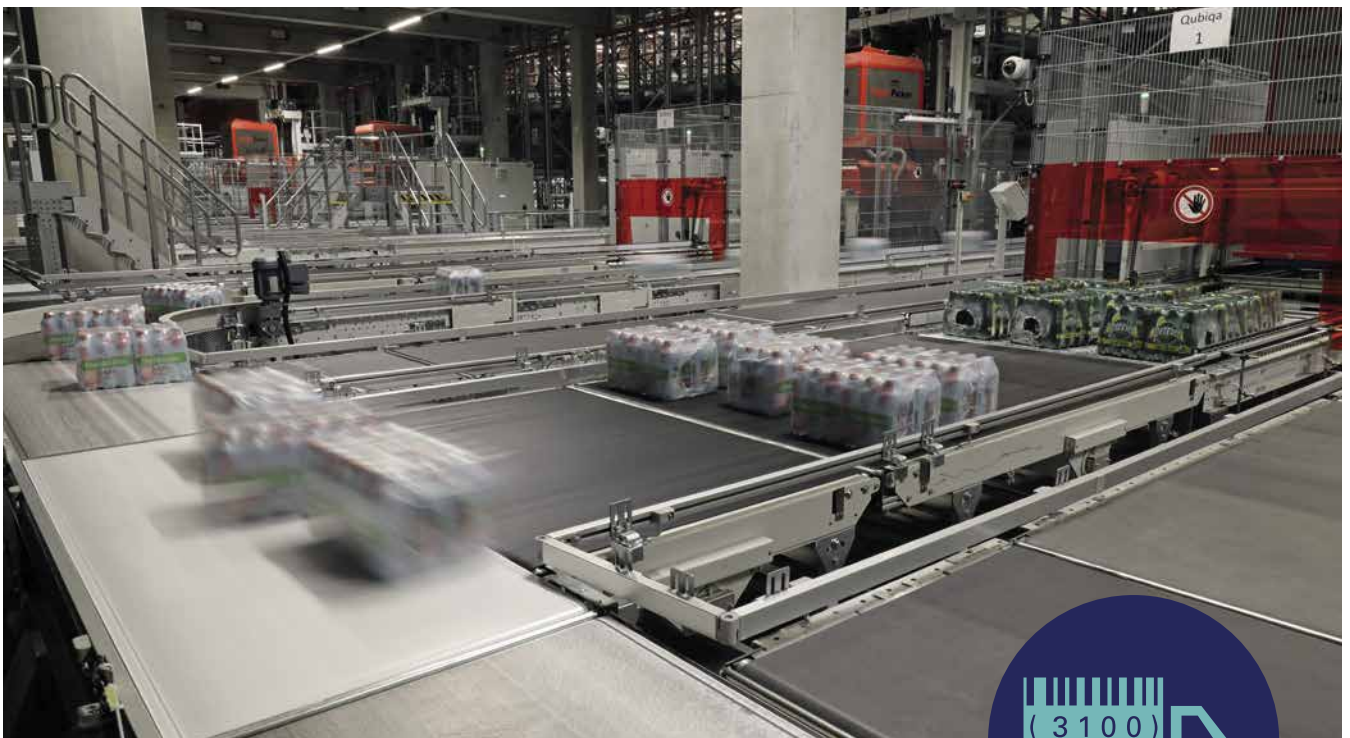




Automated Distribution Centre

Delivery Guidelines for the Belgian,
Dutch & French market



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This document was composed by representatives from (national and international) suppliers and retailers in France, Belgium, Luxembourg and the Netherlands.
The logo's are merely a shortened selection of the companies which contributed in the final result.

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1. Background

Robots have been the prerogative of manufacturers for a long time, but nowadays they are also found in the logistic area. This robotisation of the supply chain is undoubtedly an effective way to respond to the challenges of the trade's digitisation and its consequences on the supply chain (improve efficiency, quality and productivity). It is undoubtedly well illustrated by the interest in the robotisation of companies acting in retail.

From an operational point of view, robotisation allows reducing logistics costs and is an answer to stricter regulatory demands. The first implementations have shown a significant reduction of the order to cash process cycles, increase of productivity, decrease of inventory mismatch and mitigate arduous working conditions.

