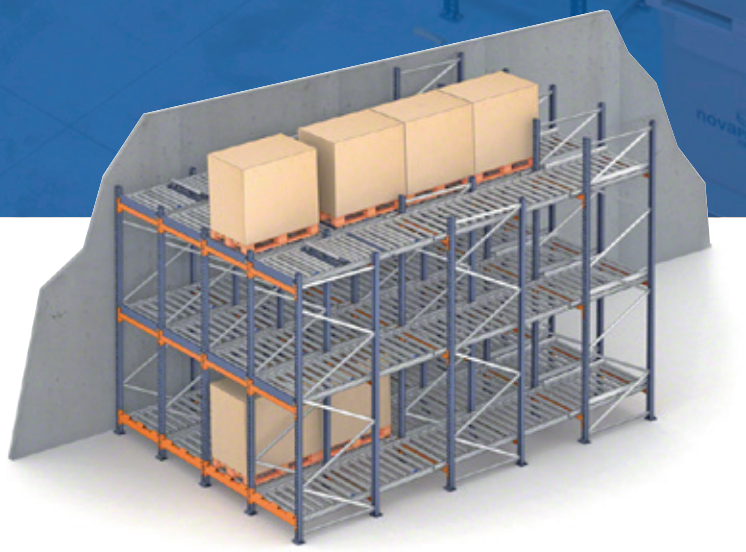
Live Pallet Racking

Perfect pallet rotation thanks to movement of the load by gravity

MECALUX

General Features of Live Pallet Racking



Live storage racking for palletised loads are compact structures that incorporate roller track sections placed on a sloped lane to allow the pallets to slide over them.

The pallets are put in at the highest part of the rolling section and move by the force of gravity and at a controlled speed towards the other end, where they remain until they are ready to be removed.

Live storage pallet racking is ideal for the following areas, where palletised loads are handled:

- **Perishable goods warehouses.**
- **Intermediate warehouses** between two working zones.
- **Dispatch areas,** where pallets need to be removed quickly.
- **Holding warehouses** (prepared orders, classification channels in automatic circuits, etc.).

Perfect rotation
Live storage enables perfect rotation of stored products, with the FIFO (First-in, First-out) system, where the first pallet to be put in is the first to be taken out.

When the first pallet is taken out, the others move forward one position, so the preceding pallet is always at the front.

This makes it ideal for storing perishable goods.

Lubricant Industry

Frozen bread/bakery sector

Advantages

- **Perfect product rotation** using the FIFO system.
- **Maximum capacity** as this is a compact storage system.
- **Time saved when pallets are removed.** All products are easily located, thus reducing forklift manoeuvring time, as travelling distances are minimal.
- **Elimination of clashes in aisles,** since the loading aisles are separate from the unloading aisles. The forklifts place and remove pallets without interruptions.
- **Excellent stock control.** Only one reference is stored in each loading aisle.
- **Easy access,** as all the available references stored in the same aisle.
- **Safe, reliable system.** The different elements that make up this system have been designed to ensure simple, dependable, safe handling.
- **Fast return of investment.** The savings in space, the reduction in manoeuvring time and the fact that this system requires next to no maintenance means that, in most cases, the investment is recovered in a 2 to 3 year period.
- **Can be adapted** to suit the requirements and load units of customers.
- **Fast installation.**

