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Changes

- Supplement of Compliance regulations
- ESD Protection and Requirements updated
- New: Packaging of Electronic Components for Automatic Handling
- Supplement to “Legal & Environmental Requirements”, Green Packaging Requirements
- Supplement to “Approved Materials and Not Approved Materials”
- Update of “Empty Box Supplies”

[03] The points marked with [03] are changed.

Previous Editions

[02] from 23rd August 2023, e-sign 16624512
[01] from 17th May 2019, FRB-15133026
[00] from 10th October 2014, FRB-14133333

1 SCOPE

[03]
With its trendsetting systems technology, the Automotive Group of Continental AG (concerning this norm referring to all legal entities within the Continental Automotive (thereinafter Continental or CA) makes a convincing and decisive contribution worldwide to the optimization of safety, reliability, economic viability, environmental compatibility and convenience of modern motor vehicles.

Supply Chain procedures and processes are becoming increasingly important in relationships between Continental and suppliers. This norm aims to standardize and continuously improve procurement processes involving Continental and suppliers. These improvement and standardization actions are basis for creation of transparency in the supply chain processes in Continental and all parties should benefit from them.

This norm is intended as a reference, which CA plants and suppliers shall use to clarify any difficulties and questions which may arise. The CA plants and suppliers shall undertake all necessary actions to meet the supply chain requirements stated in this norm. Compliance with the content is essential and will impact future sourcing decisions. It is therefore recommended that CA plants and suppliers inform all responsible members of their staff of the contents of this norm.

This norm applies to all companies within Continental Automotive as well as to their plants and functional areas and their suppliers worldwide and is established by Automotive Supply Chain Management - Material Flow & Packaging (A QO SCM MFP).

2 APPLICATION

This norm shall apply to all worldwide activities of Continental and all deliveries to worldwide destinations of Continental. This norm is part of the currently valid purchasing agreement between the supplier and Continental and states binding requirements for supply chain processes and procedures. Except otherwise explicitly laid down in the currently valid purchasing agreement, the supplier shall undertake to meet the requirements stated in this norm.

In the event that any of the provisions of this norm is ineffective, the other provisions of this norm shall remain in full force and effect.

In case of conflicting rules between the rules of this norm and any other written agreement between the supplier and Continental, it must be decided case by case which document shall prevail.

Due to changing framework conditions, it will be necessary to adapt the packaging related requirements from time to time. The CA plants and suppliers of Continental are obliged to follow the current valid versions of the TST norms and documents.

3 REFERENCES

[03]

GSCC	Global Supply Chain Concept
TST N098 00.02 000	Transportation Requirements
TST N098 00.02 001	Continental Automotive Trade Terms
TST N098 00.03 000	Requirements on Marking of Goods
TST N098 02.01 001	Container Optimized Wood Pallet L1108 and L1110 (1140x790/ 980 x140mm)
TST N098 02.02 000	Plastic pallets and Test Specification
TST N098 00.04 000	CA Packaging Standard Catalog
TST N098 05.01 000	Expendable Packaging
TST N098 01.01 000	Packaging Specification Data Sheet - PSDS
Packaging Loop Definition	Template to define returnable packaging quantity in the loop
Annex 01	Packaging Material Release, also part of CA 0600913 (document useable only CA internal)
EN ISO 780	Verpackung, Bildzeichen fuer die Handhabung von Guetern / Packaging - Graphical symbols for handling and storage of packages
DIN 6120	Packstoffe und Packmittel aus Kunststoff Bildzeichen / Marking of packaging and packaging materials for recycling purposes - Plastics packaging and packaging materials - Part 1: Graphical symbols
EN ISO 14001	Umweltmanagementsysteme, Anforderungen mit Anleitung zur Anwendung / Environmental management systems; Requirements with guidance for use
DIN EN ISO 14021	Environmental labels and declarations – Self-declared environmental claims (Type II environmental labelling)
ISO_1043-1	Plastics - Symbols and abbreviated terms - Part 1: Basic polymers and their special characteristics
97-129-EC	European Communities: Identification system for packaging materials; Numbering and abbreviations of the alpha identification codes / identification
VDA 4500	Kleinladungsträger (KLT)-System / Small Load Carrier (KLT) System
VDA 4504	Elektrostatisch ableitendes Kleinladungsträger (KLT)- System / Electrostatically Dissipative Small Load Carrier (KLT) System
VDA 4525	Standardisierte Einwegverpackung für Seecontainer-Anwendungen / Standardized expendable packaging for sea container applications
VDA 19	Cleanliness classes
IEC 61340	Elektrostatik / Electrostatics
ANSI ESD S20.20	Protection of Electrical and Electronic Parts, Assemblies and Equipment
ANSI S 541	Packaging Materials
ANSI STM 11.11	Resistance test methods for planar solid materials)
ANSI STM 11.13	Two-Point resistance measurements
ANSI STM 11.31	Shielding bags
IPPC ISPM No 15	International Standards for Phytosanitary Measures - Guidelines for Regulating Wood Packaging Material in International Trade

VDA publications could be downloaded at the official VDA homepage for “Publications”:
Publications | VDA

All TSTs and Appendices are downloadable at the CA Internet homepage for suppliers
"Supply Chain Standards & Manuals @ Continental Automotive":
Continental Automotive | Supplier Logistics (continental-automotive.com)

4 RESPONSIBILITIES

[03]
The supplier is responsible for the quality and delivery of the products and therefore also for compliance with these packaging requirements. In order to ensure safe handling (in accordance with accident prevention and other regulations) and smooth operations, it is essential for all goods to be delivered in accordance with the requirements stated in this norm.

This norm defines packaging procedures and functions. It describes the most important requirements for packaging material and the issues to be considered in the preparation / development of packaging concepts. References are also made to the packaging-specific regulations and rules relevant to deliveries to CA plants.

It is the responsibility of the supplier to provide individual and/or collective packaging for the goods. The packaging provided by the supplier shall ensure that the goods reach their destination in sufficient condition.

Among other things, the packaging shall protect the goods from damage (loads in transit) and from deterioration caused by environmental effects. The packaging shall also protect personnel against hazards resulting from the goods themselves (e.g. regulations concerning the handling of hazardous goods).

The packaging activities and responsibilities are also described in detail in the CA norm TST N098 01.01 000 “Packaging Specification Data Sheet - PSDS”. The current valid version can be downloaded at the Continental Internet homepage for supplier:
Continental Automotive | Supplier Logistics (continental-automotive.com)

Further responsibilities and appropriate activities are described in the following chapter “General Packaging Definition Procedure”.

4.1 Compliance

[03]

The supplier agrees to adhere to the Business Partner Code of Conduct of Continental:
https://www.continental.com/en/company/suppliers/supplier-information/business-partner-code-of-conduct/ .
This includes intercompany business and packaging for shipments towards customers.

5 GENERAL PACKAGING DEFINITION PROCEDURE

It is the responsibility of the Supply Chain Management (SCM) department, especially the packaging engineer, of the Continental plant concerned to define and approve delivery packaging for production materials and trading goods, in cooperation with the supplier and the production scheduling and quality departments of the receiving plant concerned.

The objective is to standardize packaging for all components to the greatest extent possible. Where the same parts are delivered to different Continental plants, efforts should be made to standardize the packaging used for the parts concerned.

5.1 During the Sourcing Process

[03]

In phase of Request for Quotation "RFQ":

Continental will send a prefilled (as much as possible) "Packaging Specification Data Sheet - PSDS" (TST N098 01.01 000) as draft to the supplier with packaging requirements for outer CA packaging standard, if possible, also for inner packaging components and if necessary special quality requirements for the products. For each article number, the supplier shall complete and submit to the Continental plant concerned a packaging approval application.

Up to the phase of the Supplier Component Review "SCM SCR":

The packaging concept (serial and substitute packaging concept) should be defined bilaterally between Continental and supplier, so that the PSDS-template should be adjusted, agreed and signed at the SCM SCR meeting by supplier and Customer SCM (incl. Packaging Engineer). Without final agreed and signed packaging proposal in PSDS, quotation is not complete.

In the phase of the Supplier Production Part Approval Process "PPAP":

The final serial packaging concept should be defined, agreed and finally signed again as well in the PSDS-template. The PSDS has to be signed by all concerned departments at supplier and CA (Packaging Engineer / Industrial Engineer, SCM, Production Planning, Warehouse, Label Coordinator and SQM / Plant Production Quality).

The PSDS as part of the Global Supply Chain Contract (GSCC) with the supplier, has to be filled out for each product (for Mechanics and Electro Mechanics) and for the serial and substitute packaging concept. The necessity of the PSDS for Electronic parts or Electronic part groups should be clarified bilaterally between supplier and receiving Customer plant (depart. SCM, by Packaging Engineer).

5.2 Definition of Returnable Packaging Concepts

In case of a returnable packaging concept is defined in PSDS, the "Packaging Loop template" has to be filled out for each part-no., too. This template must be completed to identify the need for returnable packaging in the circulation.

A proposal for a substitute/ alternative expendable packaging concept should be defined in the template of PSDS in advance, too. The alternative expendable packaging concept must have the same outer dimension, part quantity and part orientation for same part access as the returnable serial concept.

The supplier is responsible for ensuring that the Continental production process can be continued even if empty returnable bins are missing.

In the event returnable bins are not available to support production schedules, the supplier has to inform the recipient CA plant immediately. If no returnable packaging is available on time, the alternative expendable packaging concept should be used.

Before using any substitute packaging, the supplier shall notify in written form the receiving plant and submit a complaint concerning the shortage of returnable packaging. The supplier should obtain a release for the substitute/ alternative packaging from the Plant SCM of the receiving plant.

5.3 Deviations of final agreed Packaging Concepts

Any deviations of the final agreed packaging concept are not allowed without prior written announcement and approval from receiving Plant SCM department / Packaging Engineering.
Packaging that proves unacceptable for whatever reason (quality, transport, production process, safety, etc.) must be changed upon request from Packaging Engineering.

In the event of a failure by the supplier to comply with the agreed packaging specification, Continental reserves the right to refuse to take delivery or to repack the goods concerned and to charge the cost of handling and repacking to the supplier.

5.4 Approval of Packaging Material

Packaging material approval by the CA plant, SCM department (Packaging Engineer) concerned is required for any packaging by using the template “Packaging Material Release” (Annex A01). The supplier must apply for such approval. The approval will be sent to the supplier by the return of the completed template “Packaging Material Release” by the CA SCM Packaging Engineer.

The supplier shall not deliver any products to Continental before the inner and outer packaging (returnable) required for such products has been approved by the CA plant in the receiving plant.

5.5 Packaging Design Improvements

The supplier has to obey the agreed packaging specification during the whole production run for cost-effectiveness and optimal product protection. If applicable the supplier should contact the receiving plant and provide the new improved packaging proposal.

The following approval process is corresponding to flow described in Chapter “General Packaging Definition Procedure”.

5.6 Summary - Document Overview

Remember, the responsibility for ensuring component quality - from supplier plant to the point of use - remains with the supplier of the product. The approval of packaging by Continental does not relieve the supplier from its responsibility to supply parts which are free from damage.

A general agreement between CA Purchasing and the supplier cannot be concluded until a complete packaging concept incl. substitute packaging concept and labeling specification approved by the SCM department of the receiving CA plant is available:

Necessary documents to be filled in accordance with the packaging concept:

Topic	Necessary documents to fill out	In case of packaging concept:		Responsibility
		Expendable Packaging Concept	Returnable Packaging Concept	Continental [CA] Supplier [S]
Definition of serial packaging concept	Packaging Specification Data Sheet - PSDS	X	X	CA & S
Definition of substitute packaging concept	Packaging Specification Data Sheet - PSDS)		X	CA & S
Definition of returnable packaging quantity in the circulation	Packaging Loop template		X	CA & S
Approval of packaging material	Packaging Material Release – Annex 01	X	X	CA
Definition of label specification	Packaging Specification Data Sheet – PSDS	X	X	CA & S

6 PACKAGING REQUIRMENTS FOR DEVELOPMENT AND DEFINITION

All packaging shall be designed to perform the functions required functions and requirements. The properties required for the various functions of packaging are listed below.

The “CA Packaging Standard Catalog” (**TST N098 00.04 000**) and a catalogue of CA plant specific packaging standard that meet these requirements are available at each plant. When selecting packaging, standard packaging material from the receiving plant shall be considered first as it meets the below requirements and has already proved its effectiveness in practice.

Only packaging materials in accordance with the Continental specification shall be used.
It is also obligatory to consider the requirements of "Approved Materials and Non-Approved Materials" which were described and evaluated according to environmental requirements, in the chapter “Packaging materials and Environmental Requirements”.

6.1 General Packaging Requirements

6.1.1 General Protective Functions

- Temperature-resistant, tight
- Corrosion-resistant, dustproof
- Chemically neutral
- Sturdy, shockproof
- Shock-absorbing, pressure-resistant
- Tear-proof
- Technical cleanliness

6.1.2 General Packaging Requirements (storage, handling and shipment functions)

- Damage free
- Stackable, slip-resistant,
- Standardized for easy handling
- Designed for automated handling
- To under run the box / pallet with a forklift, if more than 12/ 15 kg, which depends on plant and country-specific requirements
- Designed to form units and to save space

6.1.3 Requirements per Loading Unit (LU) (incl. pallet and cover)

The loading unit (LU) is usually called a physical transport unit. A typical loading unit usually consists of the loading aid (e.g. pallet, box, tray, unit load device), loading unit securing means and the good in it.