These transformations must also be possible in the context of improving the environmental performance of Supply Chain players, for example by reducing unnecessary secondary packaging or by choosing the most adapted pallet supports to manage the operation. The introduction of these robots in logistics operations could also be useful to redesign a warehouse or to improve a workstation. Automated vehicles, robotic arms, goods to man, integrated systems, drones, etc., there are many solutions for different companies and their organisations.

However, companies who want to deploy robotic solutions must integrate a certain number of requirements in order to make their investments more profitable and sustainable. In addition to the need to rethink the internal organisation according to its needs, robotisation also requires a review of the interface with the logistics of its partners. It is important to rethink the organisation and develop interoperability between trading partners. A harmonized technical specification could help the community to deploy robotics solutions.

2. Objective

This guide contains guidelines for delivery of loaded pallets to an automated distribution centre. The document is an extension to guidelines for delivering to a conventional distribution centre, which has already been agreed upon between supplier and retailer. It is very important to follow these extra guidelines for optimum performance of the robotic equipment and to limit processing errors or blocking of the system. The objective is to provide a common reference framework for all operators in the supply chain.

This guide aims at answering these questions in a schematic way:

1. Which additional requirements apply when I transfer pallets to an automated distribution centre?
2. What are the case requirements that I need to respect?

3. Scope

Only automated distribution centres that handle products packed in non-reusable transportation packaging are in scope of this manual. Automated DC's that handle reusable non-consumer packaging, such as crates in a fresh food DC, are not in scope. Reusable consumer packaging like beer crates are in scope.

This manual contains requirements for both cases and pallets.

The requirements in this manual are complementary and compliant with the rules for delivery to a conventional (=not automated) distribution centre.

The existing GS1 Logistic label guidelines must be followed, there are no different requirements specific to the environment in scope of this manual.

An automated warehouse will probably have restrictions regarding delivery of oversized products or heterogeneous pallets because of the installed equipment. It is recommended to share the palletization plan and case requirements with the retailer.

4. Target audience

This document mainly addresses the following actors:

- Manufacturer and retailer logistic team: packaging design, supply chain customer service...
- Retailers receiving the goods, managing product stock, selling the products, ...
- Companies who deliver goods as a manufacturer or logistic service provider.
- Carriers who deliver goods from the manufacturer expedition centre to the distribution centre.
- Robotics solutions companies, IT consultancy companies...

To following signs are used throughout the manual:



Practice accepted if you respect the requirement



Practice not accepted



Practice accepted in some countries

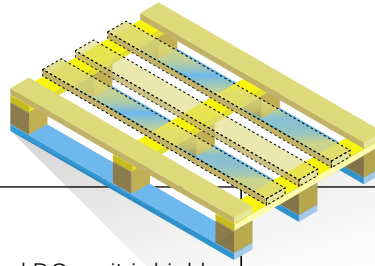







Practice to be agreed bilaterally, between supplier and retailer.

5. Glossary

DC	Distribution Centre
Automated reception	In an automated distribution centre, operations such as scanning the GS1 Logistics Label, transporting the goods into the warehouse, stocking, destacking, decanting (restack outer case from pallet to trays) and picking the goods are executed in a fully or semi-automatic way. All or part of the manual operations are replaced by robotic equipment, conveyor belts and so on.
Case, layer, pallet	
Stretch wrap	Commonly used to wrap and secure items on pallets for shipping purposes. As the products to be bundled are wrapped in the film, tension is applied to the wrap as it is wrapped several times around the items. The properties of the wrap cause it to cling to itself creating a tightly wrapped, secure packaging.
Shrink wrap	A clear plastic film that is not stretchy, used to professionally package retail items giving them a tamper proof and protective barrier. Shrink wrap is typically used to wrap individual items but can be used to package multiple items together. The shrink wrap is cut to fit around the item (or applied as a cover) and then heat is applied to shrink it to fit tightly.
Slip sheets	Thin pallet-sized sheets made of plastic, paper, paperboard or corrugated fibreboard used in commercial shipping. The slip sheet is used to prevent slipping of the product layers in vehicle delivery and transportation of products.