Automotive Industry

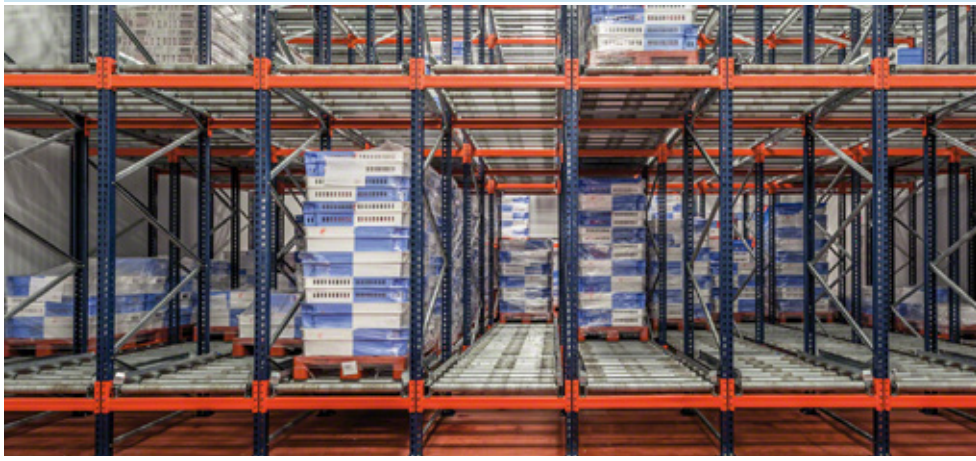
Chemical/Perfume Sector

Sectors where the system can be used

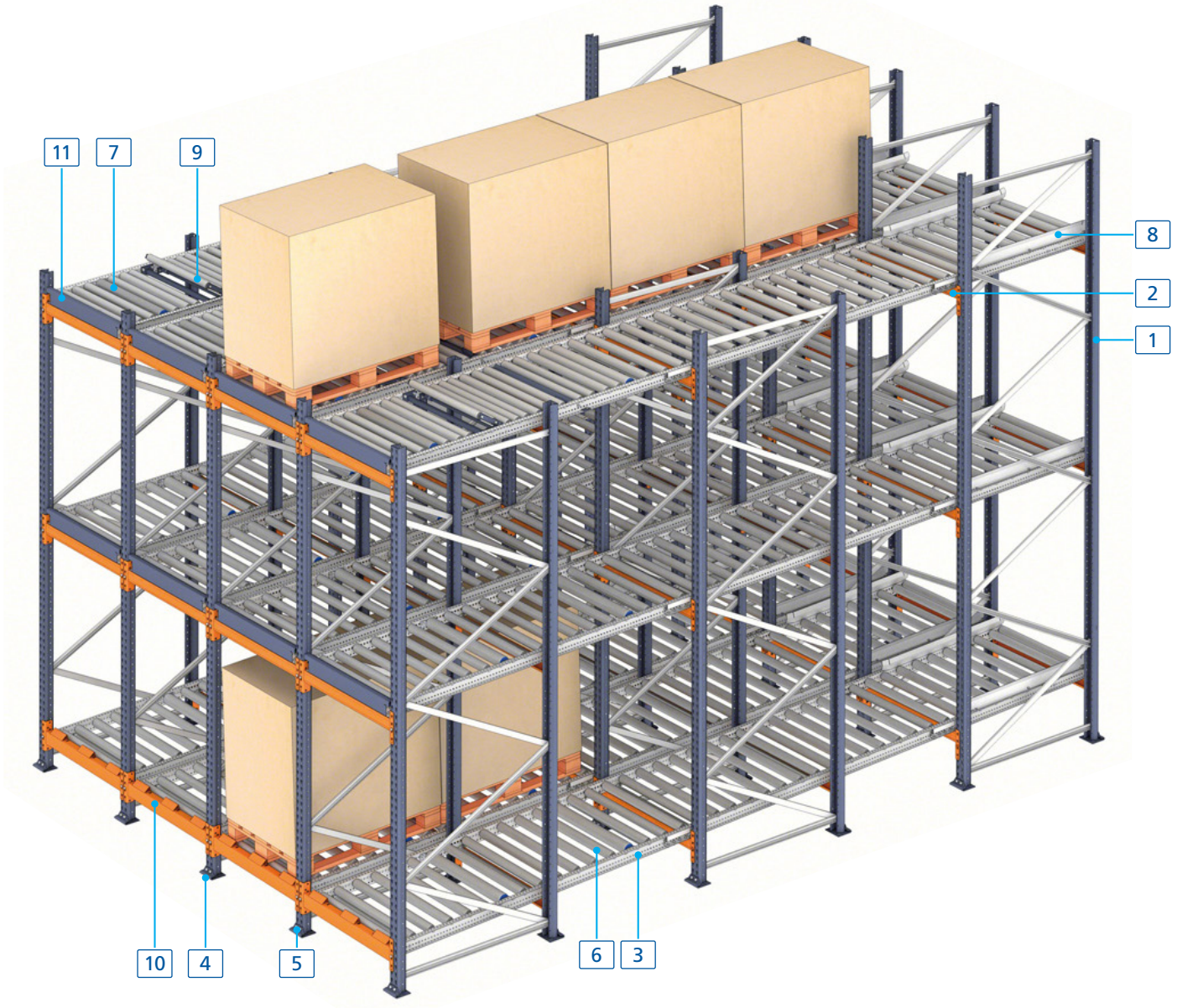
The many advantages and versatility of this system make it suitable for use in any industry or distribution sector, such as the food, automotive, pharmaceutical and chemical industries, to name a few.