- The maximum outer loading unit dimensions (incl. Pallet and lid) should be defined according to the type of packaging and transportation mode:
  - **Type of packaging**:
    - Returnable, review catalogue of returnable listed per location and
    - Expendable, according to transportation mode
  - **Transportation mode**: Air-freight / Sea-freight / truck / train

- Minimum dynamic stacking factor = 2 (1+1), best case = 3 (1+2)
- Maximum gross weight of 1000 kg per LU
- Maximum height of one LU is 1000 mm (Plant-specific deviations must be determined by the receiving plant)

- Shrinking, stretching or wrapping of loading units shall be avoided in general, because of:
  - Additional handling for removing
  - Additional waste
  - Employment protection / safety of work
  - Effectiveness problems of the process.

But in special cases plant specific requirements could permit it.

- It is not allowed to fix stacked loading units to each other. There is a high safety risk for the unloader if stacked pallets are fixed to each other.

6.1.4 Requirements per Handling Unit (HU)

A handling unit (HU) is a physical unit made up of packaging and the goods in it. It may also be that multiple HU's are packed together inside a bigger HU. A HU usually consists of no further loading aid, like e.g., a pallet.

- Standard modular dimensions are: 300 x 200 mm or 400 x 300 mm or 600 x 400 mm
- Outer dimensions per HU must be finally defined with CA Plant Packaging Engineer according to type of packaging and transportation mode.
- HUs are always provided with a unique identification number and with all inventory management information.
- Easy to open and re-close, easy to repack, re-usable
- Environmentally compatible, economical
- Easy to dispose

- Without metal brackets or clips for personal safety
- Types of material handling: Manual and automated handling
- Maximum recommended gross weight for manual lifting to avoid back injuries is 12/ 15 kg, which also depends on plant and country-specific requirements.

6.1.5 Accessories / Inner Packaging

Only clean boxes may be used. For quality reasons, if appropriate for the product and agreed with the Continental plant concerned, each box carrier shall be lined with a sturdy polyethylene bag (PE- folding bag) with a thickness of at least 100 µm, according to plant specific requirements.

In order to achieve a smooth manufacturing process, it is necessary to obtain clean vendor parts in clean boxes. Thus, each supplier is obligated to keep the boxes clean. Dirty boxes may not be used. If dirty boxes have been detected, the replacement or cleaning issue has to be agreed with the CA plant concerned.
The maximum weight per box (HU) shall be agreed with the Continental plant concerned. The gross weight per box should not exceed 12/ 15 kg, which depends on plant and country-specific requirements.

The design of inner packaging shall be agreed with the Continental plant concerned. Only wear-proofed, low-abrasion materials may be used, depends on product quality and cleanliness requirements.
Divergences in the tolerance dimensions of inner and outer packaging materials must always be considered at every development.

6.1.6 Traceability, Identification and Information Functions

[03]

- See TST N098 00.03 000 “Requirements on Marking of goods”
- Package Identification Symbols (pictogram 1-3 according to EN ISO 780)
- Symbols: “Marking of packaging and packaging materials – Plastics packaging and packaging material” according to DIN 6120
- Marking all packaging boxes (returnable and expendables) with max. payload, superimposed load and stacking factor (see symbol: e.g. for expendable carton boxes)

Figure 6.1.6-1: Identification symbols

Acceptable condition:

- ✓ Stackability: Each loading unit shall be stackable (minimum is 1+1), better:
  Static (warehouse): min. 1+2,
  Dynamic (shipping transport) : min. 1+1, better 1+2!
- ✓ The stacking factor (static & dynamic) shall be clear visible on the loading unit! It should content information about max. payload per loading unit [in kg] and max. superimposed load [in kg].
- ✓ Place identifying symbol at each side!
- ✓ Clear identifying symbol: Comprehensible for all nations!

Figure 6.1.6-2: Identification symbols - example

6.1.7 Sales Functions (Serial, After Market or Trading goods)

- economical
- distinctive, informative
- promotional, easy to open
- easy to re-close
- packaging and labeling according to customer specification

6.2 Special Packaging Requirements

Packaging materials not in accordance with the below specifications shall not be used. Exceptions are subject to written approval by the receiving plant in connection with packaging instructions.

6.2.1 Load Securing Equipment

- Loads shall be secured using polypropylene (PP) or polyester (PET) straps marked with a material designation in accordance with DIN 6120.

- Steel straps or metal clips shall not be used without the prior specific approval of the receiving plant.
- Packaging materials not in accordance with the above specifications shall not be used. Exceptions are subject to written approval by the receiving plant in connection with packaging instructions.
- It should be noted that these requirements apply to packaging of all types, including any agreed substitute packaging.

6.2.2 Plastic Inserts/ Sheetings

- **Plastic Inserts**
  All plastic inserts require the approval of the packaging department responsible and shall be marked in accordance with DIN 6120. Plastic inserts shall be reviewed for recycling potential.

Figure 6.2.2-1: HDPE-Symbol according to DIN 6120 (as examples)

  PVC inserts shall not be used otherwise a special and actual part and plant specific release exists.
  All returnable inserts shall be equipped with adequate numbers of drain holes for cleaning.

- **Plastic Sheeting**
  Only polyethylene (PE) sheeting may be used. No stickers other than labels may be used. All plastics shall be marked with a material designation in accordance with DIN 6120.

  Surfaces shall not be printed. Shrinking or stretching plastic sheet shall not be used in general; otherwise it is regulated in plant specific requirements. An appropriate outer packaging shall be used instead of such sheeting. Adhesive tapes and stickers made from other materials will not be accepted.

6.2.3 Padding and Shock-absorbent Material

The use of padding and shock-absorbent material shall be minimized by adapting quantities to the package size. Packages shall not be padded using expanded polystyrene or chips.

6.2.4 ESD Protection

[03]
Electrostatic sensitive devices (ESDS) are electrostatic discharge (ESD) sensitive parts, which need to be protected against electrostatic charges and hard discharges as well as electrostatic fields during handling and transport. Most electronic components and PCBAs (printed-circuit-board-assemblies) are very sensitive ESDS; housed controllers, but also high precision resistors, have a lower ESD sensitivity.

Inside the ESD protected area (EPA) statically conductive or dissipative packaging, which does not charge up, must be selected. ESD compliant packaging is mandatory for all ESD sensitive parts.
But NON-ESD packaging (only for NON-ESDS) inside an EPA can be used if some mandatory requirements are fulfilled:

- The use of NON-ESD packaging must be coordinated with the local ESD coordinator at the intended CA location:
  - Handling of NON-ESD-Packaging must fulfill additional requirements which will be described in CA 1012001 - Electrostatic Discharge (ESD) Protection (information for CA internal only)
  - A separated storage place inside EPA with distance of > 50cm to any ESD-sensitive parts

- It is only allowed for NON-ESD sensitive parts e.g. mechanical parts.
- NON-ESD-Packaging must be distinguishable by eyes from any ESD-Packaging (see described paragraph below: “To be defined minimum ESD requirements” and chapter "6.2.8 Identification of Boxes/ Bins/ Pallets/ Covers/ Lids")

Outside the EPA, field and discharge shielding packaging material must be used (only for NON-ESDS).

The standards for ESD protection have to be followed:

- IEC 61340 serial of standards especially:
- IEC 61340-5-1 (main standard)
- IEC 61340-5-2 (handbook)
- IEC 61340-5-3 (packaging)

the parts of IEC 61340 which are referenced by IEC 61340-5-3 (e.g. standard test methods)

Alternatively, to IEC 61340 the American national standard; ANSI ESD S20.20 is very similar,

- ANSI S 541 (Packaging Materials),
- ANSI STM 11.11 (resistance test methods for planar solid materials),
- ANSI STM 11.13 (Two-Point resistance measurements),
- ANSI STM 11.31 (Shielding bags)
- VDA 4504

At least, in case the supplier is delivering ESD articles, then the ESD packaging of the articles shall be designed and tested in accordance with the latest edition of IEC TR 61340-5-5 and DIN EN IEC 61340-5-3 or IEC TR 61340-5-5 and ANSI ESD S541.

Any change of the product that has an effect on the ESD properties requires a new ESD product qualification certificate.

The ESD requirements for packaging are determined by

- the ESD sensitivity of the device to be packed
- the environment in which the packaging shall be used (inside or outside of an EPA)
- whether the packaging directly contacts or surrounds the parts
- special requirements (e.g. for PCBAs containing a battery)

If ESD protection is necessary, in any case the ESD Coordinator needs to accept the packaging. Early involvement of the ESD Coordinator during packaging design is therefore necessary. The use and the area of the ESD packaging are specified by the responsible Plant SCM in voting with the local ESD- coordinator and the supplier. Acceptance and release of ESD packaging in a written form of a purchase measurement report is needed.

To be defined minimum ESD requirements:

1. Material description based on ESD-capability permanent or temporally limited: anti-static, isolated, shielding, conductive, dissipative
2. Pervasive outgassing additives e.g., chemical additives with temporally defined attributes, static inhibitors, coco fatty acid must be pointed out declared
3. Measures and accomplishment data sheet and certificates
4. Electrical characteristics and measuring method (number and location of the measuring point), measurement equipment, temperature and humidity recorded on measurement documentation/ certificate
5. System function
6. ESD marking is a mandatory for each ESD packaging (see chapter "6.2.8 Identification of Boxes/ Bins/ Pallets/ Covers/ Lids")
7. Warning notes identifications according to IEC DIN EN 61340-5-1 e.g., date of expiry, allegation of the producer, production date and the recycling symbol
   Flagging of ESD packaging see chapter "6.2.8 Identification of Boxes/ Bins/ Pallets/ Covers/ Lids"
8. Periodic checking intervals based on the defined criteria
9. Changes of the deliverer are binding notifications and require a written agreement

6.2.5 Minimum Requirements for Humidity Control and Corrosion Prevention

Components that may be susceptible to moisture / corrosion / rust and are shipped or stored in damp or humid environments require the use of corrosion protection methods.

Different kinds of preferred corrosion prevention:

- Desiccant bags
- VCI (volatile corrosion inhibitor)
- Corrosion Intercept-Method
- N2-Atmosphere in aluminum laminated film

Transportation and Storage Conditions:

Corrosion prevention methods should be used if any of the following transportation or storage conditions occur:

- Products originating in a region or with a final destination where normal conditions (during current seasons) include a relative air humidity of 50% or higher for 14 consecutive days.
- Sea container transportation
- Products stored for more than 14 days in a warehouse with internal relative air humidity of 50% or higher. This includes all storage periods until the product is received at the warehouse.

The kind of corrosion prevention depends on the product and transportation and storage conditions and should be agreed by the receiving CA plant.

6.2.5.1 Methods of Application for Corrosion Prevention

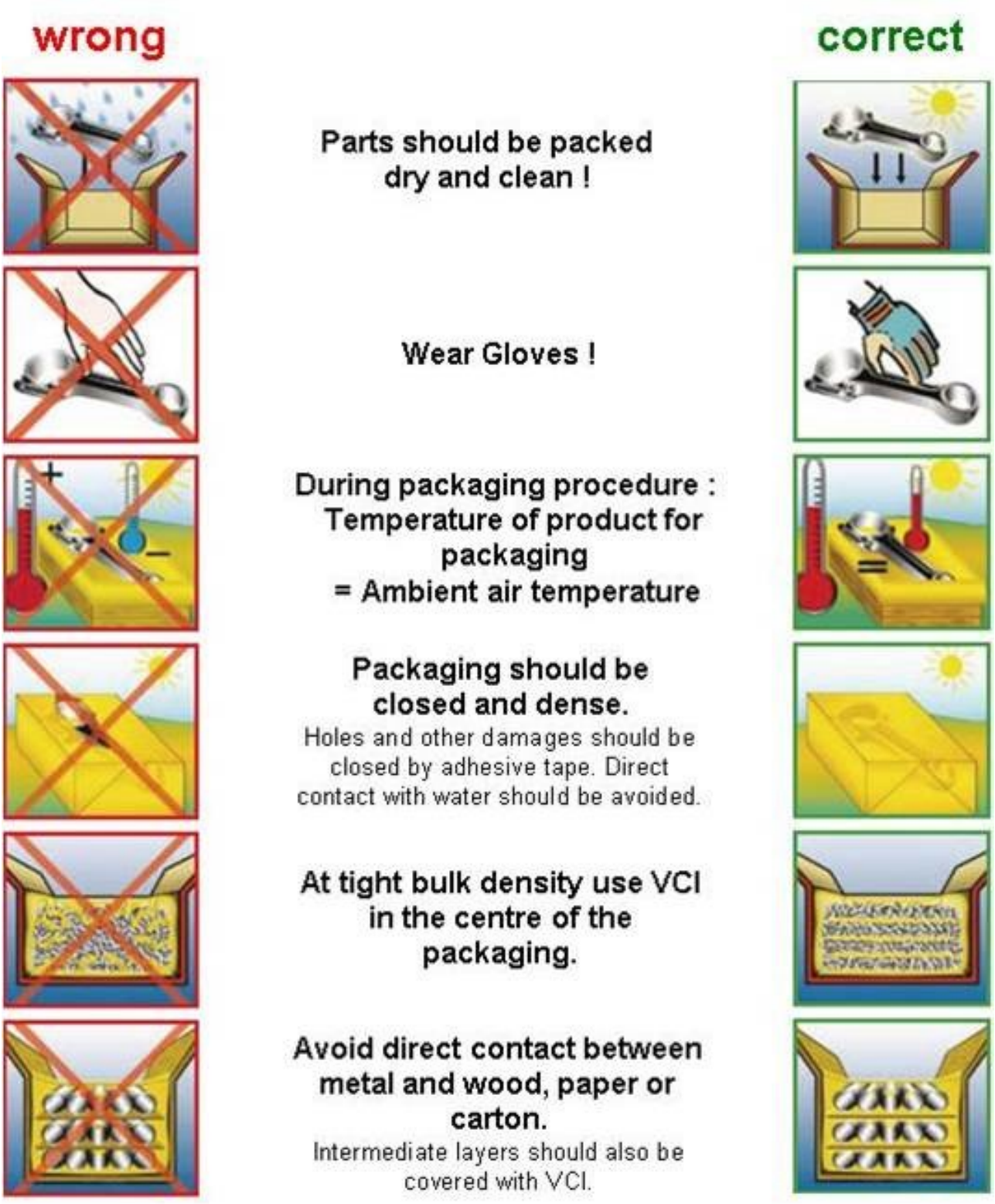


Figure 6.2.5.1-1: Methods of application for corrosion prevention

6.2.5.2 Dry Pack Moisture Sensitive Devices

Packaging for moisture sensitive devices has to be designed based on industrial standard IPC/JEDEC J-STD-033 and has to be marked with an appropriate label. See also **TST N098 00.03 000 "Requirements on Marking of Goods"**.

