edges

17.2.4. Items with length less than 1,2 meters should be put in a reinforced cardboard box to resist to the handling and transportation.
 Note: regardless the weight of product, the cardboard box must be strong enough to be piled without broking during transportation and storage

17.2.4.1. Cardboard box must compatible with the material dimensions. The item must occupy 80% of the internal volume of the box (see 7.20).

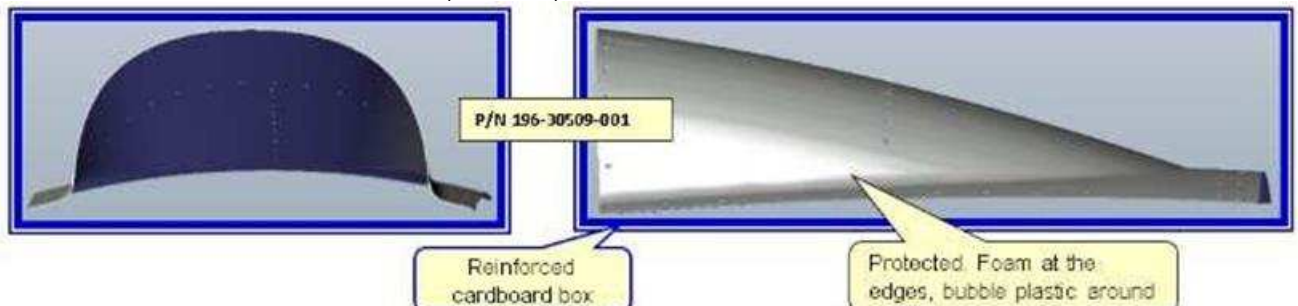


Figure 62: Example of cardboard box occupation

17.2.4.2. To transportation, the cardboard box must be put over reinforced pallets, fixed on the pallet with belts or plastic film or 'stretch' equivalent (see 7.44.10)

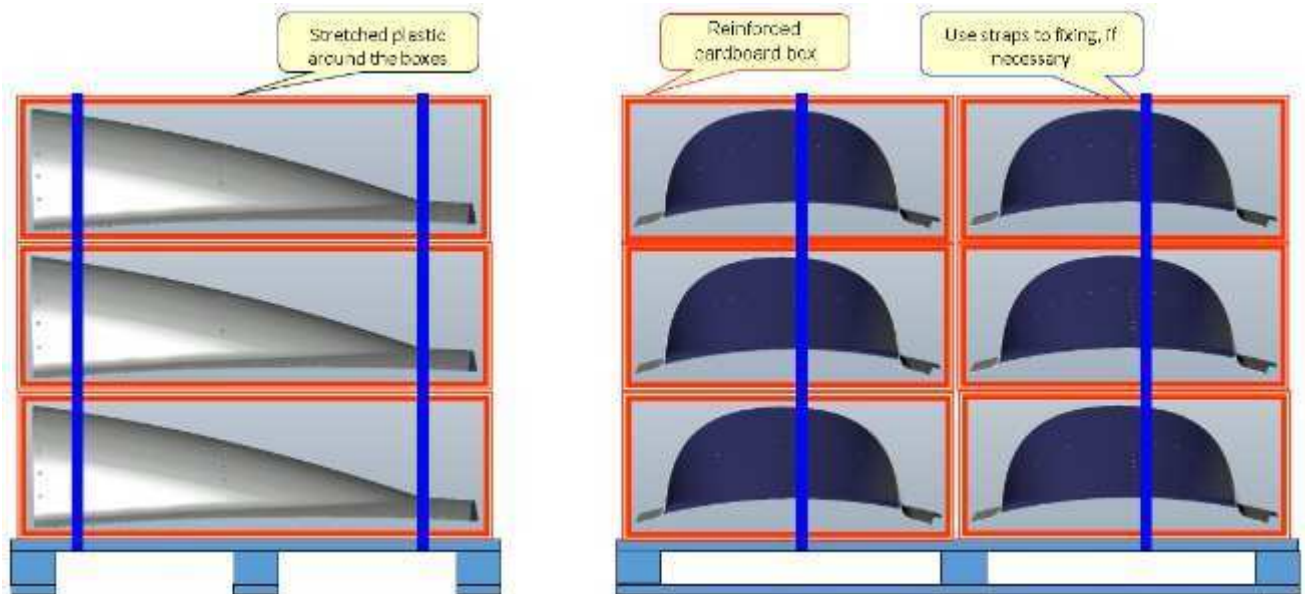


Figure 63: Consolidation of boxes over the pallet (lots)

