

Doc. Type	TST	Standard Packaging requirements for VT Plants and Suppliers	 © 2022 Vitesco Technologies
Doc. Num.	N 3 9800.01		
Doc. Part	000		
Revision	04		
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CHANGES

In comparison to the former version the following amendments have been made:

- The content changes to Vitesco wording
- The scope has been to follow the Spin-off of Vitesco Technologies

Paragraph updating the sustainability requirements added in chapter 7.

Paragraph (Chapter 7.3) updating the recycling marks standard based on new legal and customer requirements.

HISTORY / PREVIOUS EDITION

TST N09800.01-000_Packaging Requirements

TST N 3 9800.01 000 02 – 2021-04-28 - Packaging Requirements for VT plants and Suppliers

TST N 3 9800.01 000 03 – 2021-11-02 - Packaging Requirements for VT plants and Suppliers

1 SCOPE, APPLICATION AND PURPOSE

With its trendsetting systems technology, Vitesco Technologies (concerning this norm referring to all legal entities within the Vitesco Technologies (thereinafter Vitesco or VT) 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 Vitesco Technologies and suppliers. This norm aims to standardize and continuously improve procurement processes involving Vitesco Technologies and suppliers. These improvement and standardization actions are basis for creation of transparency in the supply chain processes in Vitesco Technologies and all parties should benefit from them.


This norm is intended as a reference, which VT plants and suppliers shall use to clarify any difficulties and questions which may arise. The VT 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 VT plants and suppliers inform all responsible members of their staff of the contents of this norm.

This standard applies to all companies within Vitesco Technologies as well as to their plants and functional areas and their suppliers worldwide and is established by Vitesco Supply Chain Management - Customs, Transportation & Packaging.

2 APPLICATION

This norm shall apply to all worldwide activities of Vitesco Technologies and all deliveries to worldwide destinations of Vitesco Technologies. This norm is part of the currently valid purchasing agreement between the supplier and Vitesco Technologies 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.

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

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

Due to changing framework conditions, it will be necessary to adapt the supply chain requirements from time to time. The VT plants and suppliers of Vitesco Technologies are obliged to follow the current valid version.

3 REFERENCES

GSCA	Global Supply Chain Agreement Transportation, Customs / Foreign Trade and Export Control
TST N398 00.02 001	Vitesco technologies Trade Terms VT-DAP VT-DDP For Suppliers
TST N39800.03 000	Requirements on marking of goods
TST N398 02.01 001	Container Optimized Wood Pallet L1108 and L1110
TST N398 02.02 000	Plastic pallets and Test Specification
TST N398 05.01 000	Expendable Packaging
TST N398 01.01 000	Packaging Specification Data Sheet – PSDS
TST N398 00.04 000	VT Packaging Standard Catalog
Annex 01 internal)	Packaging Material Release, also part of VT0600913 (document useable only VT internal)
97/129/EC	Commission Decision of 28 January 1997 establishing the identification system for packaging materials pursuant to European Parliament and Council Directive 94/62/EC on packaging and packaging waste
EN ISO 780	Verpackung, Bildzeichen fuer die Handhabung von Guetern / Packaging; Pictorial Marking for Handling of Goods
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
ISO 1043-1	Plastics - Symbols and abbreviated terms - Part 1: Basic polymers and their special characteristics
ISO 14021	Environmental labels and declarations — Self-declared environmental claims (Type II environmental labelling)
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

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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”:
<https://www.vda.de/en/services/Publications.html>

All VT documents and Appendices are downloadable at the VT Homepage
“Vitesco Technologies Supplier Special Information and Downloads”: [Vitesco Technologies - Suppliers – Vitesco Technologies \(vitesco-technologies.com\)](https://www.vitesco-technologies.com)

4 RESPONSIBILITIES

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 VT 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 enough 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 VT norm TST N398 01.01 000 “Packaging Specification Data Sheet - PSDS”. The Current valid version is in Vitesco Technologies Supplier Special Information and Downloads”: Vitesco Technologies - Suppliers – Vitesco Technologies (vitesco-technologies.com)

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

5 GENERAL PACKAGING DEFINITION PROCEDURE

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

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

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5.1 During the Sourcing Process

In phase of Request for Quotation “RFQ”:

Vitesco Technologies will send a prefilled (as much as possible) “Packaging Specification Data Sheet - PSDS” (TST N398 01.01 000) as draft to the supplier with packaging requirements for outer VT 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 Vitesco 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 Vitesco 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), Industrial Engineering and Quality representative. Without final agreed and signed packaging proposal in PSDS, quotation is not complete. All concerned parties have to ensure to transfer their requirements in this phase.