The packaging design must avoid the problem of moisture absorption inside the packaging and internal packaging stresses when the device is subjected to sudden, increased temperature, such as during board mounting. Packaging for moisture-sensitive devices needs to be marked according to IPC/JEDEC J-STD-033.

The table below presents the moisture sensitive level (MSL) definitions per IPC/JEDEC's J-STD-033:

Level	Floor Life		Soak Requirements			
			Standard		Accelerated	
	Time	Cond. °C / %RH	Time (hrs)	Cond. °C / %RH	Time (hrs)	Cond. °C / %RH
1	unlimited	<=30/85%	168	85/85%	n/a	n/a
2	1 year	<=30/60%	168	85/60%	n/a	n/a
2a	4 weeks	<=30/60%	696	30/60%	120	60/60%
3	168 hours	<=30/60%	192	30/60%	40	60/60%
4	72 hours	<=30/60%	96	30/60%	20	60/60%
5	48 hours	<=30/60%	72	30/60%	15	60/60%
5a	24 hours	<=30/60%	48	30/60%	10	60/60%
6	TOL	<=30/60%	TOL	30/60%	n/a	60/60%

Figure 6.2.5.2-1: IPC/JEDEC`s J-STD-033 MSL Classification

Possibilities for dry packs:

- Moisture barrier bags
- Desiccant bags
- Humidity indicator cards

The following are examples for labels (excerpt from IPC/JEDEC J-STD-033):

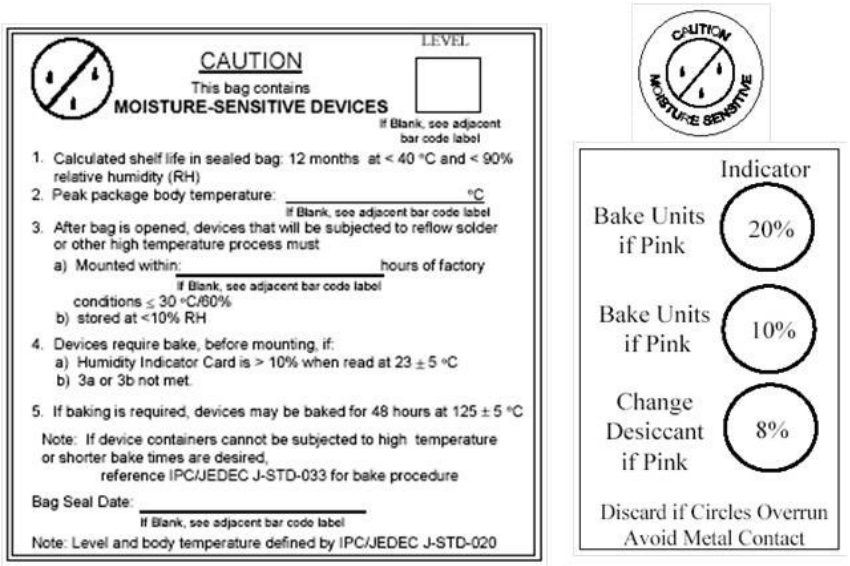


Figure 6.2.5.2-2: Indicator Card (HIC), "Moisture-Sensitive Identification'' (MSID) and Moisture-Sensitive Identification Label "Caution-Label"

6.2.6 Packaging for Hazardous Material

Packaging **for hazardous material** needs to be approved by each plant and for each material number prior to the first shipment. Also, pre-serial and sample shipments are forbidden without previous packaging and shipping agreement.

For hazardous materials, the warning symbols must be attached visibly on the packaging. Below symbols for references:

Figure 6.2.6-1: Hazardous materials warning symbols

Avoid hazardous material used on package and printing which could poison humans or other living organisms. When delivering products with printed packaging, it is necessary to verify that the packaging materials or printed paper products (e.g., manuals, labels, instructions, etc.) do not contain ink with certain mineral oils. (MOSH/ MOAH)

6.2.7 Technical Cleanliness Requirements of Packaging Materials

The requirements regarding technical cleanliness have to be considered:

The packaging materials that directly contact or surround the component/part have to conform to the cleanliness specification of the part mentioned in the drawing or specification of the part regarding maximum size of the particles.

Additionally, technical cleanliness requirements can arise from conditions of manufacturing (e.g., clean room). If technical cleanliness requirements arise from the part or manufacturing for the returnable packaging component, it will be cleaned every loop/circulation.

The respective cleanliness requirements have to be arranged bilaterally between the supplier and receiving CA plant within the Packaging Specification Data Sheets (**TST N098 01.01 000**).

6.2.8 Identification of Boxes/ Bins/ Pallets/ Covers/ Lids

As followed used summary term of boxes, bins, pallets, covers and lids is “packaging”.

Apart from the identification of the packaging with information for the boxes management, the actual packaging or their components may be marked with special labels (created by Continental) or signs (boxes ID).

The identification or ident barcodes of the packaging shall not be damaged or taped up.

The CA norm TST N098 00 03 000 “Requirements on Marking of Goods” has to be considered, too.

For all returnable packaging an identification number should be printed on two opposite sides. For CA owned packaging the SAP 98.-part-number should be printed or punched.

Each ESD protection packaging must be marked with the appropriate ESD-Symbol based on IEC 61340-5-3.
Two ESD-Symbols should be printed of two opposite sides of the “packaging”.

All ESD-packaging must be clearly marked as ESD-compliant packaging so that everyone can distinguish ESD packaging from non-ESD packaging anytime easily by eyes without measuring packaging:

- All ESD-packaging should be in material color “black”.
- All other non-ESD materials should be in material color of “basalt grey”, “blue” or “grey”.

Each packaging material shall be appropriately identified with the material type. The recycling symbols (**alphanumerical coding**) shall appear (printed, engraved or punched) on **every** packaging material, e.g., symbols for plastics PET, HDPE, PP. The implementation of the European commission decision 97/129/EC for all used packaging materials is **mandatory worldwide**.

(see more details in chapter 7. “Legal & Environmental Requirements for Packaging Materials”)

6.2.9 Requirements on Marking of Goods

The correct identification of goods in accordance with standard procedures helps to avoid unnecessary additional cost. The main requirements of Continental Automotive concerning the identification of goods by suppliers are laid down in the CA norm **TST N098 00 03 000 “Requirements on Marking of Goods”.**

This CA norm defines the requirements for the MAT-Label, 2D-Label (synonym PDF417-Label) and VDA-Label of small packaging units and loading units for plants within the Continental Automotive Group and has to be considered.

6.2.10 Packaging of Electronic Components for Automatic Handling

Electronic components, particularly Surface Mount Device (SMD) roll material packaged in tape and reel, stick magazines, matrix trays or bulk case packaging are crucial elements in our manufacturing processes.

The packaging of components for automatic handling must follow internationally recognized standards such as those established by the International Electrotechnical Commission (IEC):

IEC 60286: Packaging of components for automatic handling

- IEC 60286-1: Tape packaging of components with axial leads on continuous tapes
- IEC 60286-2: Tape packaging of components with unidirectional leads on continuous tapes
- IEC 60286-3: Packaging of surface mount components on continuous tapes
- IEC 60286-4: Stick magazines for electronic components encapsulated in packages of different forms
- IEC 60286-5: Matrix trays
- IEC 60286-6: Bulk case packaging for surface mounting components

If packaging of components for automatic handling is required, the packaging of SMD roll material is governed by established international standards and is not within the direct purview of the Packaging Engineering department. Responsibility for developing any specific packaging solutions with manufacturers for SMD components should be agreed upon by each plant.

Each plant should agree upon and document specific responsibilities regarding the handling and packaging of electronic components.

7 LEGAL & ENVIRONMENTAL REQUIREMENTS FOR PACKAGING MATERIALS

[03]

Legal requirements

The supplier is obliged to deliver the contract products in accordance with the agreed packaging specification and all applicable legal regulations and to comply with all safety, environmental and legal requirements.
The supplier is obliged to inform himself about the emerging new laws and regulations (global, regional and country-specific), to always comply with them and to implement them in relation to the packaging concepts. If necessary, agreed packaging concepts must be adapted to the legal requirements, whereby each change requires the written approval of the recipient company.

Environmental requirements

Environmental and sustainability requirements are closely linked and often mutually dependent. Both concepts aim to minimize the negative impacts of human activities on the environment while taking social and economic aspects into account.

- Environmental requirements focus mainly on the protection and conservation of natural resources and ecosystems. These include measures to reduce pollution, protect biodiversity and use resources sustainably.
- Sustainability requirements cover a broader spectrum, taking into account not only ecological but also social and economic dimensions.

7.1 Green Packaging Criteria

Legal regulations lead to tightening of packaging laws or restriction of different fuel types. Coupled with Continental Automotive's environmental and sustainability corporate goals and ambitions to produce emission-free by 2050 at the latest, "**Green Packaging Criteria**" are defined which plays a fundamental basis to achieve our sustainable packaging goal.

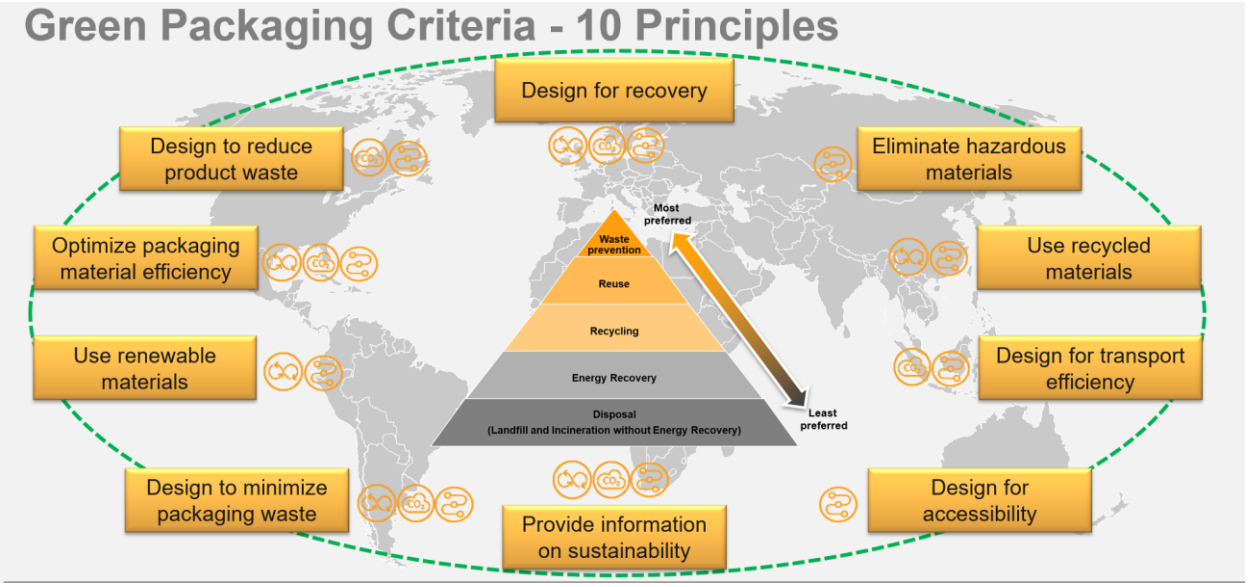


Figure 7.1: "Green Packaging Criteria"- 10 Principles

The “Green Packaging Criteria” consist of **10 principles** considering the life cycle of package materials:

1. Design for recovery
2. Optimize packaging material efficiency
3. Design to reduce product waste
4. Eliminate hazardous materials
5. Use recycled materials
6. Use renewable materials
7. Design to minimize packaging waste
8. Design for transport efficiency
9. Design for accessibility
10. Provide information on sustainability

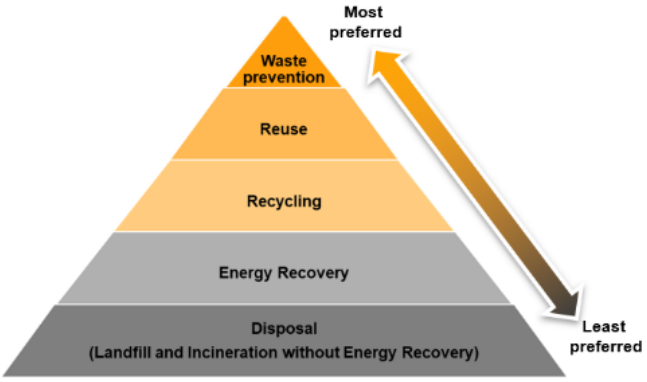
For each principle 2 levels are defined:
One is the mandatory requirement that the CA plants and our suppliers must take actions right now.
The second level is the aspiration we want to go in future.