A live storage pallet racking block is usually installed next to conventional pallet racking and is reserved for products with a fast turnover, or a shorter expiry date.

Food sector

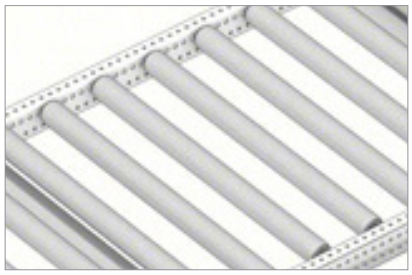


Basic Components



Components

1. Frames
2. Dynamic Beam
3. Dynamic Profile
4. Levelling plates
5. Anchor bolts
6. Rollers
7. Brake rollers
8. Brake drums
9. Centralising strips
10. Pallet retainers (optional)
11. Exit beam
12. End stop



Rollers (6)

The characteristics of these parts ensure the pallets slide smoothly over them.

The spaces between them and their diameter vary, depending on the characteristics of the pallets and how much they weigh.

Brake rollers (7)

They control the speed at which pallets move, and act directly on them, depending on the force that is generated. The greater the speed or weight, the greater the braking force.

These are raised slightly above the rollers, and the distance between them depends on the weight and size of the unit load.

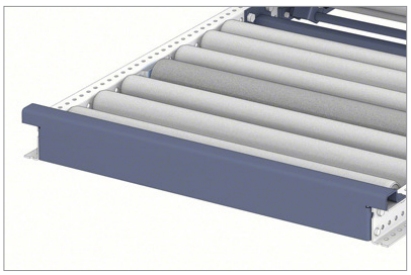
Centralising strips (9)

These center the pallet at the entrance to the aisle.

Exit beam (11)

This is the beam that is positioned at the end of the channel, into which the dynamic channel's profiles are fitted.

It has retaining bumpers incorporated.



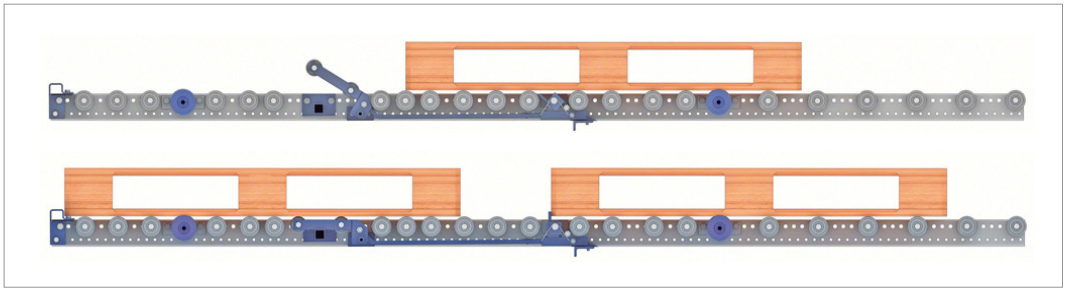
End stop (12)

This replaces the exit beam when the channel protrudes past the supporting beam.