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 must be signed by all concerned departments at supplier and VT (Packaging Engineer / Industrial Engineer, SCM, Production Planning, Warehouse, Label Coordinator and SQM / Plant Production Quality).

5.2 Definition of Returnable Packaging Concepts

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 Vitesco production process can be continued even if empty returnable bins are missing.

In the event returnable packaging are not available to support production schedules, the supplier must inform the recipient VT 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.

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In the event of a failure by the supplier to comply with the agreed packaging specification, Vitesco 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 VT 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 VT SCM Packaging Engineer.

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

5.5 Packaging Design Improvements

The supplier must 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 Vitesco does not relieve the supplier from its responsibility to supply parts which are free from damage.

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

A general agreement between VT 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 VT plant is available:

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

6 PACKAGING REQUIREMENTS 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 “VT Packaging Standard Catalog” (TST N398 00.04 000) and a catalogue of VT 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 Vitesco specification shall be used.

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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
- ESD protection

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:** Airfreight / 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 expandable 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.

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But in special cases plant specific requirements could permit it.

For returnable concept, some anti-dust protection measures must be taken to ensure the cleanliness of returnable packaging during transportation and storage.

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 VT 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 Vitesco plant concerned, each box carrier shall be lined with a sturdy polyethylene bag (PE- folding bag) with a thickness of at least 60 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 must be agreed with the VT plant concerned.

The design of inner packaging shall be agreed with the Vitesco 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

- See VT TST N39800.03 000 - Requirements on marking of goods

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- 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
- Recycling symbols according to DIN 6120 and 97/129/EC (see chapter 7)
- 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

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.

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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, 97/129/EC and VT requirements. Plastic inserts shall be reviewed for recycling potential. (see chapter 7 "Packaging materials and environmental requirements")



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, 97/129/EC and VT requirements.

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

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) static conductive or dissipative packaging which does not charge up need to be chosen. Outside the EPA field and discharge shielding packaging material must be used.

The standards for ESD protection must 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)

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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.

Each ESD protection “package” 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 “package”.

All ESD packages should be pink or black in color.

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

All ESD safe packages need to be marked with following symbols according to the used type of material:



..... for electrostatic dissipative material



..... for electrostatic conductive material



..... for shielding material



Note that on some material, e.g. component rolls or blisters, the symbol cannot be printed on yellow background; in these cases just the black part of the symbol is applied (printed, molded, etc).

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. Warning notes identifications according to IEC DINEN 61340-5-1 e.g. date of expiry, allegation of the producer, production date and the recycling symbol
7. Periodic checking intervals based on the defined criteria
8. Changes of the deliverer are binding notifications and require a written agreement

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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 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 VT plant.

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6.2.5.1 Methods of Application for Corrosion Prevention

wrong		correct
	Parts should be packed dry and clean !	
	Wear Gloves !	
	During packaging procedure : Temperature of product for packaging = Ambient air temperature	
	Packaging should be closed and dense. Holes and other damages should be closed by adhesive tape. Direct contact with water should be avoided.	
	At tight bulk density use VCI in the centre of the packaging.	
	Avoid direct contact between metal and wood, paper or carton. Intermediate layers should also be covered with VCI.	