The definition of each principle as well as criteria for "Requirement" and "Aspiration" level are explained in the next subchapters.

7.1.1 Design for recovery

The aim is to achieve the highest potential environmental value by following the waste hierarchy:
From reduction to reuse the material recycled back into packaging product. **Avoidance or reduction** achieves the highest value, followed by **reuse**, material **recycling** and energy recovery. Reuse is encouraged prior to recovery when there is evidence that it extends the packaging’s life and achieves positive sustainability outcomes.

Any packaging material that cannot be reused or recycled must be disposed in compliance with national legislation.



The general packaging approach is shown in this pyramid.

All CA plants and our suppliers should aim to minimize environmental footprint (like CO2 Emission, Carbon Neutrality), reduce waste, support high value material recycling and use of recycled materials.

It is important for CA to improve and harmonize continually the packaging material in cooperation with our suppliers. Whenever a supplier identifies an opportunity for improvement to reduce and avoid packaging material, this must be brought to the attention of the recipient CA plant.

Level	Criteria
Requirement **(mandatory)**	• Preferably use material that consists of 1 material (mono-materials) and lightweight materials where possible and materials that are easy to separate • Minimize colors or select preferred colors • Ensure compatibility of closures and labels for Recycling • Incorporate recycled content • Include labelling for recyclability

	• Use returnable solution whenever possible and useful considering economic impact. Use returnable packaging and base this decision on life cycle factors. Always consider opportunities to re-use packaging materials that were previously considered expendable (wood, cardboard, plastic dunnage…). When building business cases for packaging design and logistics, include a total enterprise financial scope that considers all corporate goals and strategies including the environment. • The primary, secondary and tertiary packaging cannot be: composite and packaging combining different materials, multilayer packaging (plastic/paper, plastic/aluminum. • Choose materials which are recyclable and bring up to life cycle assessment as well as circular economy. • The recyclability and sustainability aspects should be considered for each packaging material and projects. • Avoid using one-way plastic packaging, when possible, especially different types of plastic foams since they are very difficult to recycle.
Aspiration	• All stakeholders are required to review all their packaging against this Principle and ensure that they have a strategy to meet the target for 100% of packaging to be reusable, recyclable, or even compostable (e.g. stretch foil). • Reduce Impact of CO2 emissions by considering the CO2 equivalent of a packaging concept together with the packaging cost (priority is to reduce and reuse packaging materials which will reduce impact of CO2 emissions).

7.1.2 Optimize packaging material efficiency

Material efficiency aims to reduce material consumption and associated environmental impact in the packaging lifecycle by optimizing the volume and weight of packaging to reduce the impact of CO2 emissions.

Level	Criteria
Requirement **(mandatory)**	• Use as much packaging material as necessary and as less as possible, as thin as possible. • CA plants and suppliers continuously have to improve and harmonize the efficient usage of the packaging material. • Optimizing the volume and weight of packaging Optimize the volume and weight of packaging by reducing it to the minimum necessary to maintain the required level of safety. • Reduce impact of CO2 emissions (it's not about exact figures or numbers, just a consequence of optimizing packaging concept, e.g., optimizing the volume and weight of packaging will reduce CO2 emission) • Use of mono and lightweight materials where possible • The amount of tape used should be kept to a minimum while still doing the job effectively 
Aspiration	• Establish knowledge sharing and best practice from other plants & collaborative packaging optimization. • High efficiency of packaging material usage • Knowledge of CO2 equivalent calculation of the packaging concept using LCA

Finding the optimal packaging level is crucial:

Under-packaging can lead to damaged components and waste, as insufficient protection results in parts being harmed during transit. This damage incurs high replacement and repair costs and contributes to environmental waste due to the disposal of damaged parts.

Conversely, **over-packaging**, where excessive material is used, increases costs, and causes operational delays due to the complexity of handling larger volumes. Additionally, over-packaging has a significant environmental impact, as the production, transportation, and disposal of excessive packaging materials contribute to resource depletion and pollution.

Achieving the optimal packaging level in the automotive sector involves preventing both under-packaging and over-packaging. This balance ensures the protection of materials, operational efficiency, and reduced environmental impact, leading to cost-effective and eco-friendly supply chain management.

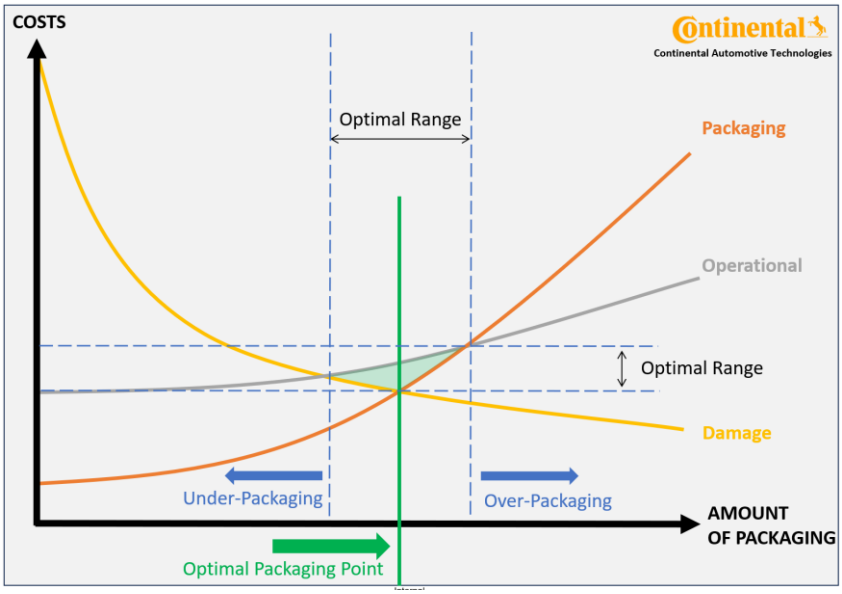


Figure 7.1.2: Optimal packaging level

7.1.3 Design to reduce product waste

Design packaging to avoid damaged goods by using as less packaging material as possible to save all kinds of resources and reduce the impact of CO2 emissions.

Level	Criteria
Requirement **(mandatory)**	• Design packaging strong enough to avoid damaged goods and use as less packaging materials as possible. • Reduce impact of CO2 emissions (Avoid replacement or delivery of products caused by weak packaging). 
Aspiration	• Establish knowledge sharing and best practice from other plants & collaborative packaging optimization. • No damages at all from suppliers

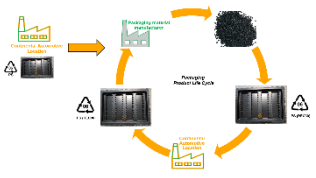
7.1.4 Eliminate hazardous materials

The aim is to avoid using hazardous substances that could be toxic to humans or other living organisms. Organizations should consider their common law liabilities, assess packaging for potentially hazardous substances that are likely to pose risk, and endeavor to reduce that risk accordingly.

Level	Criteria
Requirement **(mandatory)**	• Avoiding hazardous material using on package and printing which could poison humans or other living organisms, including flammable and explosive material • If delivery to specific country with law regulation for MOSH/MOAH material, follow the regulations. • Avoid using color as visual aid. • In case of virgin raw material: Unless specified or agreed otherwise all virgin expendable plastic should be clear rather than colored.
Aspiration	• Avoiding use material when disposal cause ozone depleting, or contribute to climate change, follow up below standard on applying hazardous material in package. heavy metals (Pb, Cd, Hg, Cr, VI) <=100 ppm Bisphenol A, plasticizers, Phthalates， PAEs (Phthalate acid esters) <= 100ppm, PFAS <=0 • Regulation for MOSH/MOAH materials should be considered globally (if this does not result in an increase in costs)

7.1.5 Use recycled materials

The aim is to optimize the amount of recycled content in packaging, considering technical feasibility, customer / Continental plant acceptability, regulatory, requirements (e.g. law / legal regulations, safety, regulatory) etc. The amount of recycled material needs to be expressed as a percentage of the quantity of packaging material and officially documented.

Level	Criteria
Requirement **(mandatory)**	• Have knowledge about available recycled materials, uses/advantages, and risks/disadvantages of the recycled material. Also, suppliers and sources of recycled material are known and can be sourced whenever needed and possible • Check the feasibility of using recycled material in alignment with the given packaging requirements from the plant and the part quality • Offer & drawing and the PSDS must include material information including recycled content • Use materials according to chap. “Approved Materials and Not Approved Materials” • Legal provisions and country-specific requirements (e.g. EU Plastic Tax) must always be taken into account and specifications must be complied with
Aspiration	• Increase the ratio of recycled materials whenever possible but the product quality won’t be worse and total cost won’t be higher considering plastic tax in specific countries • Using recycled materials will contribute to Circular Economy of corporate ambitions. 

7.1.6 Use renewable materials

The aim is to support a circular economy for packaging by optimizing the proportion of material that are renewable. All material selections should be based on sound science and a whole-of-life cycle approach.

What we understand about "renewable" : Material that is composed of biomass from a living source and that can be continually replenished. Renewable materials include paper and cardboard from sustainably grown wood fiber, or a biopolymer from a sustainable source.

Renewable materials are likely to have a lower environmental impact than those generated by the extraction and processing of non-renewable materials.

Level	Criteria
Requirement **(mandatory)**	• In case expendable package material is necessary, renewable materials must be first choice. Grown using sustainable farming and forestry practices, to have a lower environmental impact, using packaging materials made of wood-fibers material like paper, cardboard or wood • Reduce demand for non-renewable virgin materials including metals and most plastics, to minimize these components within packaging components and concepts
Aspiration	• Always check for renewable alternatives before packaging products made from plastic or other fossil-based materials • Use renewable materials that have been certified as being from responsible sources, e.g., by Forest Stewardship Council (FSC) • Choosing materials that are renewable as well as recyclable (such as cardboard) will ease the strain on the earth's finite resources • Review and make an assessment on current packaging concept to improve packaging to renewable materials if possible and with no cost impact • In case plastic material is necessary, use recycled materials instead of virgin materials • Use mono materials instead of composite materials, and taking into account that the technical characteristics are guaranteed 

7.1.7 Design to minimize packaging waste

The aim is to reduce and minimize materials used for packaging Minimize the use of packaging materials, improve the space occupancy rate of packaging, and avoid excessive packaging.

The key is to create sturdy packaging to protect the shipped goods while reducing material consumption at the same time.

Level	Criteria
Requirement **(mandatory)**	• Generally, parts must be packaged such that the use of packaging material is kept to a minimum while adequately protecting the part • Auxiliary materials, e.g., bubble foams, plastic bags etc. should be avoided. If necessary, should be reduced as much as possible • For returnable packaging, choose box from standard packaging catalog • For expendable corrugated cardboard packaging, choose appropriate gram weight and flute • Choose materials which are recyclable and bring up to life cycle assessment as well as circular economy. • Reduce waste and increase the proportion of recycled materials • Use of expanding polyurethane foam in packaging should be avoided, especially when formed within plastic bags. This package material presents a significant challenge for recycling and reuse. 
Aspiration	• Review and make an assessment on current packaging concept to improve packaging • Establish knowledge sharing and best practice from other plants & collaborative packaging optimization • Reduce impact of CO2 emissions by considering the CO2 equivalent of a packaging concept together with the packaging cost.

7.1.8 Design for transport efficiency

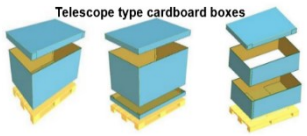
Packaging should be designed to maximize the efficiency of transport through light weighting, fully utilizing shipping space. More efficient distribution, e.g., packaging density can result in significant savings in energy, CO2 emissions, packaging material and transport costs.

Level	Criteria
Requirement **(mandatory)**	• Loading unit height meet: Static stacking 1+2 more, dynamic stacking 1+1 more • Optimizing loading unit length and width, take full advantage of inner space of truck and container • Empty package can be foldable to reduce return freight cost • Use 4-way-free-entry block pallet to increase transport efficiency. • Reduce the impact of CO2 emissions by improving transport efficiency. • Continuous improvement on current packaging concepts and consider for all new project, to increase packaging density. 