17.2.5. Flexible items greater than 1 meter, subject of torsion, must have reinforcements at fragile points (if necessary) to ensure the integrity of the product during handling and transportation



Fig. 12



Fig. 13

Metalic Reinforcement



Fig. 14

Metalic Reinforcement

Figure 64: Example of reinforcement of fragile points of the product

17.2.6. To Item greater then 1,2 meters, if necessary, the box must have internal cradles (see 7.44.6) and be prepared to mechanical handling (se fig 19 / 20)

Note: For internal cradles see too item 10.2.4 and 10.2.5

17.2.6.1. For parts larger than 2 m, the packaging must be made of wood to ensure the safety of the material during mechanical handling (see fig. 19 and 20).

17.3. PARTS WITH TRANSPARENCY (GLASS AND ACRYLIC)

17.3.1. Must be used individual package.

17.3.2. The item must have, if necessary, protective film to avoid scratching

Note: the material of the protective film must be chemically compatible with the item material. The film must not leave any residue on the item surface.

17.3.3. Where necessary, protect material edges (see fig 61)

17.3.4. Protect the item with bubble plastic (or similar). Must be used the amount of bubble layers required to ensure the safety of the item.

17.3.5. The item should be put in a reinforced cardboard box to resist to the handling and transportation

- Regardless the weight of product, the cardboard box must be strong enough to be piled without to broke during transportation and storage.
- The box must have all the necessary external marks (see 7.46)

17.3.6. In case of a plane item very fragile, as mirrors and similar, must be used (if necessary) a plate of reinforcement to avoid any torsion of the package that can crack the product.

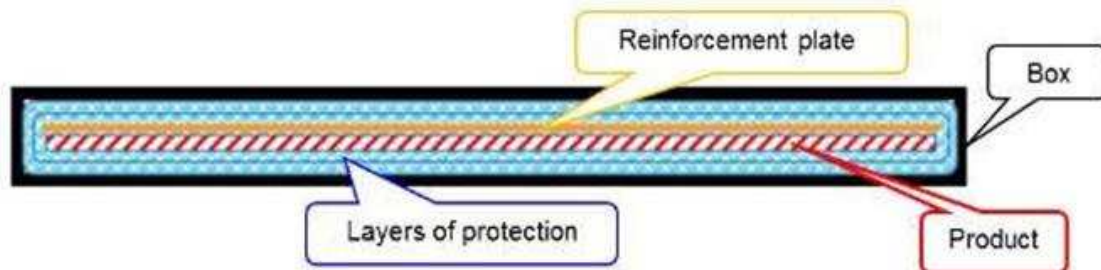


Figure 65: Example of reinforcement plate and correct box dimension

17.3.7. Cardboard box must compatible with the material dimensions. The item must occupy 80% of the internal volume of the box (see 7.20).

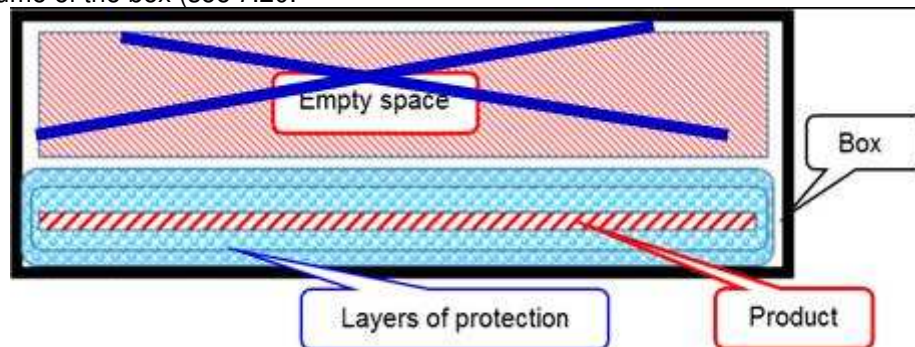


Figure 66: Example of a box with empty space inside- NOT acceptable

17.3.8. The product must be locked inside the cardboard box

Note: The product can NEVER be loose inside the box (see fig.65)