Figure 6.2.5.1-1: Methods of application for corrosion prevention

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6.2.5.2 Dry Pack Moisture Sensitive Devices

Packaging for moisture sensitive devices must be designed based on industrial standard IPC/JEDEC J-STD-033 and must be marked with an appropriate label. See also VT TST N39800.03 000 - 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			
	Time	Cond.	Time (hrs)	Cond.	Time (hrs)	Cond.
		°C / %RH		°C / %RH		°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 6.2.6-1: 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):

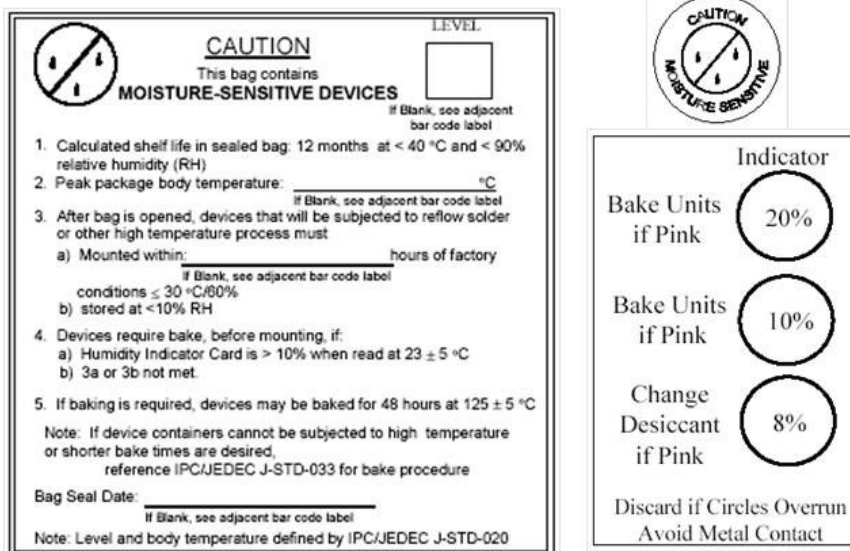


Figure 6.2.6-2: Indicator Card (HIC), "Moisture-Sensitive Identification" (MSID) and Moisture-Sensitive Identification Label "Caution-Label"

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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:

 Explosives 爆炸品	 Inflammable gases (Class 2) or liquids (Class 3) 易燃气体 (第 2 类) 或者 易燃液体 (第 3 类)	 inflammable solids (Class 4) 易燃固体 (第 4 类)	 Non-inflammable gases 不燃气体
 poisonous substances (gases Class 2., other poisonous substances (第 2 类和第 6.1 类))	 liable to spontaneous combustion 易自燃物品	 substances which, in contact with water, emit inflammable gases 遇水释放出易燃气体的物品	 oxidizing substances and for organic peroxides 氧化剂和有机过氧化物
 infectious substances 感染性物品	 radioactive substances 放射性物品	 corrosive substances 腐蚀性物品	

Figure 6.2.7-1: Hazardous materials warning symbols

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

The supplier must 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 **C**hemicals.

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 **C**hemicals **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 such a substance is included in any packaging material, the supplier must find a substitution immediately and is obliged to inform VT REACh coordinators immediately in written form.

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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>

6.2.8 Technical Cleanliness Requirements of Packaging Materials

The requirements regarding technical cleanliness must be considered:

The packaging materials that directly contact or surround the component/part must 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 must be arranged bilaterally between the supplier and receiving VT plant within the Packaging Specification Data Sheets (TST N398 01.01 000).

Costs for cleanliness of packaging materials should be separated from product piece price.

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

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

Apart from the identification of the “package” with information for the box’s management, the actual “package” or their components may be marked with special labels (created by Vitesco) or signs (boxes ID).

The identification or ident barcodes of the “package” shall not be damaged or taped up.



The VT norm TST N39800.03 000- Requirements on marking of goods has to be considered, too.



For all returnable “packages” an identification number should be printed on two opposite sides. For VT owned “package” the SAP 98.-part-number should be printed or punched.

Packaging material shall be appropriately identified with the material type. (see also chap. 7.3 “Recycling symbols”)

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6.2.10 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 Vitesco Technologies concerning the identification of goods by suppliers are laid down in the VT norm TST N39800.03 000- Requirements on marking of goods

This VT 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 Vitesco Technologies Group and must be considered.

7 PACKAGING MATERIALS AND ENVIRONMENTAL REQUIREMENTS

All suppliers and VT plants have to enhance sustainability in whole Supply Chain and reduce waste.