Aspiration	• Using new packaging material lighter and more strength to increase packing density • Review and make an assessment on current packaging concept to improve packaging

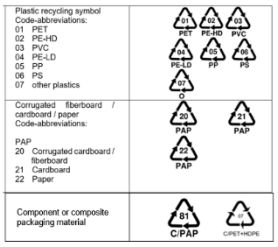
7.1.9 Design for accessibility

The aim is for packaging to be accessible. It must be designed to be easy to open and functional packaging for health and safety issues. In addition, it will reduce material used for packaging.

Level	Criteria
Requirement **(mandatory)**	• Choose kind of construction for corrugated box e.g., Fefco 0310, 0312 which could be open easily without additional tapes or usage of auxiliaries, e.g. knives and scissors etc. in the condition that no additional cost impact • Reduce or avoid expendable materials usage, e.g.. bags or tapes to be easier to access. 
Aspiration	• Review and make an assessment on current packaging concept to improve packaging

7.1.10 Provide information on sustainability

The aim is to provide clear information or advice about any claims made about appropriate disposal or environmental attributes of the packaging (e.g., recycled content, alphanumeric identification code and sustainable sourcing of materials) on the packaging or packaged product.

Level	Criteria
Requirement **(mandatory)**	• Each packaging material must be granted with a code and an abbreviation, to allow an identification of the packaging materials with a view to facilitate the collection, reuse, recovery including recycling (According to the decision 97/129/EC of the European commission) • The alphanumerical coding shall appear (printed engrave or punched) on every package (inner and outer packaging materials; primary, secondary, and tertiary packaging). That means, this coding must be indicated for all manually separable packaging components. • If we have shipments delivery to specific countries based on law regulations, the recycling code must be implemented also in existed packaging. • The identification of all packaging materials is requirement globally for B2B and B2C packaging 
Aspiration	• All packaging material are clearly marked for and support the waste management. • Less CO2 emissions due to better recycling process

7.2 Recycling and Identification of Packaging Material

Legislative authority in every region of the world have enacted legislation to encourage the recycling of all packaging materials. Although there is no consistent set of rules, suppliers who place packaging on the market shall comply with regional or national regulations for marking of packaging materials.

All suppliers and CA plants are obligated to use recyclable packaging materials whenever possible, and under consideration of all necessary quality requirements. The purpose is to increase the recycling recovery quota.

At European level, a marking and identification system is provided for in Directive 1994/62/EC of the European Parliament and (EU) Directive 2018/852 “on packaging and packaging waste”. In elaboration of this provision decision 97/129/EC of the European commission appeared regarding the identification system for packaging. In this decision, each packaging material is assigned a code and an abbreviation to enable identification of the packaging material and thus facilitate collection, reuse, recovery including recycling.

CA has set itself the goal of contributing to better recycling and improved waste sorting. In order to facilitate the recycling of a packaging and waste management activities, identification must be known on each packaging material. Therefore, each packaging material shall be appropriately identified with the material type.

The implementation of the European commission 97/129/EC for the identification of all packaging materials used for and at CA is mandatory globally for B2B and B2C packaging.

A distinction should be made here between the universal recycling symbols (symbol to be applied voluntarily) and the alphanumeric codes prescribed by the decision 97/129/EC (mandatory). The abbreviations of the proposed polymer names are prescribed in the technical standard UNI EN 1043-1.

7.2.1 Universal Recycling Symbol

Below are the internationally recognized symbols for recycling activities, where at its naming might vary in different countries. The logo depicted is a Möbius strip. Many variations of the logo have been emerged since its creation. The universal Recycling symbol, same as the RESY logo, are no longer sufficient for individual labeling and identification of the packaging.

Universal recycling symbols (**voluntarily**)	**Recycling symbol** This is a well-known, established and widely used eco-label. It is a voluntary label. This eco-label is not linked to a specific quality of the product. It symbolizes only the recyclability of the packaging. It is used to identify various materials for return to the recycling cycle.	
	RESY This eco-label symbolizes the complete disposal and material recycling of all transport and outer packaging made of paper and cardboard marked with the RESY symbol. The RESY sign is not part of the mandatory environmental labeling information. Therefore, it can be added voluntarily.	

7.2.2 Alphanumeric Coding System

Each Packaging material shall be appropriately identified with the material type.
The alphanumerical coding shall appear (printed, engrave or punched) on **every** packaging material (inner and outer packaging materials; primary, secondary and tertiary packaging, e.g., symbols for plastics PET, HDPE, PP). That means, this coding must be indicated for all manually separable packaging components, i.e., for all packaging materials that have been designed to be separated with the sole use of the hands and in a safe way for the final consumer. It is **mandatory**!

7.2.2.1 Identification of Virgin Packaging Material

Below are the abbreviation digit codes according to decision 97/129/EC and DIN 6120 for virgin packaging materials made of plastics and corrugated fiberboard / cardboard / paper, which are absolutely necessary for the identification of these materials (e.g., printed, engraved or punched):

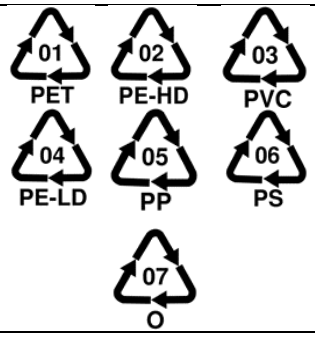
Virgin material (Prescribed by the decision 97/129/EC) (**mandatory globally**)	Plastic recycling symbol Code-abbreviations: 01 PET 02 PE-HD 03 PVC 04 PE-LD 05 PP 06 PS 07 other plastics	
	Corrugated fiberboard / cardboard / paper Code-abbreviations: PAP 20 Corrugated cardboard / fiberboard 21 Cardboard 22 Paper	

Figure 7.2.2.1-1: Abbreviation digit codes according to decision 97/129/EC and DIN 6120

7.2.2.2 Identification of the Component or Composite Packaging Materials

Packaging materials are defined as ‘composite’ or ‘component’ materials when they “consist of different materials which cannot be separated by hand” and according to the raw material content, the packaging material has to be marked with the environmental code.

The use of component packaging should be avoided as much as possible. If it cannot be avoided, the component material must also be marked accordingly (according to decision 97/129/EC and DIN 6120). The order of the component identification is based on the percentage by mass of the materials present, with the major component of the composite being listed first. E.g.:

Component or composite packaging material (Prescribed by the decision 97/129/EC; EN ISO 1043-1, DIN 6120, UNI EN 11469) (**mandatory globally**)	Decision 97/129/EC [ANNEX VII] provides for different numbering according to the combination of materials. This numbering must then be accompanied by the following abbreviation: "C/ abbreviation corresponding to the predominant material", whereby dominant it is meant the material prevailing by weight. For example, a packaging composed of paper and plastic, with paper as the predominant material by weight, must bear the alphanumeric code C/PAP 81	
	Also, Plastic packaging structurally composed of two or more polymers are identified by code "7", since Decision 97/129/EC does not provide specific codes for these materials. To obtain more detailed information on the composition of multilayer plastic packaging, it is advisable to follow the provisions of the technical standard UNI EN 11469, according to which the abbreviations of polymers composing the packaging are written between the symbols ">" and "<", with the sign "+" placed in between. For example, a multilayer packaging made up of PET and HDPE may be identified as follows: >PET+HDPE< 07 or >PET1+HDPE2< 07	

7.2.2.3 Identification and Recyclate Content of Packaging Material

Efforts to reduce the impact on the environment are also increasingly moving towards adding more and more recycled material to the new goods or making the products entirely from recycled material. We at CA are also striving to increase the proportion of recyclates in packaging material.

The DIN 6120 and ISO 1043-1 already refers to the possibility of coding the use of recycled material. The abbreviated term for the plastic type may be supplemented by the designation "(REC)". If the percentage of recycled material is known, the designation (REC) as well as the minimum fraction of recycled material may be given as percentage by mass in brackets after the final letter of the abbreviated term for the plastic type, e.g., for a minimum of 30 % recycled material the designation would read "(REC30)".

Recyclate content at packaging material (Acc. to DIN 6120 and EN ISO 1043-1) (**mandatory globally**)	e.g.: Poly(ethylene terephthalate) material resulting from the recycling of PET with 30 % recycled material = PET(REC30)	

Important note:
In view of the upcoming demand for the Plastic Tax in European countries, the coding of packaging with recycled content is essential and helps to control the disposal process and to calculate the charges for the Plastic Tax correctly.

! The supplier is obligated to be able to provide information about the composition of the packaging materials used. At Continental's request, the supplier is obliged to provide information about the plastic materials, the respective recycled content (%) and the associated packaging weights (kg).
(DIN EN ISO 14021:201-10, 7.8 Recycled content)

7.2.3 Technical Requirements of the Marking

- The number of the coding must be placed in the middle of the triangle.
- The letter sign of the code must be placed under of the triangle.
- The marking must be affixed to the outside of the package in a place and size clearly visible to the naked eye.
- All methods which are available for the marking are applicable. Printing, labelling, stamping, needling, prickling, thermoforming, injection molding.
  Exception: In case of aftermarket / after-sales packaging, the prickling or needling is not allowed.
- In case of label method, the raw material of the label must be the same as the material of the packaging unit.
- In case of stamp method, use water-based, environmental-friendly ink.
- The environmental sign must be marked on the drawing of the packaging unit.
- The part number change of the packaging unit is not necessary because of this added marking. (CA internally)
- The marking method must be defined and included in the quotation.

With these internationally understandable and generally recognized environmental recycling symbols, you send a clear signal for simple sorting and support the circular economy.

See also official CA Letter for Suppliers: “Recycling symbol on the packaging - Guideline for the suppliers” at Continental Automotive - Supply Chain Standards & Manuals @ Continental Automotive (continental-automotive.com) -> (at the Internet homepage in the chapter “Packaging”)

The non-application of these symbols leads to additional expenses for waste disposal and sorting as well as to increased disposal costs.
Continental reserves the right to charge the supplier for these additional costs in the event of non-compliance.

7.2.4 FSC Coding

The **F**orest **S**tewardship **C**ouncil A. C. (**FSC**) promotes responsible management of the world's forests, via timber certification. (Source: https://en.wikipedia.org/wiki/Forest_Stewardship_Council).
FSC's open and transparent standards include safeguards to ensure stakeholders throughout the forest supply chain adhere to principles that protect healthy and resilient forests forever for all.

Use of the FSC logo means, that the product is responsibly sourced, environmentally responsible, socially beneficial, and economically viable. By using the FSC seal, the manufacturer confirms that it supports responsible forestry.

Continental would also like to support this responsible management of the forests and demands FSC®-certified packaging, wherever possible.

3 labels, 1 mission		
FSC 100%	**FSC Recycled**	**FSC Mix**
		
All materials used come from responsibly managed, FSC-certified forests. Products with the FSC 100% label contribute most directly to our mission to ensure thriving forests for all.	The product is made from 100% recycled materials. Using recycled material makes the most of precious forest resources and reduces the pressure to harvest more trees.	The product is made with a mixture of materials from FSC-certified forests, recycled materials, and/or FSC-controlled wood. While controlled wood doesn't come from FSC-certified forests, it mitigates the risk of the material originating from unacceptable sources.

7.3 REACh - Regulation / SVHC (Substance of Very High Concern)

[03]

The supplier has to fulfill all requirements according to packaging directives 94/62/EC and (EU) 2018/852 “on packaging and packaging waste”

REACh is the acronym for **R**egistration, **E**valuation and **A**uthorisation of **Ch**emicals.
Under REACh, all chemicals which are produced, placed on the market and used in the EU must be examined in detail and must be registered at the **E**uropean **Ch**emicals **A**gency (ECHA) in Helsinki.

Packaging materials belongs to/ are part of the REACh regulation.

REACh-regulation / SVHC (Substance of Very High Concern):
It is not allowed to use packaging materials containing substances listed in Annex XIV of REACh-regulation or SVHC (Substance of Very High Concern). If the proportion by weight of an SVHC substance exceeds the limit value of 0.1% in the packaging per substance and in relation to the total weight, the supplier must find a substitution immediately and is obliged to inform the customer quality manager immediately in written form about the name of the substance. In the event of substitution, the supplier must always provide an updated safety data sheet.

If none of the packaging contains an SVHC substance or if the proportion of the listed SVHC substances in the product is less than 0.1 percent by weight, a declaration that the stated quota of 0.1% will not be exceeded is sufficient.

Further important information, helpful links:

- European Chemicals Agency (ECHA)
  http://echa.europa.eu/
  https://echa.europa.eu/regulations/reach/understanding-reach

- REACH-helpdesk of CEFIC (European association of chemical manufacturers)
  http://www.cefic.org/Industry-support/Implementing-reach

- Official Guidance Documents for implementation of REACh
  http://echa.europa.eu/support/guidance

- Please note that the lists, which will be updated regularly by the European Union!
  REACh Candidate List: https://echa.europa.eu/candidate-list-table
  REACh Authorization List (Annex XIV): https://echa.europa.eu/authorisation-list
  REACh Restriction List (Annex XVII): https://echa.europa.eu/substances-restricted-under-reach

All suppliers must comply with all relevant EU Regulations including REACH (EC 1907/2006), with particular emphasis on the Obligations under Article 33, “Duty to communicate information on substances in articles.” Please note that the lists according to Art. 59 Para. 1 and Annex XIV of the REACH Regulation are constantly updated. Supplier is obliged to inform itself about the upcoming REACh updates and to notify Continental immediately in case of non-compliance.