6. Pallet requirements



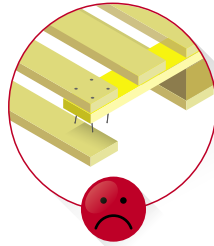
TYPE	Pool pallets and exchange pallets (e.g. euro-pallets) Quality of pallets is key in an automated DC, so it is highly preferred to use pool pallets.	
	Disposable pallets	
DIMENSIONS	As a reminder, two dimensions are accepted for pallets: 800x1200mm and 1000x1200mm. 800x1200mm pallets must be equipped with 3 floor elements (skis) and 9 dices. 1000x1200mm pallets must be closed with perimeter bars to ensure its solidity and must be equipped with 5 floor elements (skis) and 9 dices.	
	The ½ of ¼ version of these pallets are only accepted if agreed upon by the retailer.	
MATERIAL	Not each distribution centre accepts pallets of any type of material. Therefore, suppliers must align with their retailer for this. Quality of pallets is key in an automated DC, so it is highly preferred to use pool pallets. This also determines the material used.	
COLOUR	Suppliers must align with their retailers in advance to check if the used equipment is capable of processing the pallet colour at hand. This is especially required for dark pallets without lighter accent stripes.	
QUALITY	<p>For the quality of wooden pallets, we refer to the ISO 18613:2014⁽¹⁾ standard, which specifies the maximum defects and damage allowed before it shall be repaired, as well as the minimum repair criteria that shall be used.</p> <p>Pallets should preferably be obtained from a pool with an active quality control program. Furthermore, the quality of the ground support must be assessed in light of the following main criteria:</p> <ul style="list-style-type: none"> • Presence of all the boards and blocks constituting the pallet ⁽²⁾ and guaranteeing: <ul style="list-style-type: none"> - The safety of operators during handling operations - The preservation of goods during the various logistic operations - The pallet's ability to fully fulfill its primary functions of handling/transport/storage support - Enough space to allow the forks to pass through ⁽³⁾ <p>Compliance with the exchange criteria established by EPAL⁽²⁾, ensures compliance with these criteria.</p>	

(2) Particular attention must be paid to compliance with handling best practices to ensure the integrity of the pallet insofar as automatic integrity checks can be carried out by the Distributor.

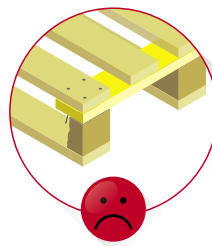
(3) This criteria does not apply to a 1,000 x 1,200 pallet support when it is placed on a slave pallet support on the ground.

**FAILURE
ILLUSTRATIONS**

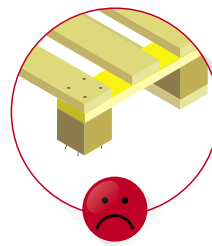
As an illustration, the main issues observed in an automated distribution centre:



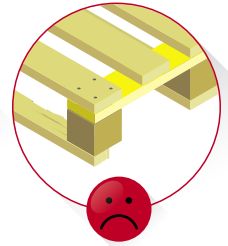
Missing
block



Incomplete
block



Missing
board


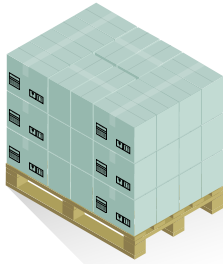

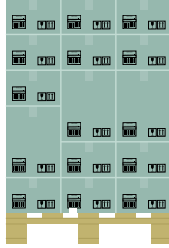



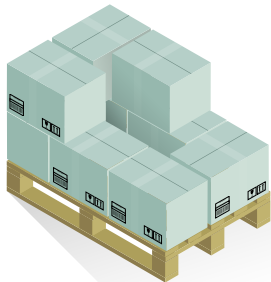


Broken
board

The pallet should be clean (e.g. if possible, no barcodes attached/printed on the pallet) because an optical scanning system must be able to recognize it.