To achieve the Vitesco Technologies sustainability targets the packaging must fulfill following requirements:

1. All parts of packaging must be either reusable or 100% recyclable. (Any deviation must be approved by Packaging Competence Center by eSign in advance)
2. Each part of packaging must be marked with a recycling symbol according to 1997/129/EC.
3. Only mono-material packaging is allowed – use of composites and multi-material packaging is strictly prohibited. (Any deviation must be approved by Packaging Competence Center by eSign in advance)
4. Packaging design should consider and use new technologies and materials, i.e. bio-degradable or compostable plastics, biopolymers etc.
5. Returnable packaging concept must be used whenever organizational and economical specifics allows it.

The general packaging approach should be

- Avoid
- Reduce
- Reuse
- Recycle

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

7.1 Avoidance and Reduction of Packaging Material

Vitesco Technologies tries to reduce and avoid packaging material wherever possible. As a rule, parts must be packaged such that the use of packaging material is kept to a minimum while adequately protecting the part. It is important for VT to improve and harmonize continually the packaging material in cooperation with our suppliers.

Whenever a supplier identifies an opportunity for improvement in order to reduce and avoid packaging material, this must be brought to the attention of the recipient VT plant.

7.2 Recycling of Packaging Material

All suppliers and VT plants are requested to use recyclable packaging materials whenever possible, and under consideration of all necessary quality requirements.

At European level the Directive 1994/62/EC and (EU) 2018/852 “on packaging and packaging waste” obliges to obtain certain quotes for recycling and valorization.

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In this directive a provision is also made concerning a marking and identification system. In elaboration of this provision decision 1997/129/EC of the European commission appeared regarding the identification system for packaging. In this decision each packaging material is granted with a code and an abbreviation, in order to allow an identification of the packaging materials with a view to facilitate the collection, reuse, recovery including recycling.

7.3 Recycling symbols










Packaging that is manufactured with recyclable material has to be appropriately identified.

Recycling symbols must be compliant to this VT standard as well as to applicable legal requirements of manufacturing/import/export country or international community and customer requirements.

Recycling symbols are mandatory for **both expandable and returnable packaging concepts** and for VT locations as well as VT suppliers – **all inbound and outbound (customer) packaging must be marked with recycling symbols** according to this standard.

The recycling symbols has to appear (printed engrave or punched) on **every packaging part**, e.g. symbols for plastics PET, HDPE, PP – according to DIN 612, 97/129EC and VT requirements.

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Plastic recycling symbols		Code-abbreviation: 01 PET 02 HDPE 03 PVC 04 LDPE 05 PP 06 PS 07 other plastics
Corrugated fibreboard / cardboard	 	Code-abbreviation: 20
Paper		Code-abbreviation: 22
Packaging manufactured with recycled material		Code-abbreviation: according to 97/129/EC and (REC+percentage of recycled material) – according to DIN 6120
Metal Packaging	 	Code-abbreviation: 40 FE 41 ALU
Wooden Packaging	 	Code-abbreviation: 50 FOR 51 FOR
Material composites		No number code Abbreviation of the components in the composite, separated by a forward slash, shall be given under the graphical symbol. The order of the components is based on the percentage by mass of the materials present, with the main component of the composite being listed first. The number of components listed shall be limited to a maximum number of three

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VT standard is a mobius loop with a number code of specific material in center and abbreviation of material name below the loop (according to 97/129/EC or ISO 1043-1). The visual of the recycling mark has to be in accordance to DIN 6120.



If a product has been produced from recycled plastic, the abbreviated term for the plastic type has to be supplemented by the designation “(REC)”. The designation “REC” for recycled plastic shall always be in the last position after the abbreviated term for the type of plastic.

If the percentage of recycled material is known, the designation (REC) as well as the minimum fraction of recycled material has to 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 25 % recycled material the designation would read “(REC25)”.

The following selection of recycling symbols shall appear on every packaging:

Figure 10.2-1: Abbreviation digit accord. to 1997/129/EC

The non-use of these symbols leads to additional expenses for waste disposal and sorting as well as to increased disposal costs. May result also in legal sanctions by either authorities or customers.