Suppliers are required on request to provide safety related documentation, test certificates or other REACh certification documents.

7.4 Approved Materials and Not Approved Materials

[03]

Material		Approved Materials	Not Approved Materials	Environmental rating 1 = best 6 = worst
Composites	General		Composite materials have to be avoided in general or require the separate approval of the particular receiving plant.	6
Plastics	Expendable [EX] Returnable [RE]	PE, PP, PS, PP-E, PS-E ABS, PE, PP, PS, PP-E, PE-E Each packaging material [EX and RE] must be marked in accordance to DIN 6120, EN ISO 1043-1 and Chapter 7.2 **Mandatory**: The abbreviation digit codes according to decision 97/129/EC must be printed visible on the outside of each packaging material. PVC only after explicit approval of receiving plant	PUR, PS-E - Chips	3
	Foams: Expendable Returnable	 PE PE, PP, PS		4
	Expanded polystyrene (Styrofoam, PS-E)	Only molded parts and only with explicit approval of receiving plant Identification acc. to chapter 7.2	Avoid stickers and adhesive tape made of non-environmentally friendly materials	5
	Shrink and stretch wrapping	Only after explicit approval of receiving plant! Please see also chapter 6.1.3 Only PE with material identification based on DIN 6120, EN ISO 1043-1 and acc. to chapter 7.2.	Adhesive tape, stickers or bags made of composites or non-environmentally friendly materials	4 2
	Bags and sacks made of foil	Only PE with material identification based on DIN 6120, EN ISO 1043-1 and acc. to chapter 7.2 Stickers and adhesive tape made from the same materials	Other lettering shall not exceed 3% of the foil surface. Stickers, adhesive tape and lettering made non-environmentally friendly materials	2 2

Material		Approved Materials	Not Approved Materials	Environmental rating 1 = best 6 = worst
Paper and Cardboard	General	Must be free of paper production damaging substances and has to be marked (acc. to chapter 7.2) Mandatory: The abbreviation digit codes according to decision 97/129/EC must be printed visible on the outside of each carton boxes.	Coatings or adhesives that are not water soluble, e.g., wax, paraffin, bitumen, and oil paper or impregnated papers and cardboard adhesive fabric tapes, plastic bags, fiberglass reinforced adhesive paper tapes, adhesive paper tapes	1
	Corrosion protection paper	For oil coated parts: VCI papers that are proven to be recycled with paper / cardboard. All kinds of papers have to be marked (acc. to chapter 7.2).		1
Strap	General	Polypropylene (PP) Polyester (PET) (= only with special approval of the receiving plant) See also: **TST N09805.01 000 "Expendable Packaging"**	Polyamide (PA) straps Steel straps are only admitted with heavy loads and require the explicit approval of the particular receiving plant!	3
Wire	General For attachment of labels, shipping bags etc.	Only with special approval of the receiving plant	Not permitted	5

Please consider for all packaging concepts the recyclability of the chosen materials, especially the recyclability of expendable (one-way) plastics. The following list helps when choosing the appropriate plastic material to leave a good ecological footprint and improve the recycling quota:

High sustainability (Mono-materials)	ABS PC PE PE-HD PE-LD PET PP PS	Acrylonitrile – Butadiene -Styrene Polycarbonate Polyethylene High density polyethylene Low density polyethylene Polyethylene terephthalate Polyethylene Polystyrene
Medium sustainability	PE-E PP-E PS-E	expanded Polyethylene, foamed expanded Polypropylene, foamed expanded Polystyrene, foamed
Low sustainability (Composite or component plastics)	ABS+TPU PUR-E PVC-P	Acrylonitrile-Butadiene-Styrene + Thermoplastic Polyurethane expanded Polyurethan Polyvinylchloride, plasticized

When choosing packaging materials for a suitable packaging concept, it is important to remember that **composite materials are fundamentally not recyclable**.

Non-recyclable materials, hazardous substances and material composites should not be used:

- Expanded materials (e.g., PEx) 

- Hybrid materials (e.g., PS-PE, PP-TPV, PP-TPU)

The following plastics are either not recyclable or contaminate the recyclates:

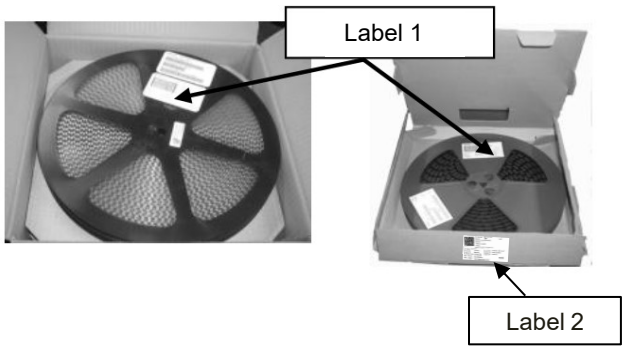
7.5 Waste-Management at the Supply Chain Management

- The selection of packaging material must be in a way that recycling is always possible.
- The selection of packaging material must ensure a meaningful separation.
- Visible marking of all packaging materials is a mandatory requirement. This marking has to be realized as alphanumeric coding according to the EU decision 97/129/EC.
- Reusable packaging material shall be used instead single use materials where possible

7.6 Improvement of the Recycling Rate

The use of mono-materials for packaging concepts is one important step, to improve the recycling rate at the end of the lifecycle of packaging materials.

The following examples illustrate the wise use of mono-materials and contribute to a small but decisive contribution to the reduction of environmental impact and the better recycling possibility:



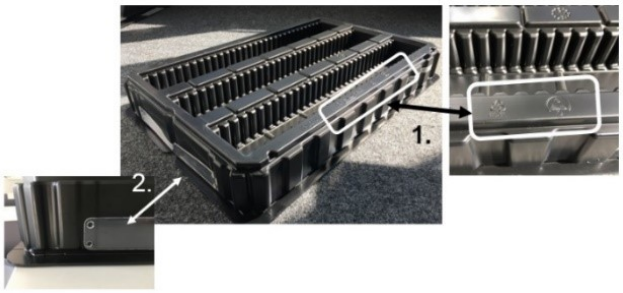
Reel in small cardboard box

Label 1:
The label 1 should consist of the same material as the reel

(reel = PS, then label = PS)

Label 2:
The label 2 should consists of the same material as the small box

(small box = cardboard or carton, then label = paper)



Expendable or returnable Trays
(e.g. PS-el returnable tray)

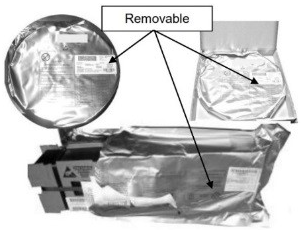
1. Marked with recycling symbols (acc. to DIN 6120), here PS and ESD symbol

2. Label-holder consists of PS and fixed with weld points.
   The label holder at the tray consists of the same material as the tray

   (Tray = PS, label holder = PS)

Inner bag
(e.g. PE)

The label on the inner bag should consist of the same material as the bag
(bag = PE, then label = PE)

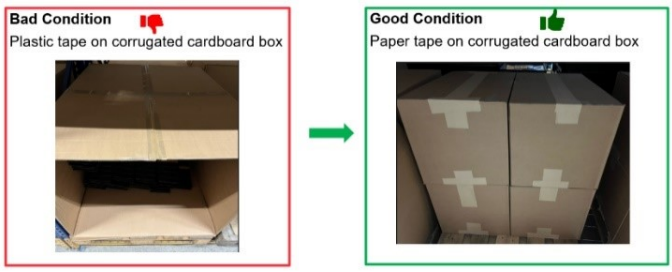


Component bag
(e.g., aluminum with plastic coating):

The label should be made of easily removable material.

Label outside of the LU
(corrugated cardboard box)

The LU label should consist of the same material as the cardboard box
(box = corrugated cardboard, then label = paper)



Correct usage of closure material of packaging

- Paper based packaging => Paper based tape
- Plastic based packaging => Plastic based tape

To be avoided: Use of plastic delivery note pockets on cardboard boxes!

Preferred: Use of paper delivery note pockets with self-adhesive backing with solvent-free glue (environmentally friendly)!

The packaging engineers/ experts of the supplier and the CA plant should take care of these requirements and implement them as far as possible in consideration of cost-effectiveness.

8 EXPENDABLE PACKAGING

Expendable (non-returnable) packaging is used once only and should be avoided where possible. If expendable packaging is preferred to returnable packaging for economic reasons, only packaging, auxiliary packaging and loading packaging approved by Continental may be used.

All such materials shall be environmentally compatible and recyclable and shall be marked with the alphanumerical codes (see chap “7.2 Recycling and Identification of Packaging Material”). These materials are defined in “Approved Materials”.

The maximum (1) / preferred (2) outer dimensions of expendable packaging shall be according to transportation mode:

Airfreight:

(1)	1200 x 1000 x 1000 mm
(2)	1140 x 790 x 460/ 750/ 1045 mm *
(2)	1140 x 980 x 460/ 750/ 1045 mm *

Sea-freight:

(1)+(2)	1140 x 980 x 460/ 750/ 1045 mm *
(2)	1140 x 790 x 460/ 750/ 1045 mm *

Truck:
Europe/Asia

(1)	1200 x 1000 x 1000 mm
(2)	1200 x 800 x 1000 mm
(2)	1140 x 790 x 460/ 750/ 1045 mm *
(2)	1140 x 980 x 460/ 750/ 1045 mm *

Americas

(1)	1220 x 1140 x 1200 mm (plant specific definition is possible)
(2)	1200 x 800 x 1000 mm

* **VDA – recommendation 4525**, detailed information is described also in **TST N098 05.01 000 “Expendable Packaging”.** The height could depend on height of inner packaging and should be the height of the loading unit including the height of pallet.

- Maximum height of all loading units should be plant specific (often maximum height is 1000 mm).
- No loading unit may exceed a gross weight of 1000 kg and packaging units shall be stackable – it is mandatory!
  Static stacking factor of minimum 3 (1+2) and
  Dynamic stacking factor of minimum 2 (1+1).
- It is not allowed to fix stacked loading units to each other. There is a high safety risk for the unloader if stacked pallets are fixed to each other.

- No manual handling unit may exceed a gross weight of 12 / 15 kg. The weight depends on plant and country-specific requirements.
- Continental plant specific demands/requirements are to be voted with the SCM department of the receiver’s plant directly.

- The dimensions stated above are outer contours. Such packages shall not have protruding labels or straps. Especially with cartons, care shall be taken to ensure dimensional stability and appropriately folded lids.

- The minimum thickness of a cardboard for overseas shipments is a quality of triple wall with water resistant gluing corrugated cardboard walls.

8.1 Accepted Expendable Pallets

Continental accepted expendable pallets with

- Construction: 4-way-free-entry block pallets with a minimum of 3 skids have to be used and
- Material: made of solid wooden pallet certified according to IPPC-Standard (ISPM no.15).

The 4-way-free-entry expendable block pallets with 3 skids are specified in special Continental Automotive norm:

- TST N098 00.04 000 “CA Packaging Standard Catalog”
- TST N098 02.01 001 “Container Optimized Wood Pallet L1108 and L1110” with dimension 1140x790x140 mm and 1140x980x140 mm.

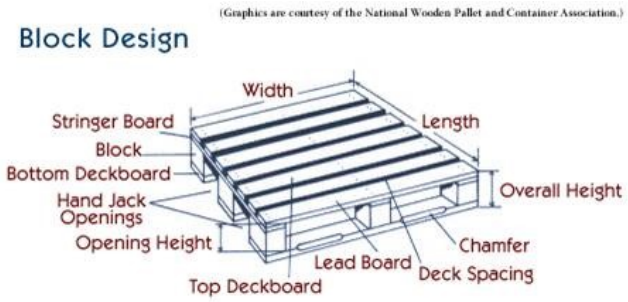


Figure 8.1-1: Definition of a 4-way-free-entry block pallet

Not accepted:

- Due to the increase of transport damages presswood pallets are not accepted! The presswood pallets don’t have a sufficient stability, so that they break easily. Furthermore, during stacking, they sink into the packaging unit below, caused by the high pressure due to the little area the feet of the pallet are standing on. Additionally, these pallets contaminate their immediate vicinity with splints.
- Plywood pallets only accepted as interims solution if problems with ISPM no15 certification occur during import process.
- Plastic pallets should be avoided. But if plant requires, then they have to be marked with recycling codes.

Not Accepted	Accepted
	e.g. for Europe and Asia  e.g for America  

Figure 8.1-2: Not accepted pallet and accepted 4-way-free-entry block pallet

8.2 Expendable Overseas Packaging Requirements

The requirements of the packaging gain in importance with the increase of overseas transportations. The transport claims are enormous during long transit times and distances across different countries and climate zones.

Due to these facts the packaging should be adapted to these climatic and mechanical claims, also to the transportation expenses.

The **TST N098 05.01 000 "Expendable Packaging"** is an extract of a specification worked out together with car manufacturers and 1-Tier-suppliers worldwide and summarizes the main points and characteristics of the new global standardized expendable packaging specification. Furthermore, it visualizes the main requirements and point out unacceptable and acceptable packaging conditions.