Pallet retainers (10)

These retain or separate pallets, making it easier to extract the first pallet, or subdividing the pressure they exert on each other. The pallet retainers are equipped with a set of elements that make it possible for the rest of the pallets to be retained while the first one is being removed.

These retainers are optional and whether or not they are installed will depend on the specific characteristics of the installation and on the lifting equipment used (forklift trucks or robotics).



Close-up showing the workings of a pallet retainer.
The pressure that the first pallet applies to the retainer handle activates the tabs that hold the second pallet in place.

Clearances

The levels of clearances that apply to a live storage pallet racking installation depend on the dimensions of the pallets, the depth of the installation, maintenance machinery, etc.

The usual levels of clearances are shown below.

1. Bay width and height
The distance between uprights (or beam measurement E) is equal to the front width of the pallet with load (measurement A) plus 160 mm (which is 80 mm on either side).

The roller length (dimension D) must be 30 mm greater than the width of the base of the pallet. If the load overhangs the edges of the pallet, it does not affect the roller measurement but it does affect the width of the aisle and therefore also affects the length of the beams (figure 5).

Figure 6 below shows the profiles fitted directly on the ground, to reduce height (F).

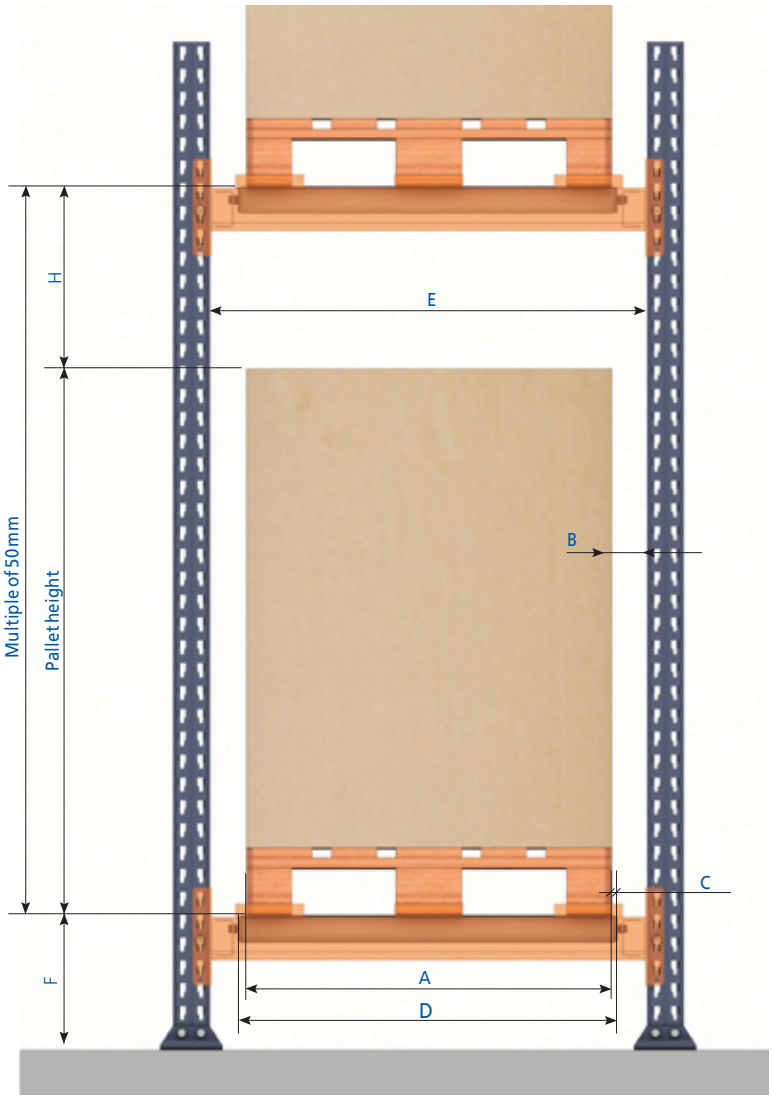


Figure 5

A	B	C	D	E*	F	H**
800	80	15	830	960	284	400
1,000	80	15	1,030	1,160	284	400
1,200	80	15	1,230	1,360	284	400

Dimensions in mm.
* In the event that the width of the load exceeds the width of the pallet, the lane width (E) is increased.
**(H) minimum of 400 mm.

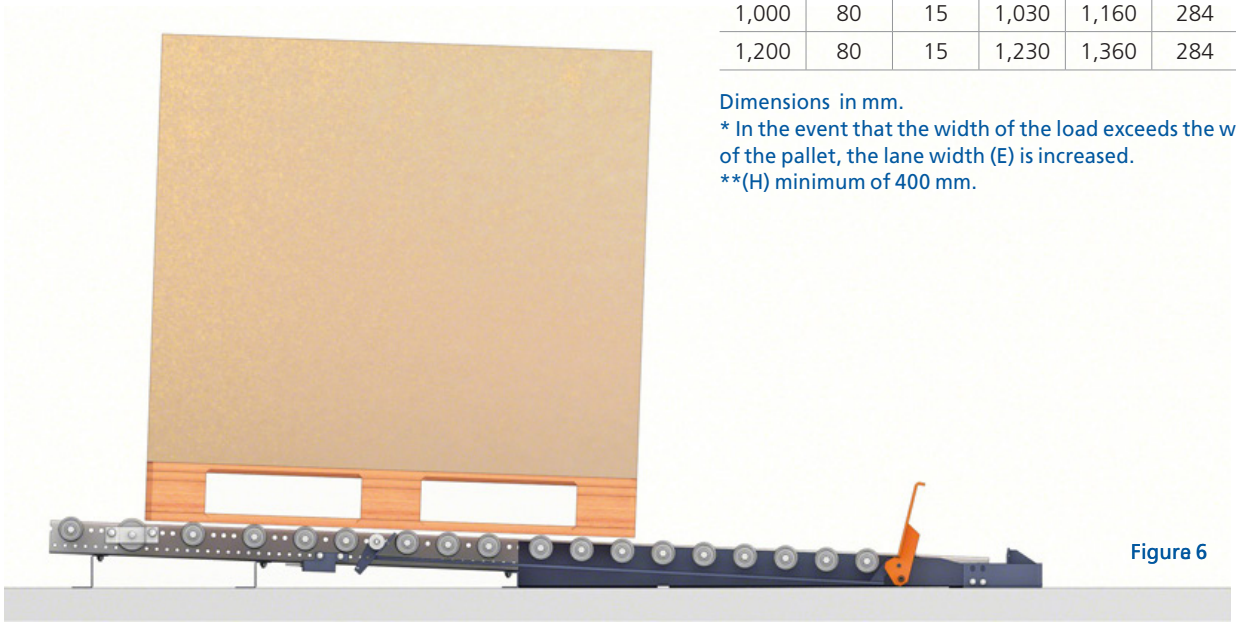


Figure 6

2. Depth of the racking

The depth of the racking (dimension X) is obtained by adding the measurements of all the pallets plus a variable tolerance, according to the number of pallets and the construction system (figure 7).

If pallet retainers are installed, the measurement will be greater, as a space of approximately 300 mm is needed between the two pallets.

The usual gradient of the slope is 4%.

The following drawings show two examples of racking depth, both of which have pallets of 1,200 mm deep. The first example does not have a pallet retainer but the second example does have one installed (figures 7 and 8).