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7.4 Approved Materials and Not Approved Materials

Material		Approved Materials	Not Approved Materials	Environmental rating 1=best; 6=worst
Composites	General		Composites have to be avoided in general or require the separate approval of the particular receiving plant.	6
General Plastics	Expendable	PE, PP, PS, EPP, EPS, PET have to be identified based on DIN 6120 Biodegradable plastic materials are always recommended to be used if it can meet related criteria. PVC only after explicit approval of receiving plant	PUR, EPS-Chips	3
	Returnable	ABS, PE, PP, PS, PET, PUR must be identified based on DIN 6120, PVC only after explicit approval of receiving plant		3
Plastic Packag-ing Material	Foams: Expendable Returnable	PE PE, PP, PUR, PET, EPS - only molded parts and only with explicit approval of receiving plant		4

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Material		Approved Materials	Not Approved Materials	Environmental rating 1=best; 6=worst
		have to be marked with the recycling symbol.		
Strap	General	Polypropylene (PP) Polyester (PET) See also TST N39805.01 000 “Expendable Packaging”	Polyamide (PA) straps Steel straps are only admitted with heavy loads and require the explicit approval of the receiving plant	3
Wire	General For attachment of labels, shipping bags etc.	Only with special approval of the receiving plant	Not permitted	5

7.5 Waste-Management at the Supply Chain Management

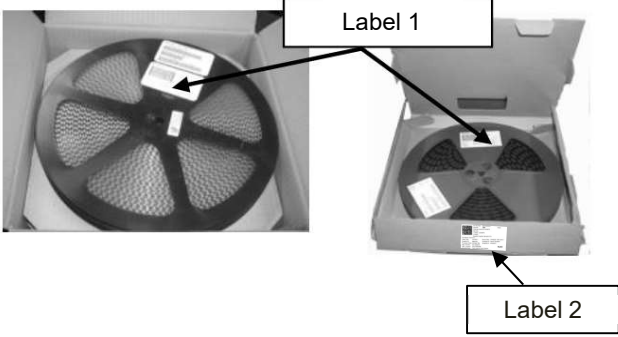


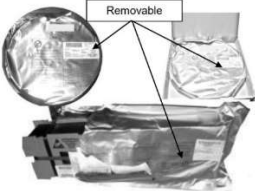

- The selection of packaging material must be in a way that recycling is always possible
- The selection of packaging material must ensure a meaningful separation.
- Visible marking of all plastic materials and other materials is a mandatory requirement
- Reusable packaging material shall be used instead 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:

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	<p>Reel in small cardboard box</p> <p>Label 1: The label 1 should consist of the same material as the reel (reel = PS, then label = PS)</p> <p>Label 2: The label 2 should consist of the same material as the small box (small box = cardboard or carton, then label = paper)</p>
	<p>Expendable or returnable Trays (e.g. PS-el returnable tray)</p> <ol style="list-style-type: none"> 1. Marked with recycling symbols (acc. to DIN 6120), here PS and ESD symbol 2. Label-holder consist of PS and fixed with weld points. The label holder at the tray consist of the same material as the tray (Tray = PS, label holder = PS)
	<p>Inner bag (e.g. PE)</p> <p>The label on the inner bag should consist of the same material as the bag (bag = PE, then label = PE)</p>
	<p>Component bag (e.g. aluminum with plastic coating):</p> <p>The label should be made of easily removable material.</p>
	<p>Label outside of the LU (corrugated cardboard box)</p> <p>The LU label should consist of the same material as the cardboard box (box = corrugated cardboard, then label = paper)</p>

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The packaging engineers of the supplier and the VT 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, ancillary packaging and loading packaging approved by Vitesco may be used.

All such materials shall be environmentally compatible and recyclable and shall be marked with the „RESY-Symbol“ (only for domestic Europe). 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) 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)

* VDA – recommendation 4525, detailed information you can find also in TST N398 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) -> exceptions might be made after explicit agreement of concerned parties.
- No loading unit may exceed a gross weight of 1000 kg and packaging units shall be stackable: 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.
- Vitesco 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



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- The minimum thickness of a cardboard for overseas shipments is a quality of triple wall / double wall (to be defined based on the weight of the box, stackable layers, etc) water resistant gluing corrugated cardboard walls.
- It is important to carefully consider all the factors that weaken the stacking strength of a box before products are packed and put into the distribution cycle. Relative humidity, time in supply chain, etc. - all these factors can reduce a corrugated box's stacking strength. A target box compression value can be determined through calculation (calculate the top load which have to be supported by bottom box) and the safety/environmental factors have to be considered.