There are some basics to avoid packaging damages during the long overseas transports. The main requirements for an optimal overseas packaging are:

Pallet:

- Using of 4-way-free-entry block pallets (advisable for wood pallets: according to the IPPC-standard)
- To reduce the supply chain costs it should be a target to use loading unit dimension which are optimized to the sea-container dimensions like:

  1140 x 790 x 460/ 750/ 1045 mm *
  1140 x 980 x 460/ 750/ 1045 mm *

* **VDA – recommendation 4525**, detailed information is described also in **TST N098 05.01 000 "Expendable Packaging".** The height could depend on height of inner packaging and should be the height of the loading unit including the height of pallet.

Outer cardboard boxes:

- Use outer cardboard box glued with “wet strength glue/ water resistant glue”.
- For the outer cover layer “kraft liner” is necessary and for the inner cover layer it is advisable to use “kraft liner”.
- 3-flute version of the outer cardboard box is recommended!
- The quality requirements [breaking strength, BCT, ECT, thickness, puncture resistance, (wet) bursting strength] are mentioned in the **“TST N098 05.01 000 Expendable Packaging“**!

That means e.g.:
Flute sizes “A” = 4,0 to 4,9 mm height (h) mm and 8,0 to 9,5 mm pitch (t)
3-flute: Triple-wall corrugated fiberboard

Figure 8.2-1: Triple-wall corrugated fiberboard (left) and Flute dimension (right)

Inner cardboard boxes:

- In case of using small cartons, these should be packed inside an outer cardboard box.
- The small cartons should fill out the outer cardboard box from bottom to top in order to support outside stacking.
- Single small cartons at the top of a LU, which initiate a non stackability of the LU, are not permitted. In such cases the supplier should contact the part scheduler of Continental, to optimize the order quantity (demands) in accordance with a stackable packaging unit.

Loading Unit:

- The construction of the LU should be strong enough for a 2- till 3-times dynamical stackability (1+1 till 1+2 LU). Clear symbols printed on the LU, comprehensible for all nations and languages, are advantageous.
- Depending on the sensitivity of the parts, the use of VCI protection or a sufficient number of desiccant bags is recommended.

Securing devices:

- In general, no shrinking or stretching with plastic foil is allowed. Plant specific requirements should be voted by the SCM department of receiving plant. In general, only polypropylene (PP) or polyester (PET) straps are permitted!
- Load Securing devices in the sea container have to be realized by cargo airbags or treated (IPPC) wooden beams. The use of old wooden pallets as space-stuffing is not permitted. If necessary, container stuffing is settled by specialists.

Not Accepted	Accepted
	

Figure 8.2-2: Not accepted and accepted loading units (LU)

Some important and interesting information about load securing can also be found at the following internet-link: http://www.tis-gdv.de

8.3 Wood Packaging Material - IPPC

Packaging for delivery to several countries shall comply with the appropriate customs and quarantine regulations for wood and wooden packaging materials according to the IPPC-standard.

Pallets and crates shall be made from untreated, bark-free wood. Chipboard, plywood and similar wood-based materials shall not be used without prior approval by Continental. A declaration for non-wood packaging material is necessary for some countries.

The IPPC-Standard achieves international harmonization of phytosanitary measures, with the aim to facilitate trade and avoid the use of unjustifiable measures as barriers of trade. This International Plant Protection Convention (IPPC) distributes the guideline, which is published with the title „Guidelines for Regulating Wood Packaging Material in International Trade“ (ISPM No.15 = International Standard for Phytosanitary Measures).

The guideline has some extensions, and the essential points are:

- It is valid only for raw wood. Processed wood material and raw wood packaging with a thickness of less than 3mm are excepted.

- Treatment of the raw wood packaging according to the recognized measures, like:
  - HT Heat treatment with core temperature of 56°C for a minimum of 30minutes
  - MB Fumigation with methyl bromide (is not allowed anymore, by 2006, 1st September in some countries)
  - Boiler Pressure impregnate (currently mentioned but not accepted.)

- The marking is necessary with an accepted logo (according to the IPPC ISPM no.15, Annex 2). It should be well readable, durable and fixed at two opposite sides of the wood packaging. The printing order is given: country (if n.: state), registration-number of the producer and the kind of approved measure (treatment).

  The mark must not be hand drawn!

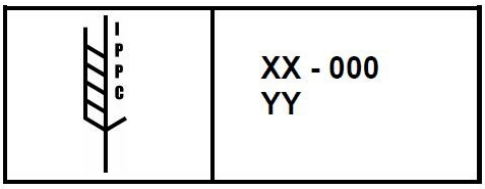


Figure 8.3-1: One example of marking at treated wooden packaging, IPPC-Symbol

- IPPC-Symbol: Fixed symbol according to ISPM no.15 Annex 2
- XX ISO- two letter country code followed by a unique number (Producer/ treatment provider code) assigned by the NPPO to the producer of wood packaging material or treatment provider.
- YY IPPC abbreviation (according to IPPC no.15, Annex 1) for the approved measured used (e.g., HT, MB, DB)
- HT heat treatment
- MB fumigation with methyl bromide
- DB debarked

The Plant Protection Certification is no longer in demand.

According to the extensions and updating of the import regulation for wood packaging material of different countries, please inform you also via Internet, e.g.:

- United States Department of Agriculture:
  http://www.aphis.usda.gov

- International Phytosanitary Portal (the official web site for the International Plant Protection Convention): https://www.ippc.int

  Frequently Asked Questions https://www.ippc.int/en/faq/#Standards

- Federal Research Centre for Cultivated Plants – Julius Kuehn Institute
  German Internet-page : Wood packaging material (see “Holzverpackungsmaterial”)

- Packaging wood – Non – EU-States, who implement the ISPM Standard No.15 (incl. Overview reference list of the states):
  https://pflanzengesundheit.julius-kuehn.de/index.php?menuid=48&reporeid=40

- Packaging wood – placing on the market in Germany and trading between the EU-States
  https://pflanzengesundheit.julius-kuehn.de/holzverpackungsmaterial-inverkehrbringen.html

- Packaging wood – Import from Non – EU-States
  https://pflanzengesundheit.julius-kuehn.de/holzverpackungsmaterial-einfuhr.html

- Packaging wood – Export from Non – EU-States
  https://pflanzengesundheit.julius-kuehn.de/holzverpackungsmaterial-ausfuhr.html

The requirements of the ISPM No.15 apply only to the import out of and/or export into countries outside of the European Union (EU).

The trade within Germany and between European Union states with the import and export of packaging wood doesn't belong to the ISPM No.15.

It is mandatory to use IPPC ISPM no15 conform pallets made of solid wood.
Alternative plastic pallets marked with recycling codes are allowed.

9 RETURNABLE PACKAGING

Returnable packaging is packaging material that may be used several times. Our environmental target is to use returnable packaging useful considering CO2 impact.
Procedures for determining requirements and for the use and purchase of returnable /reusable packaging are defined by the respective plant SCM in cooperation with the supplier, taking into account all relevant aspects, e.g., packaging costs, transport costs (return of empties), washing, etc..

9.1 Pallets Standard

It is the aim of Continental Automotive to introduce standard packaging material throughout the company, therefore also pallets.

- 4-way-free-entry block pallets with a minimum of 3 skids have to be used.
- CA standard returnable and expendable pallets are specified in the special CA norms:
  TST N098 00.04 000 "CA Packaging Standard Catalog"
  TST N098 02.02-000 "Plastic Pallets and Test Specification"

These CA norms must be considered for each packaging concept.

9.2 Small Load Carriers (KLT)

It is the aim of Continental to introduce standard packaging material throughout the company. For small production components, Continental uses VDA small load carrier [in accordance with VDA recommendations 4500 for RL-KLT and VDA 4504 for ESD RL-KLT].

Common terms for small load carrier are: SLC, "Kleinladungsträger" (KLT), totes, small boxes, …:
thereafter using the term "small load carrier" or "KLT".

In order to achieve its standardization objectives, the following small load carrier "RL-KLT" types shall be chosen depending on the characteristics of the products to be packed. Continental Automotive prefers the RL-KLT types (ESD – black and non ESD – blue) which can be found in our
TST N098 00.04 000 "CA Packaging Standard Catalog".

The modular RL-KLT system, restricted to these preferred small load carrier types at CA, is a major step towards box standardization and also takes environmental constraints into account in reducing the use of expendable packaging by component producers and suppliers in the automobile industry.

Where suppliers believe that the use of other KLT series boxes would represent an improvement (in terms of quantity or quality), the supplier may make an alternative proposal to Continental. The economics of all packaging concepts shall be reviewed prior to plant-specific approval.

9.2.1 Description of the Small Load Carriers (RL-KLT/ ESD RL-KLT)

- The small load carriers are of modular design, allowing the stacking of RL-KLT or ESD RL-KLT in one stack.
- The upper stacking edge of each small load carrier shall be left free in order to allow interlocking stacking.
- All RL-KLT / ESD RL-KLT have smooth base/bottoms and can only be used in column stacking.
- With the exception of RL-KLT 3147, all RL-KLT types (blue) are equipped with drainage holes at the smooth base/bottom. All ESD RL-KLT types (black) have no drainage holes.
- See also the VDA-recommendation 4500 and 4504!

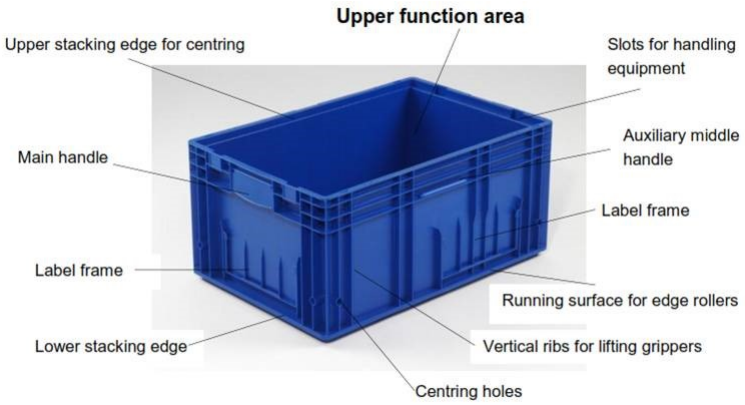


Figure 9.2.1-1: Description of the small load carriers (here RL-KLT 6280)

Figure 9.2.1-2: Description of the ESD-symbol position (here ESD RL-KLT 6080)

Figure 9.2.1-3: Description of the smooth base (RL-KLT and ESD RL-KLT)

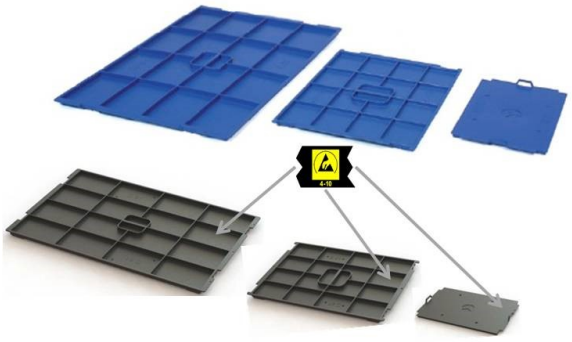


Figure 9.2.1-4: VDA KLT cover types (blue): D65, D45, D35 and VDA ESD KLT cover types (black): D61-ESD, D41-ESD, D31-ESD

9.2.2 Developments of Inner Packaging for RL-KLTs

According to the recommendations of VDA 4500 and 4504, tolerances are allowed in the manufacture of KLT, which affect the inner dimensions of the KLTs. These tolerances variations are very important for special developments of the inner packaging and must be considered for the accurately fitting of inner packaging (such as in automation trays). These variances are different from KLT to KLT type, depends on the tooling equipment (combi or single tooling) of the manufacturer and the age (release date) of the tooling. The tolerances variations can be found in the official VDA measurement scale drawing.

Due to the optimized RL-KLT internal dimensions and the lower internal manufacturing tolerances (done by VDA, since 01.01.2010), it would be important to know on which tooling the manufacturers have used for the KLT production. Since that is not always easy to find out and a mixing of the old and new generation can't be ruled out, Continental Automotive recommends the use tolerance values of the measurement scale drawing of the new RL-KLT.
That means the new measurement schedule (manufacturer's tool-produce number from R0149 and higher) within all RL-KLT-drawings, should be used for developments of inner packaging materials.

It is furthermore important to order and use only RL-KLTs from manufacturers that are officially certified and approved by the VDA.

9.2.3 General Requirements for Delivery of Small Load Carriers

- Full loading units and layers shall be formed always!
- If a stackable layer cannot be formed, the supplier should obtain an agreement with the Continental purchasing and receiving plant (SCM department) to optimize the quantity of the parts per small load carrier and per loading unit (LU).
- The use of empty small load carrier to fill up a layer is necessary until optimized order quantities are agreed with the Continental part scheduler.
- For mixed load each Continental receiving plant must approve. Different loading heights on the same pallet are not allowed.
- The 4-way-free-entry block-pallet must have a minimum of 3 skids (min. width of skids 90mm) and should preferably be a returnable pallet with circulated safety border.
- The small load carriers shall be positioned flush with the edges of the pallet.
- Minimum two plastic straps shall be run around the entire LU. To prevent damage, plastic straps shall not be run around pallets without covers.
- Each loading unit should be protected by a stackable plastic cover.