17.3.9. To transportation should be used a secondary box to unitize the cardboard box

Note: The secondary package must be Strong enough to resist to transportation and handling

17.3.9.1. To small items, to unitize the small packages in a reinforced cardboard box (secondary one). Limiting the weight in 20 Kg, if necessary, split the batch equally into several boxes to respect the weight limit, ensuring that the primary packages occupies 80% (minimum) of the secondary box (see 7.44.3.1)

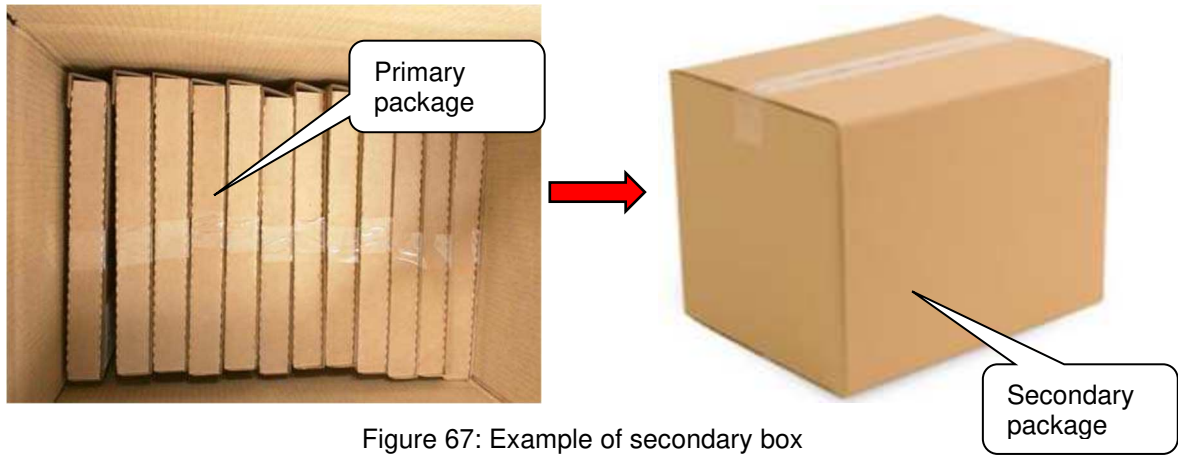


Figure 67: Example of secondary box

- 17.3.9.2. To medium items, should be used a wooden box with lid “type bell” prepared to be handled with forklift.
 Note: The size of the box must be adjusted to avoid empty space inside. The primary packages must be locked inside secondary box.