8.1 Accepted Expendable Pallets

Vitesco accepted expendable pallets with

- Construction: 4-way-free-entry block pallets with a minimum of 3 skids must 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 Vitesco Technologies norm:

- TST N398 00.04 000 "VT Packaging Standard Catalog"
- TST N398 02.01 001 "Container Optimized Wood Pallet L1108 and L1110" with dimension 1140x790x140 mm and 1140x980x140 mm.

(Graphics are courtesy of the National Wooden Pallet and Container Association.)

Block Design

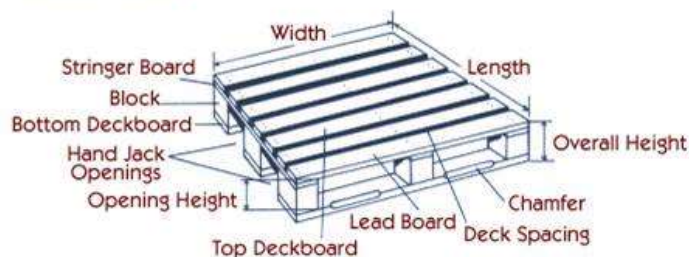


Figure 7.1-1: Definition of a 4-way-free-entry block pallet

Not accepted:

- Due to the increase of transport damages press wood pallets are not accepted! The press wood pallets don't have an enough 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 splinters.
- Plywood pallets only accepted as interims solution if problems with ISPM no15 certification occur during import process. (Explicit agreement based on regional specifics possible)
- Plastic pallets should be avoided. But if plant requires, then they must be marked with recycling codes.

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Not Accepted	Accepted
	<p>e.g. for Europe and Asia</p>  <p>e.g for America</p>  

Figure 7.1-2: 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 N398 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 *

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* VDA – recommendation 4525, detailed information can also be found in TST N398 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 advisable!
- The quality requirements [breaking strength, BCT, ECT, thickness, puncture resistance, (wet) bursting strength] are mentioned in the TST N398 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

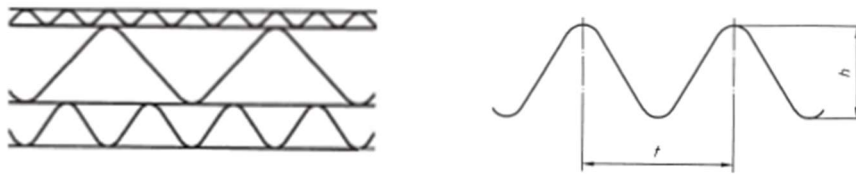


Figure 7.2-1: Triple-wall corrugated fiberboard (left) and Flute dimension (right)

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-stack ability of the LU, are not permitted. In such cases the supplier should contact the part scheduler of Vitesco, to optimize the order quantity (demands) in accordance to a stackable packaging unit.

Loading Unit:

- The construction of the LU should be strong enough for a 2- till 3-times dynamical stack ability (1+1 till 1+2 LU). Clear symbols printed on the LU, comprehensible for all nations and languages, are advantageous.

Using of VCI-protection is preferred or enough desiccant bags in dependence on the sensitivity of the parts in exception.

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 must 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.

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Figure 7.2-2: 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

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 Vitesco. 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:

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- 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!

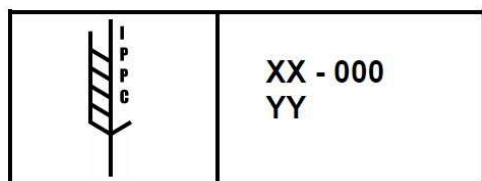


Figure 7.3-1: One example of marking at treated wooden packaging, IPPC-Symbol

- 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/ppq/wpm/index.html>
- 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):

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<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-e28093-ausfuhr-in-nicht-eu-staaten.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 wherever possible. Procedures for determining requirements and the use and purchasing of returnable packaging shall be defined by the Plant SCM concerned in cooperation with the supplier.