Figure 7.
Example without pallet retainer (gradient of 4%).

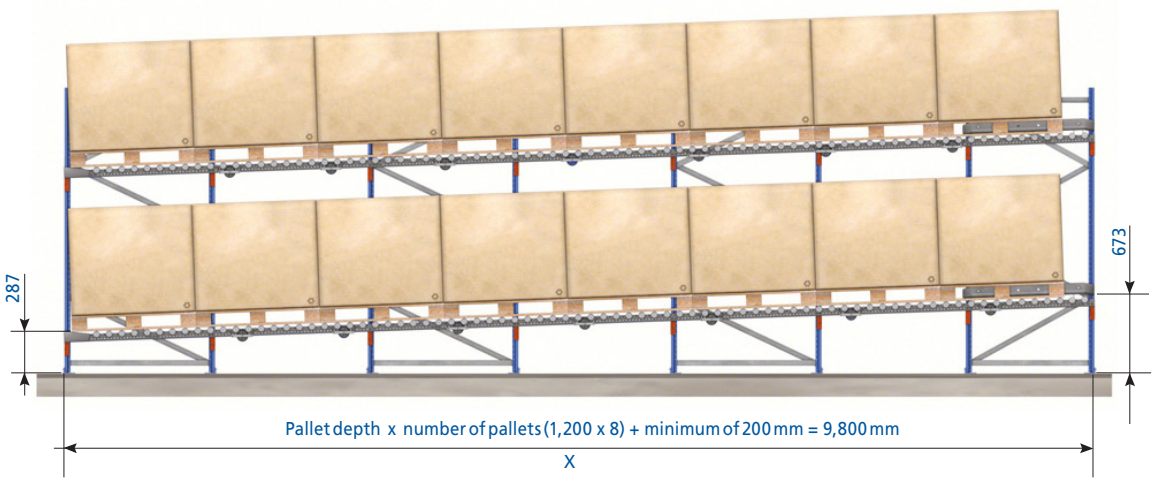
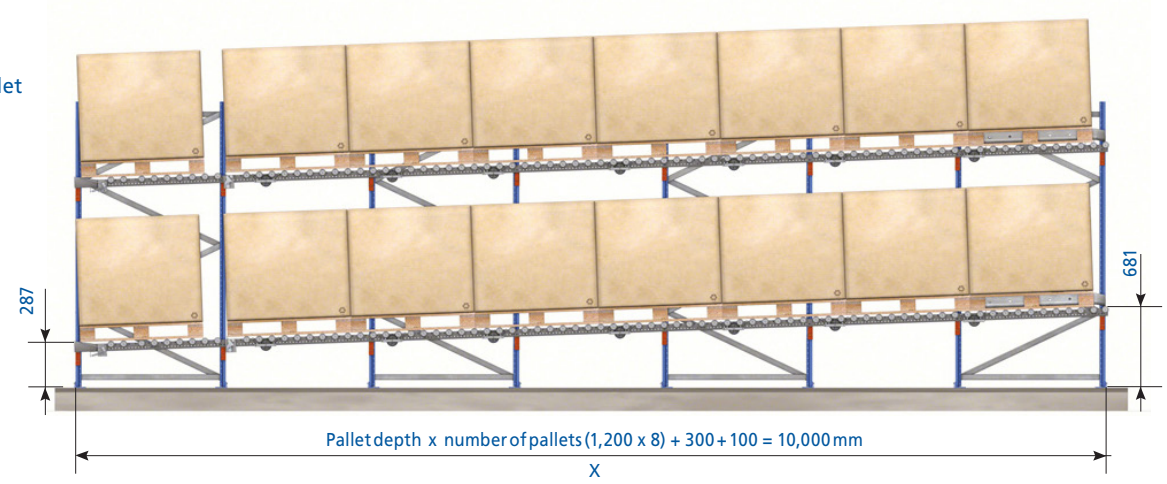
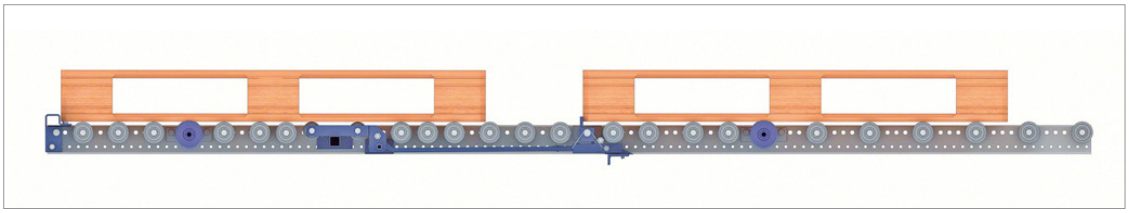