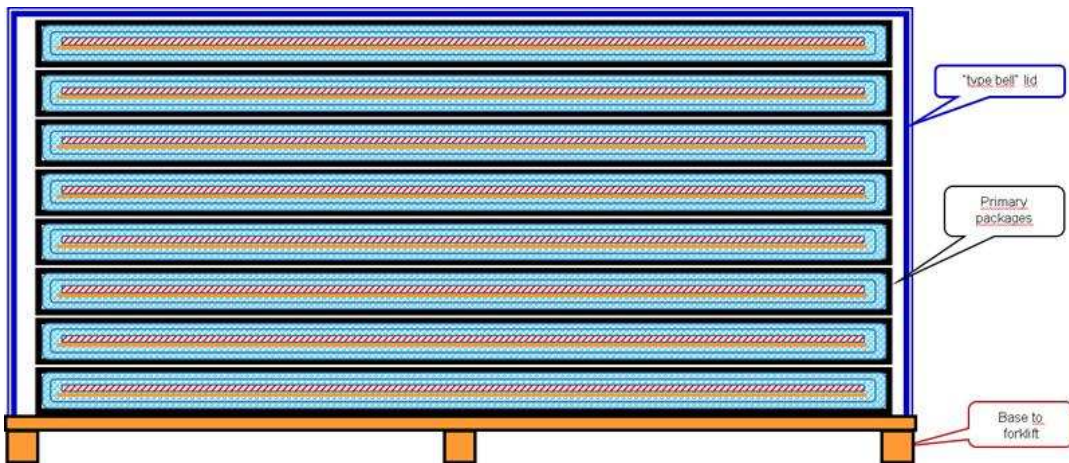


Figure 68: Example of secondary box, type bell

18. PRODUCTS MADE OF TUBE AND DUCTS

18.1. In addition to the requirements below, the requirements in Item 7 of this manual must be followed.

18.2. SIMPLE PARTS, MADE IN LOTS

18.2.1. Must be put protection on the ends of the product (Caplug)

18.2.2. The items must be put in a plastic bag unitarily (polyetilene or similar)



Figure 69: Example of simple tube

- 18.2.3. Wrap the item with bubble plastic (or similar) to protect. Must be used the amount of bubble layers required to ensure the safety of the item (see 7.1)
- 18.2.4. To items greater than 2 meters, put the batch of items (or part of it) in a reinforced cardboard box. The size of box must be correct (see 7.20)
 Note: regardless the weight of the products, the box must be strong enough to resist to be piled without problems in the transportation and storage
- 18.2.5. The package must contain only items of the same part number
- 18.2.6. Never mix different batches in the same box (see 7.14)
- 18.2.7. Limit the weight of the box in 20 Kg (see 5.2), If necessary, split up the batch EQUALLY into several boxes to respect the weight limit (see 7.44.3.1)
- 18.2.7.1. The box must be compatible with the material dimensions. The batch of items must occupy 80% of the internal volume of the box (see 7.20)
- 18.2.7.2. The length of box must be equal to: product length + space of protection (space necessary to isolate the product from the box wall)
 Note: The space must be adjusted in accordance with the fragility of the items.



Figure 70: Example of protected space

- 18.2.8. The cardboard box must resist to the handling and transportation.
- Regardless the weight of product, the cardboard box must be strong enough to be piled without to broke during transportation and storage.
 - The box must have all the necessary external marks (see 7.46)
- 18.2.9. Locking the batch of items inside the box by filling the voids (see 7.19)
 Note: It is necessary to take care when locking fragile tubes in a box (with lot of curves)
- 18.2.10. To Item greater than 2 meters, its necessary to put the batch of items in a wooden box. The box must have the correct size (see 7.20) and must be reinforced to ensure the tubes inside it DO not suffer any strain above its limit.
 Note: The wooden box must be in accordance with NIMF 15 (see 7.9)
- 18.2.10.1. If the box weight is over 20 Kg, the box must be prepared to forklift handling.

18.3. COMPLEX ITENS

- Collector's tubes welded
- Fuel lines
- Tubes with external coatings (insulation)
- Compound ducts



Figure 71: Example of complex tube packaging

- 18.3.1. Must be put protection (Caplug) in the ends of the tube, if necessary
- 18.3.2. The item must have primary and secondary package individual
- 18.3.3. Must be put in a plastic bag (polyethylene or similar), one item per bag
- 18.3.4. Wrap the item with bubble plastic (or similar) to protect. Must be used the amount of bubble layers required to ensure the safety of the item
- 18.3.5. Items less than 2 meters should be put in a reinforced cardboard box (see 7.20)
 Note: regardless the weight of the products, the box must be strong enough to resist to be piled without problems in the transportation and storage.