9.1 Pallets Standard

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

- 4-way-free-entry block pallets with a minimum of 3 skids must be used.
- VT standard returnable and expendable pallets are specified in the special VT norms:
TST N398 00.04 000 "VT Packaging Standard Catalog"
TST N398 02.02-000 "Plastic Pallets and Test Specification"

These VT norms must be considered for each packaging concept.

9.2 Small Load Carriers (KLT)

It is the aim of Vitesco to introduce standard packaging material throughout the company. For small production components, Vitesco 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".

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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. Vitesco Technologies prefers the RL-KLT types (ESD – black and non ESD – blue) which can be found in our TST N398 00.04 000 “VT Packaging Standard Catalog”.

The modular RL-KLT system, restricted to these preferred small load carrier types at VT, is a major step towards box standardization and 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 Vitesco. 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!

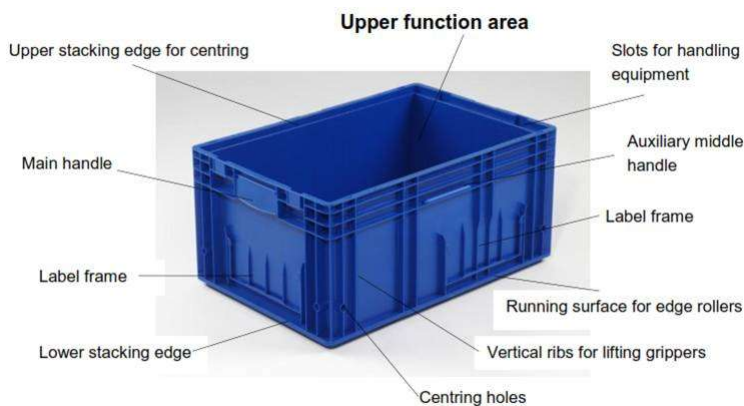


Figure 8.2.1-1: Description of the small load carriers (here RL-KLT 6280)



Figure 8.2.1-2: Description of the ESD-symbol position (here ESD RL-KLT 6080)

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Figure 8.2.1-3: Description of the smooth base (RL-KLT and ESD RL-KLT)

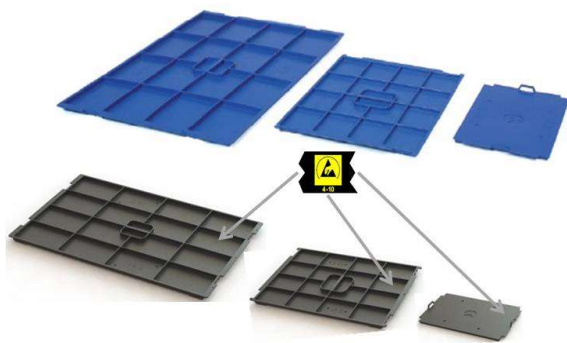


Figure 8.2.1-4: VDA KLT cover types (blue): D65, D45, D35 and VDA ESD KLT cover types (black): D61-ESD, D41-ESD, D31-ESD

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 an immixed of the old and new generation can't be ruled out, Vitesco Technologies 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 Vitesco purchasing and receiving plant (SCM department) to optimize the quantity of the parts per small load carrier and per loading unit (LU).

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- The use of empty small load carrier to fill up a layer is necessary until optimized order quantities are agreed with the Vitesco part scheduler.
- For mixed load each Vitesco 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.

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 can be stacked on pallets with the openings downwards. Not applicable if inlay is included.
- 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

Vitesco 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 Vitesco 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 necessary to look at the economic efficiency and the whole supply chain process. In each Vitesco plant the re-usable packaging must 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 Vitesco plant

In general, Vitesco is supplied in Vitesco 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 must be agreed.)

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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 must 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 VT norm:

- “Transportation, Customs/ Foreign Trade and Export Control”
- TST N398 00.02 001 - Vitesco technologies Trade Terms VT-DAP VT-DDP For Suppliers

A regulation regarding repair, shrinkage, washing of returnable packaging must be agreed with the responsible department of the receiving VT plant. This regulation must be fixed in the “Packaging Specification Data Sheet” (see TST N 398 01.01 000).