7. Loaded pallet requirements

7.1 Case placement

	Different horizontal orientation of cases on a layer	<p>It is authorized that cases on a layer have a different horizontal orientation in order to stabilize the pallet. Example of what is accepted:</p>	
	Different case heights on a layer	<p>The height of each layer must be uniform over the entire pallet. Examples of what is not accepted:</p>	
	Tunnel ⁽⁵⁾	<p>Tunnel processing may not be robotics-compatible depending on the depalletizing technology used. It is therefore the Supplier's responsibility to ensure that this practice is compatible with the robotic system of its customer.</p> <p>Example of a tunnel, for illustration purposes:</p>	
	Chimney ⁽⁶⁾	<p>Chimneys are allowed if this preparation diagram corresponds to the decision of the Supplier in order to optimize the stability and the surface of the pallet, even when the pallet is uncovered or unwrapped.</p> <p>In this case, the Distributor must validate the palletization plan in order to ensure compatibility with its installation.</p> <p>Example of a chimney, for illustration purposes:</p>	

(5) Existence of an empty space at the level of a pallet layer, from one edge to the other, separating said layer into two distinct blocks.

(6) Existence of an empty space inside the pallet, from bottom to top, in each layer.

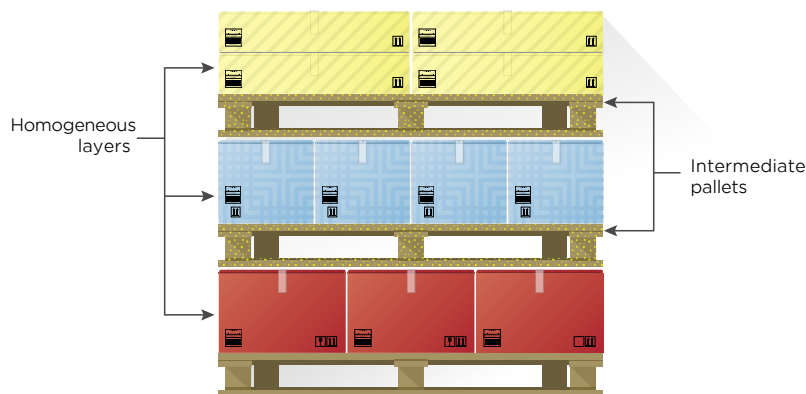
7.2 Layer placement & content

In an automated DC, layers are depalletised automatically. Therefore, a pallet and its layer must comply with the following requirements:

- Each layer of the pallet must be full and contain the same number of cases
- Products on a pallet must have at least the same GTIN
- A pallet must have at least 1 layer

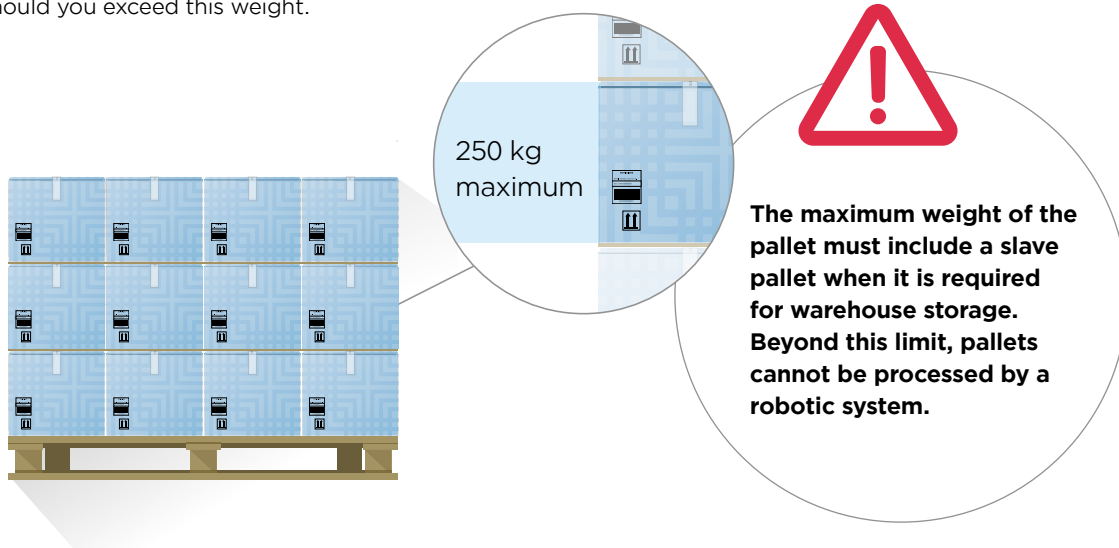
The same requirements apply to stacked pallets, also referred to as sandwich pallets. These are groups of pallets that are stacked for shipment and must be destacked before being offered to the automated system.