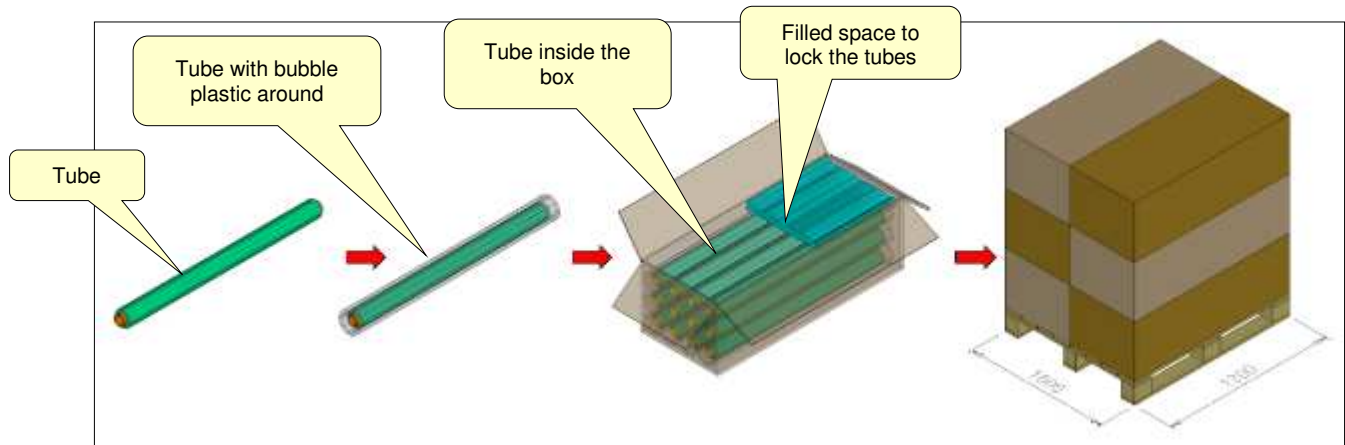


Figure 72: Example of a simple tube (straight)

- 18.3.6. The box must compatible with the material dimensions. The batch of items must occupy 80% of the internal volume of the box (see 7.20)
- 18.3.7. Locking the item inside the box by filling the voids (see 7.19)
 Note: It is necessary to take care when locking fragile tubes in a box (with lot of curves)
- 18.3.8. To Item greater than 2 meters, it's necessary to put the item in a wooden box. The box must have the correct size (see 7.20) and must be reinforced to ensure the tubes inside it DO not suffer any strain above its limit
 Note: The wooden box must be in accordance with NIMF 15 (see 7.9)
- 18.3.8.1. If the box weight is over 20 Kg, the box must be prepared to forklift handling
- 18.3.9. Items with sharp and pointed edges must have protection to isolate the edges and sharp points



Figure 73: Example of sharp point protected

18.4. FLEXIBLE DUCTS

NOTE: In addition to the items below, the requirements of item 7 of this manual must be followed.

- 18.4.1. The items must be put in a plastic bag unitarily (polyethylene or similar)
- 18.4.2. Wrap the item with bubble plastic (or similar) to protect, if necessary. Must be used the amount of bubble layers required to ensure the safety of the item (see 7.1)
- 18.4.3. To unitary items, put in a cardboard box. The box must be reinforced and have the correct size (see 18.4.5)
Note: regardless the weight of the products, the box must be strong enough to resist to be piled without problems in the transportation and storage
- 18.4.4. To items made in batches, with less than 1,2 meters. Put the batch in a cardboard box. The box must be reinforced and have the correct size (see 7.20)
Note: regardless the weight of product, the cardboard box must be strong enough to be piled without broking during transportation and storage
- 18.4.5. Limit the weight of the cardboard box in 20Kg (see 5.2). If necessary, split up the batch EQUALLY into several boxes to respect the weight limit (see 7.44.3.1)
The batch of items (or part of it) must occupy 80% of the internal volume of the box (see 7.20)
- 18.4.6. Long ducts must be bent to fit in small box (if possible, box length less than 1,2 meters) to make the handling easy. If necessary, split up the batch EQUALLY into several boxes to respect the size limit (see 7.44.3.1)



Figure 74: Example of ducts bent inside the box

- 18.4.7. Items with sharp and pointed edges must have protection to isolate the edges and sharp (see fig 73)
- 18.4.8. The items must be locked inside the cardboard box
 Note: The item must not be loose inside the box (see fig 72)
- 18.4.9. To the transportation of the boxes, use a pallet to consolidate the boxes (see fig 72)
- 18.4.10. To Long ducts that cannot be bent to fit in small box. It must be put in a reinforced cardboard box, limited in 2 meters. Above this length must be used a wooden box
 Note: The wooden box must be in accordance with NIMF 15 (see 7.9) and be prepared to forklift handling