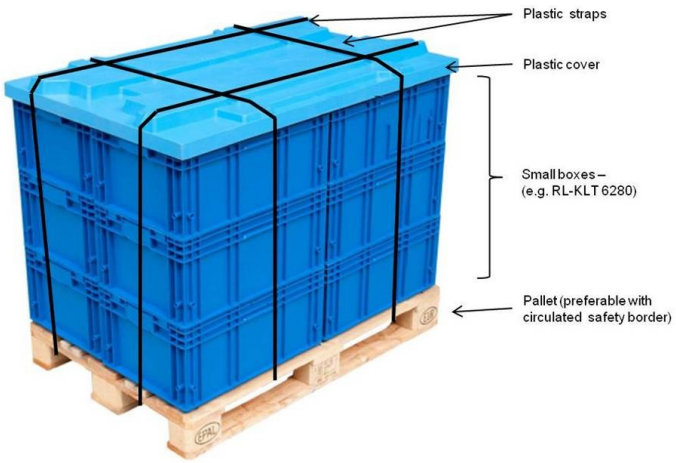


Figure 9.2.3-1: Necessary components of a LU with RL-KLTs

- Steel straps are not allowed.
- Each small load carrier shall be legibly marked.
- Special marking is required for mixed pallets.
- The loading unit shall not be shrunk or stretched.
- Individual small load carriers shipped without pallets shall be closed using an appropriate small box- cover and fastened using a plastic tape. The cover shall not be fastened in place using an adhesive tape.

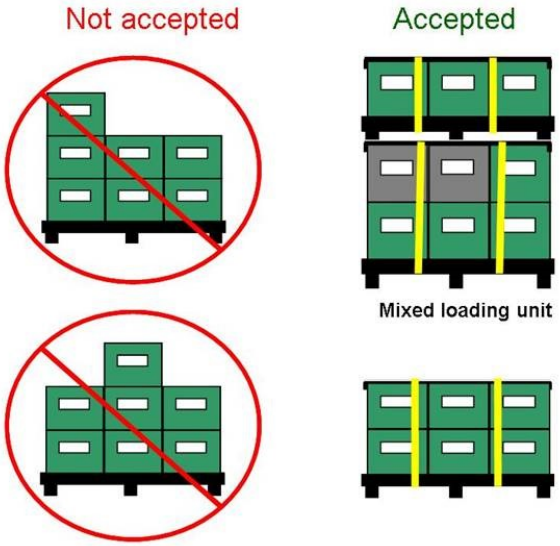


Figure 9.2.3-2: Not acceptable and acceptable LU with small load carrier

- Wooden Pallets (meant for one-way corrugated shipments) shall not be used to transport returnable boxes (small load carriers), without consulting the receiving plant. Wooden Pallets lack the locking mechanisms associated with returnable pallets and their use constitutes a potential hazard due to the possibility of boxes sliding off.
- Only clean boxes may be used. For quality reasons, if appropriate for the product and agreed with the Continental plant concerned, each box carrier shall be lined with a sturdy polyethylene bag (PE- folding bag) with a thickness of at least 100 µm, according to plant specific requirements.

- In order to achieve a smooth manufacturing process, it is necessary to obtain clean vendor parts in clean boxes. Thus, each supplier is obligated to keep the boxes clean.
- Dirty boxes may not be used. If dirty boxes have been detected, the replacement or cleaning issue has to be agreed with the plant concerned.
- The maximum weight per box shall be agreed with the Continental plant concerned. The gross weight per box should not exceed 15 kg.
- The design of internal packaging shall be agreed with the Continental plant concerned. Only wear-proofed materials may be used.

9.2.4 Assembly of Loading Units for the Return of Empty Small Load Carriers

General requirements for delivery / return of empty small load carriers:

- Empty small load carriers shall be properly stored and shipped and protected against dirt and moisture.
- In order to ensure effective protection, empty small load carriers shall be stacked on pallets with the openings downwards.
- Each loading unit shall include only one type of small load carrier.
- Each layer shall be completed with number of small load carrier.
- Two plastic straps shall be run around the entire loading unit.
- Any empty small load carriers received in a dirty or damaged condition shall be marked as such and returned to the party responsible

9.3 Use of Returnable Packaging

Continental is using returnable packaging to an increasing extent. Returnable packaging offers opportunities for the optimization of the supply chain at the company's partners. In addition, the re-use of boxes is part of the Continental environmental policy. Packaging re-use cycles are integrated in the environmental management system in accordance with ISO 14001.

If the kind of packaging is chosen, it is absolutely necessary to keep the economic efficiency and the whole supply chain process in mind. In each Continental plant the re-usable packaging has to be considered carefully.

In view of the growing volumes and values of the packaging involved, it is essential to implement uniform procedures in relations with all suppliers. In addition, standardization is required for planning new packaging cycles and budgeting for these cycles.

Two main arrangements are possible for the use of returnable packaging:

1. **The packaging is owned by the Continental plant**
   In general Continental is supplied in Continental owned packaging (independent of returnable inner or outer packaging).
   No cost impact regarding procurement within the quote process

   (Supply excluding packaging is the normal case, if standard boxes are used; after a stock horizon has been defined, a maximum box limit is laid down for the supplier.)

2. **Special packaging owned by the supplier**
   (Only in special cases, where specific packaging is required cost split has to be agreed.)
   The supplier can use his own boxes or re-usable packaging in coordination with the purchasing department and the SCM department or project team of the appropriate receiving plant. This supplier-owned packaging has to be presented before the contract is completed and approved by each receiving plant.

For regulation regarding return transports of returnable packaging (freight, insurance) please see chapter "Empty Box Supplies" and consider furthermore the CA norm:

- TST N098 00.02 000 "Transportation Requirements"
- TST N098 00.02 001" Continental Automotive Trade Terms".

A regulation regarding repair, shrinkage, washing of returnable packaging has to be agreed with the responsible department of the receiving CA plant. This regulation has to be fixed in the "**Packaging Specification Data Sheet" (see TST N 098 01.01 000)**.

9.3.1 Determination of Requirements for Boxes Owned by Continental

The Continental plant concerned is responsible for defining packaging (based on the supplier's proposal), for selecting the appropriate box type for each part to be delivered and for defining the box handling cycle.

For each supplier the quantity of needed boxes is calculated per article number based on current part requirements, delivery frequency and lead times (see calculation procedure – the template "Definition of the Packaging Loop"). The basis and results of the calculation must be agreed with each supplier.

Suppliers are required to state reasons if they wish to increase their box stocks. Additional quantities supplied without adequate advance planning may result in supply bottlenecks (see Chapter "Empty Box Supplies").

9.3.2 Box Purchasing

Continental returnable packaging is purchased directly by the plants concerned based on the requirements calculated in accordance with the procedure described above. The boxes remain the property of the plant concerned and are intended only for the supply of parts to that plant.

Additional box quantities required by suppliers, for example to pack advance production in order to cover vacation periods, will not be paid by the Continental plants concerned. Purchasing of boxes without Continental central function or plant specific release is prohibited.

Obtaining and ordering boxes from Continental plant is only permitted by the particular receiving plant. The packaging movement has to be coordinated with the Plant SCM of the receiving plant.

9.3.3 Empty Box Supplies

[03]
Suppliers receive empty boxes directly from the Continental plant concerned. The Continental plants maintain empties accounts for each supplier and compare them with current box requirements. The supplier shall afford Continental all reasonable assistance for the maintenance of empties accounts. Particularly the Continental empties scheduler has to be reminded of missing empties so that he still can react on time.

Any demand fluctuations shall be agreed without delay between the supplier and the Continental plant concerned. The supplier shall make its best efforts to avoid the use of substitute packaging and requires the authorization of the Continental plant concerned in advance.

Continental boxes shall not be used for deliveries to other Continental plants without the permission of the Continental plant which owns such boxes. However, suppliers delivering parts to more than one Continental plant in the same type of boxes shall not be under any obligation to segregate the boxes received from the various plants. In such cases, it shall be sufficient to agree on the use of the boxes with the plants concerned.

In the event Continental Automotive is responsible for the costs of the main carriage associated with delivery of the goods (e.g., under CA-Trade Terms CA-DAP & CA-DDP and under Incoterms EXW, FOB & FCA), then all logistical responsibilities, activities and costs related to the return delivery of empty packaging units shall be in accordance with Incoterm DAP with Continental Automotive considered “Seller” and supplier considered “Buyer” for purposes of such assignment of responsibilities.

In the event supplier is responsible for the costs of the main carriage associated with delivery of the goods (e.g., under Incoterms DDP, DAP, CIP & CPT), then all logistical responsibilities, activities and costs related to the return delivery of empty packaging units shall be in accordance with Incoterm FCA with Continental Automotive considered “Seller” and supplier considered “Buyer” for purposes of such assignment of responsibilities.

Please consider therefore the CA norm:

- TST N098 00.02 000 “Transportation Requirements” and
- TST N098 00.02 001” Continental Automotive Trade Terms”.

9.3.4 Empty Box Inventory Management

Empty box accounts will be maintained by the Continental plant concerned and shall be checked by the supplier. Suppliers will receive regular boxes account statements covering all types of boxes used. These statements indicate the current boxes stocks held by the supplier taking into account any boxes received and issued (on the basis of delivery notes and bills of lading).

The supplier shall be entitled to object to any boxes account statement within a period of two weeks of the receipt of the statement. If no objections are received by Continental within such period of two weeks, the supplier shall be deemed to have approved the statement, which shall then form the basis for the calculation of any discrepancies.

Any objections by the supplier shall be submitted to the Continental plant concerned with copies of the relevant delivery notes. Boxes may only be credited to the supplier’s account if they are clearly indicated and designated according to the receiving plant requirements in the ASN and on the delivery notes issued by the supplier.

Upon the receipt of empty boxes, the supplier shall be obligated to verify the types and quantities received by comparison with the bills of lading. In the event of any discrepancies, the supplier shall correct the bill of lading, obtain a receipt from the driver and submit the corrected bill of lading with the receipt to the Continental plant concerned for the correction of the supplier’s boxes account.

9.3.5 Empty Box Inventory Handling

In order to maintain empty box cycles, annual reconciliation of recorded and actual box stocks is required. Such reconciliations shall be conducted by each Continental plant and each supplier at the end of each calendar year (or upon request).

The supplier shall be obligated to take a physical inventory of the boxes in stock. For this purpose, the supplier will receive in good time an inventory list with detailed instructions from each Continental plant concerned.

The empty boxes records kept by the Continental plant will then be compared with the inventory lists received from suppliers. The empty boxes records of Continental will then be corrected by adjustment entries to reflect the stocks of boxes actually held by suppliers.

9.3.6 Handling of Special Boxes Owned by the Supplier

The handling of special boxes owned by the supplier shall be agreed in each specific case mutual by the supplier and Continental and laid down in attachment exhibits to the general agreement.

10 COMBINED PACKAGING

Combined packaging represents a combination of returnable and expendable packaging in one loading unit. The requirements, already described for expendable and returnable packaging materials, are also apply to combined packaging.

Combined packaging has to be marked with the environmental code, too.
See chap. “7.2. Recycling and Identification of Packaging Material”.

11 ABBREVIATIONS

ABS	Acrylonitrile-butadiene-styrene
ANSI	American National Standards Institute
ASN	Advanced Shipping Notification
BCT	Box compression test
CA	Continental Automotive
DB	Debarked
DIN	Deutsches Institut für Normung / German Institute for Standardization
ECHA	**E**uropean **Ch**emicals **A**gency
ECT	Edge Compression Test
EN ISO	EN for European standard and ISO for International Organization for Standardization
EPA	ESD protected area
EPP	Expanded Polypropylene
EPS	Expanded Polystyrene
ESD	Electrostatic Discharge
ESD KLT	Electrostatic Discharge small load carrier / totes/ KLT
ESDS	Electrostatic sensitive devices
EU	European Union
GSCC	Global Supply Chain Concept
HDPE	Polyethylene High Density
HT	Heat treatment
HU	Handling Unit
IPPC	International Plant Protection Convention
ISPM	International Standard for Phytosanitary Measures
KLT	"**K**lein**l**adungs**t**räger" (German word) = Small load carrier / totes
LU	Loading Unit
MB	Methyl bromide
MOSH/ MOAH	Hydrocarbons saturated with mineral oil (**MOSH**)/ Mineral oil aromatic hydrocarbons (**MOAH**)
PE	Polyethylene
PE-HD	High density polyethylene
PE-LD	Low density polyethylene
PET	Polyester
PP	Polypropylene
PPAP	Production Part Approval Process
PS	Polystyrene
PSDS	Packaging Specification Data Sheet
PPAP	Production Part Approval Process
PUR	Polyurethane
PVC	Polyvinylchloride
RAL	RAL is a color matching system used in Europe that is created and administrated by the German RAL gGmbH
REACh	**R**egistration, **E**valuation and **A**uthorization of **Ch**emicals
RFQ	Request for Quotation
RL-KLT	Redesign Light -KLT (small load carrier / totes)
SCM	Supply Chain Management
SCR	Supply Component Review
SML	Supply Manual Logistics
SVHC	Substance of Very High Concern
SQM	Supplier Quality Management
TST	Technical Standard Norm of CA
VCI	Volatile corrosion inhibitor
VDA	**V**erband **d**er **A**utomobilindustrie e. V. (VDA) / German Association of the Automotive Industry

12 CONTACTS @ AUTOMOTIVE SUPPLY CHAIN MANAGEMENT – MATERIAL FLOW & PACKAGING

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