When pallets are stacked they should be considered independent logistic units. Each layer has to be separated by an intermediate pallet (800*1200 or 1000*1200), which has to respect the same requirements as the ground support.



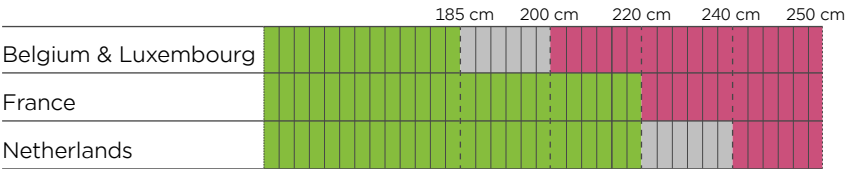
7.3 Layer weight

The maximum weight allowed per layer is 250 kg. Consult your retailer should you exceed this weight.



7.4 Loaded pallet height

The maximum height of a loaded pallet (as a handling unit, pallet support included, slave pallet not included) differs from country to country and is explained in the schema below.



Transport units can be higher because they must be destacked before offering to the automated DC:



7.5 Loaded pallet weight

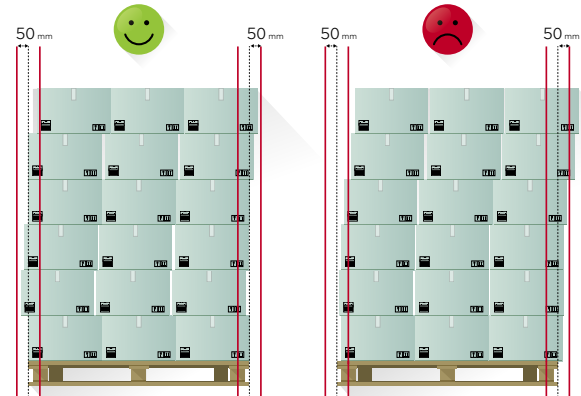
The maximum weight of your loaded pallet must comply with the demands that are being set for the specific pallet support used. Each type of pallet support has different technical characteristics, including a maximum weight it can carry. Please consult your pallet provider for these specifications.