9.3.1 Determination of Requirements for Boxes Owned by Vitesco

The Vitesco 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 – in the template “Packaging specification data sheet”). 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

Vitesco returnable packaging is purchased directly by the plants concerned on the basis of 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 Vitesco plants concerned. Purchasing of boxes without Vitesco central function or plant specific release is prohibited.

Obtaining and ordering boxes from Vitesco plant is only permitted by the receiving plant. The packaging movement must be coordinated with the Plant SCM of the receiving plant.

9.3.3 Empty Box Supplies

Suppliers receive empty boxes directly from the Vitesco plant concerned. The Vitesco plants maintain empties accounts for each supplier and compare them with current box requirements. The supplier shall afford Vitesco all reasonable assistance for the maintenance of empties accounts. Particularly the Vitesco empties scheduler must 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 Vitesco plant concerned. The supplier shall make its best efforts to avoid the use of substitute packaging and requires the authorization of the Vitesco plant concerned in advance.

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Vitesco boxes shall not be used for deliveries to other Vitesco plants without the permission of the Vitesco plant which owns such boxes.

The freight costs for the delivery of the empty boxes should be paid depending on the contracted VT trade terms or Incoterms. The freight cost and insurance for empties will be paid by the party who also pay the freight costs of goods.

Please consider therefore the VT norm:

- “Transportation, Customs/ Foreign Trade and Export Control” and
- TST N398 00.02 001 - Vitesco technologies Trade Terms VT-DAP VT-DDP For Suppliers

Example:

- 1) If freight costs of goods (Incoterms / Trade Terms: EXW, FOB, FCA VT-DAP & VT-DDP) are paid by Vitesco Technologies, then Vitesco Technologies also pays the freight costs of empties (i.e. INCOTERM DAP)
- 2) If freight costs of goods (Incoterms /Trade Terms: DDP, DAP, CIP & CPT) are paid by supplier, then supplier also pays the freight costs of empties (i.e. INCOTERM FCA)

9.3.4 Empty Box Inventory Management

Empty box accounts will be maintained by the Vitesco 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 considering any boxes received and issued (based on delivery notes and bills of loading).

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 Vitesco 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 Vitesco 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.

Any discrepancy not claimed in period of 2 weeks from statement received from Vitesco will be charged to 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 loading. In the event of any discrepancies, the supplier shall correct the bill of loading, obtain a receipt from the driver and submit the corrected bill of loading with the receipt to the Vitesco 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 Vitesco 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 Vitesco plant concerned.

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

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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 Vitesco 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.

11 REVIEW

11.1 Review Team

The members of the Review Team have reviewed the rule and their feedback has been considered. The Responsible Function keeps records about the review.

Name	Department	Location
Kamil Struhala	VT O SCM CTP	Trutnov
Tomáš Valenta	VT O SCM CTP	Trutnov

12 Abbreviations

ABS	Acrylonitrile-butadiene-styrene
ANSI	American National Standards Institute
ASN	Advanced Shipping Notification
BCT	Box compression test
DB	Debarked
DIN	Deutsches Institut für Normung / German Institute for Standardisation
ECHA	European Chemicals Agency
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
ESDS	Electrostatic sensitive devices
EU	European Union
GSCA	Global Supply Chain Agreement
HDPE	Polyethylen High Density
HT	Heat treatment

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HU	Handling Unit
IPPC	International Plant Protection Convention
ISPM	International Standard for Phytosanitary Measures
KLT	“Kleinladungsträger” (German word) = Small load carrier / totes
LDPE	Polyethylen Low Density
LU	Loading Unit
MB	Methyl bromide
PE	Polyethylen
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	Registration, Evaluation and Authorisation of Chemicals
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 VT
VCI	Volatile corrosion inhibitor
VDA	Verband der Automobilindustrie e. V. (VDA) / German Association of the Automotive Industry
VT	Vitesco Technologies

13 Contacts @ Vitesco Technologies Supply Chain Management – Customs, Transportation and Packaging (O SCM CTP)

Packaging tomas.3.valenta@vitesco.com