7.6 Loaded pallet overhang


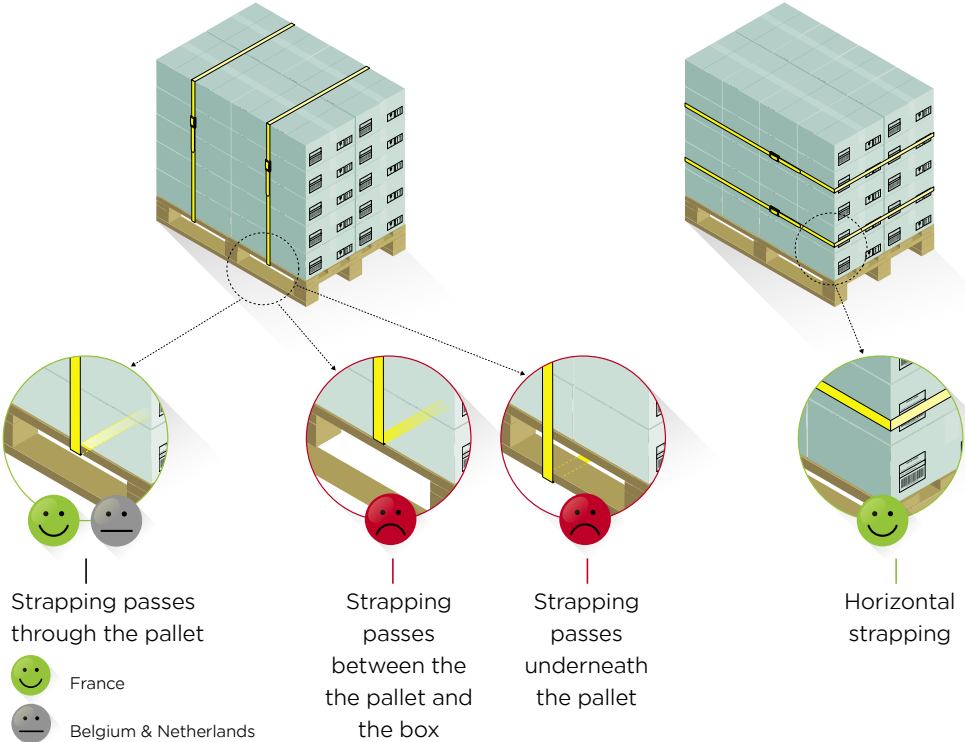



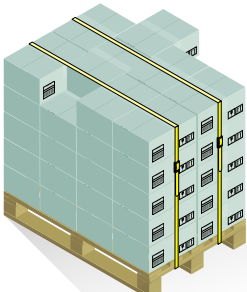
The maximum overhang of a pallet, inwards and outwards, on both sides (cover included) and over its entire height, is 50 mm per side. Aim to position the goods as such, that centre of gravity is in the middle of the pallet.


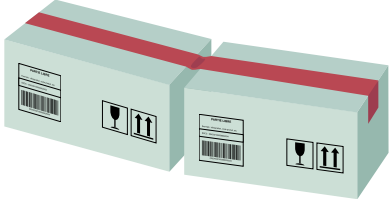

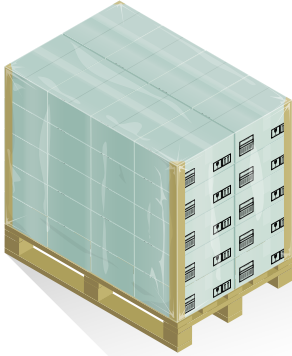

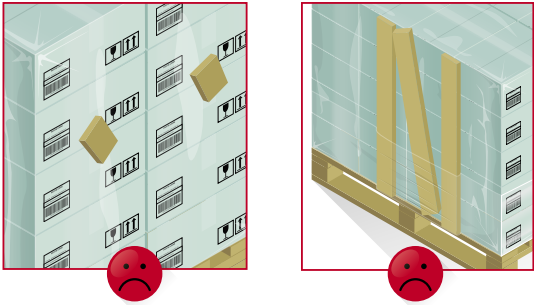

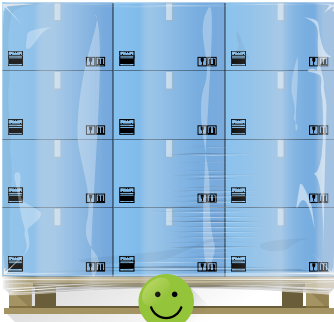
These tolerances cannot be cumulated on one side and they apply after acceptance of the goods at distributor side.

When unwrapping the pallets, the products cannot expand more than the agreed overhang.





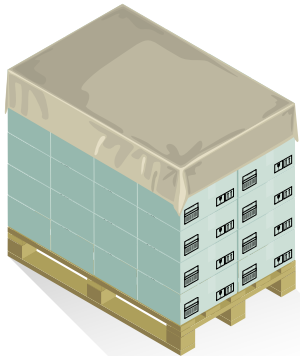


7.7 Loaded pallet securing

		REQUIREMENT
 Straps	 <p>Strapping passes through the pallet</p> <p>Strapping passes between the pallet and the box</p> <p>Strapping passes underneath the pallet</p> <p>Horizontal strapping</p> <p>  France  Belgium & Netherlands </p>	<p>The image below shows how straps can be used to secure a pallet and how they can't. Securing should be done in such a way that boxes are not damaged</p>
 Straps	<p>Straps may not be used to secure several cases to each other:</p> 	

	Glue	<p>The usage of glue should be minimized as much as possible, because of its polluting effects. Next to that, strong glue, tape or wax will block the robotic equipment and could also damage the products. When you use glue between layers and cases, they must be easy to detach from each other with either a horizontal (slide) and/or a vertical (lift) movement.</p> 
	Corner support	<p>The use of corner support should be avoided, as it requires a manual intervention⁽³⁾. When destacking one layer, the distributor has to remove the complete corner support manually. This practice is only accepted to solve stability issues when the staple pattern cannot be optimized.</p> 
	Smooth form surface	<p>The top and each side of the pallet must have a smooth form surface</p> 
	Stretch wrap	<ul style="list-style-type: none"> • Colour: The use of dark wrapping must be avoided. Dark colours absorb the rays of the sensors of the robotic equipment, which causes malfunctioning. Next to that, its use is undesirable from an environment/sorting waste point of view. Dark and white wrappings have to be sorted before collection by a waste disposal service. • Fork opening: <ul style="list-style-type: none"> - It is recommended that 2/3 of the fork opening has no wrapping, as not to hinder the passage of the forks. <p>Wrapping cannot pass underneath the pallet. This causes issues with chain-movement-tracks and roller-tracks. It is also not possible to completely remove the wrap at the defoiling stage.</p> 

⁽³⁾ With the technologies available on the market today, corner supports cannot be processed by a robotic system.

	Stretch wrap	<ul style="list-style-type: none"> • In an exceptional case and in agreement between both parties, your wrapping could cover the full fork opening. In this case, it must be able to be pierced by the forks of the forklift and you need the agreement of the distributor as this is subject to testing. This is not a recommended practice. • The wrap must be cohesive to the pallet. Wrapping knots around the pallet blocks are prohibited. Wrapping residue from previous use must be removed. 
	Slip sheets	<p>Please find below the requirements that apply when you use slip sheets, of any type. Consult your distributor when you can't comply to them.</p> <ul style="list-style-type: none"> • Material <ul style="list-style-type: none"> - Flat cardboard and corrugated paper with a minimum weight of 120 g/m2 are accepted when these are inflexible and rigid enough to be manipulated by the mechanical device and in accordance with the palletizing pattern. - Friction coated slip sheets are allowed when they don't stick to the case. - Non-transparent polypropylene plastic is accepted • They must be flat • They must be in one piece • They must be large enough to cover the layer as much and as little as possible and can't be bigger than the pallet. • It is preferred that they don't have holes. If there are holes, they should be limited in number and as small as possible. For example, holes to allow the passage of the pins used to stabilize boxes that are palletized in columns. In any case, the holes may not interfere with the functioning of the depalletizer. • There can only be one slip sheet per layer • Within the same pallet, slip sheets must be identical • They may not be folded • It is not allowed to glue slip sheet to the cases • They can be printed (e.g. marketing, branding), under the condition that they are present on each layer⁽⁴⁾. • It is acceptable to have a top slip sheet but only when it is needed to guarantee the quality of the product. Top slip sheets require specific handling⁽⁵⁾ and should not be used when not needed. • If slip sheet are used, the material should be of such quality that it cannot be deformed during the suction process. <p>In any case, the thicker the sheet, the less chance of errors and blocking of the automated system.</p>
	Hoods	<p>The use of hoods should be avoided, as it requires a manual intervention⁽⁵⁾. This practice is only accepted to solve integrity issues or to protect the product when necessary.</p> 

(4) Depending on the robotic system in place, prints can hinder the automatic detection of the slip sheets. When there are prints applied, the system is parameterized so that it removes slip sheets without visual recognition.

(5) With the technologies available on the market today, top slip sheets cannot be processed by a robotic system.

7.8 Case specifications


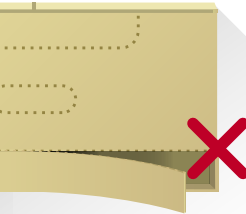


Cases must have the following characteristics for automated processing:

- General parallel shape
- The base must be rectangular/square shaped
- Symmetrical top surface

The automation of other case formats (e.g. quincunx) will have to be studied on a case by case basis between the supplier and its customer.

Particular attention must be paid to the burden of transparent and smooth surface products (e.g. PET or glass lemonade bottles) because these logistics units will be difficult to detect by the sensors.

Packaging requirements

	RIGIDITY	INTEGRITY	STABILITY	COHESIVE
Definitions	Package that resists torsional forces, shear and that does not bend	Package that retains all its parts, which has not suffered any loss	Package that maintains its balanced position	Package of which all parts are mutually supportive
Vigilance points	<ul style="list-style-type: none"> • Packages containing products with flexible packaging • Packages in plastic packaging (e.g. diapers in bags) • Package fillings 	<ul style="list-style-type: none"> • Pre-cut packages • Packages incorporating products with "sport" caps 	<ul style="list-style-type: none"> • Package bottoms (flat bottoms are recommended) • Package stability can be ensured by the application of the previously indicated ratios (see next page) 	<ul style="list-style-type: none"> • Packages with handles • Assembled cardboard (maintenance of glue points)
Failure illustrations				

+ Packaging may not have loose lids

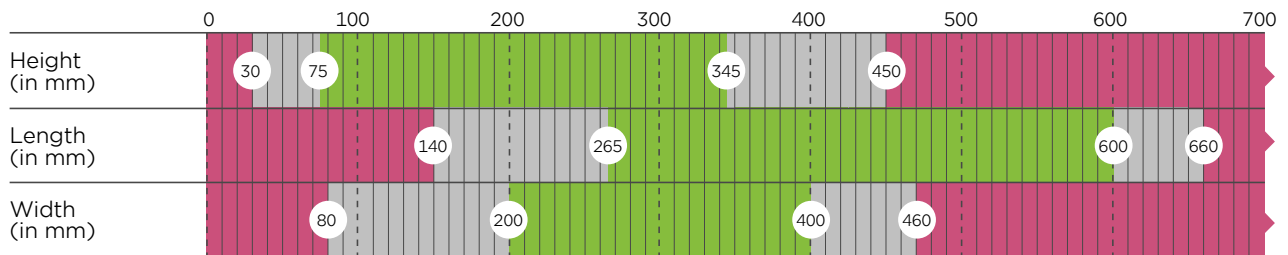
+ Openings in cartons should be avoided, to prevent products to fall out.

+ If the shrink wrap is not applied tight enough, it can cause instability and faulty transportation on the conveyor belt.

Dimensions

With the technologies available on the market today, the dimensions of the package are included within the following ranges to ensure their processing in a robotic warehouse. Outside of these ranges, packages cannot be processed by a robotic system. Possible exceptions can be discussed bilateral between supplier and distributor.

The image below explains those different ranges:



- Range of dimensions allowing the automated processing of packages, under the condition they comply with the requirements indicated in this guide and the following ratios:
 $\text{Height} / \text{Width} \leq 2.1$
 $\text{Length} / \text{Width} \leq 4.2$
 $\text{Height} / \text{Length} \leq 1.5$

- Range of dimensions allowing the automated processing of packages under the condition they comply with the requirements indicated in this guide, the previously indicated ratios and the system used by the Distributor⁽⁷⁾

- Range of dimensions excluding automated package handling

For the same reference, the dimensions of the packages should not vary from one delivery to another. In the event of a change in dimensions, the supplier must inform the distributor in advance in order to allow the new parameterization of the mechanized installation before receiving the products.

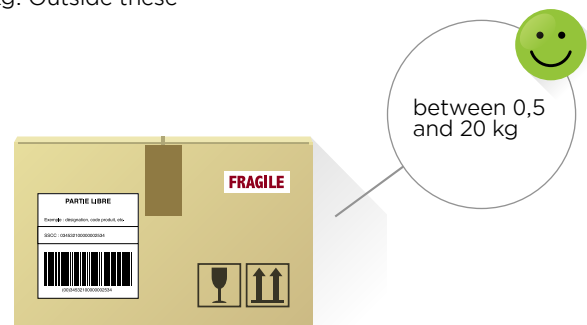
Trays

For trays without plastic wrapping, the height of the tray must be at least 5 cm and must be at least 1/3 of the height of the product.

Prevent holes at the bottom of trays or totes because they avoid the generation of the necessary vacuum by the depalletizer.

Weight

The weight of the package must be between 0,5 and 20 kg. Outside these limits, the distributor must be consulted.



⁽⁷⁾ It is the suppliers' responsibility to ensure that packages with dimensions within this range are compatible with the distributors' robotic equipment.

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