Figure 8.
Example with pallet retainer (gradient of 4%).





This close-up shows the tolerance level that is needed between two pallets, for the retainer to be activated.

Operation

Direction of handling

Pallets are usually handled from the narrowest side and move inside the rolling sections with their skidsperpendicular to the rollers (figure 1).

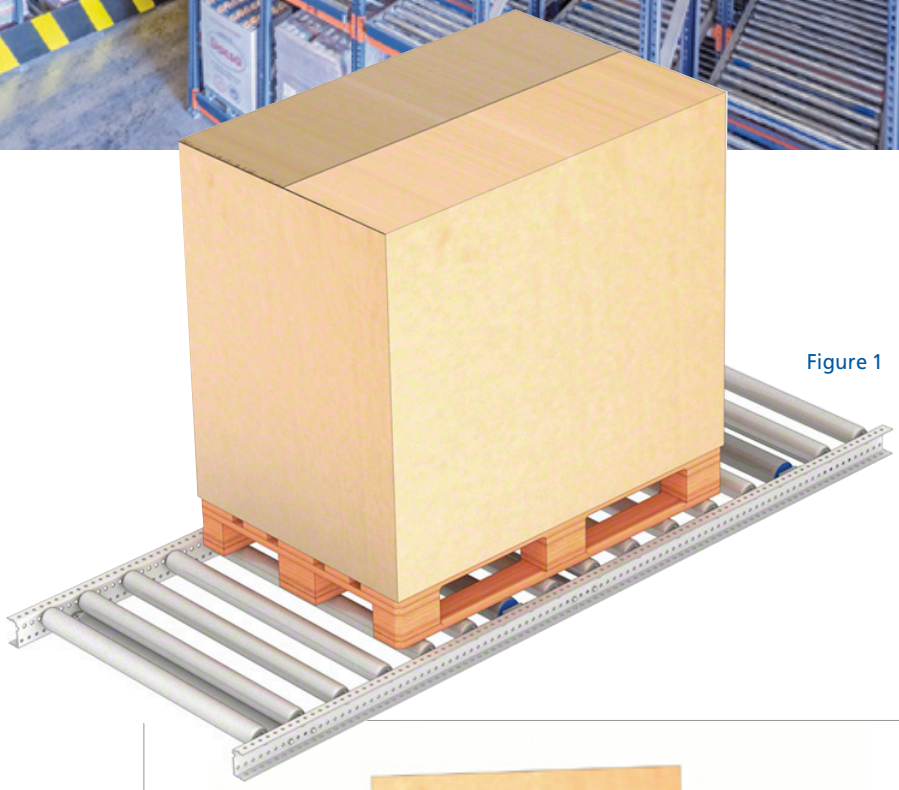


Figure 1

Of course, it is crucial that good quality pallets are used in order for the system to operate correctly.

The distance between the rollers can vary, depending mainly on the weight and characteristics of the pallets. Dimension Y must be a multiple of 75 mm (figure 2).

The same is true of the distance between the speed regulators, usually brake drums (dimension X), since their function is to ensure that the pallets move at a controlled speed (figure 2).

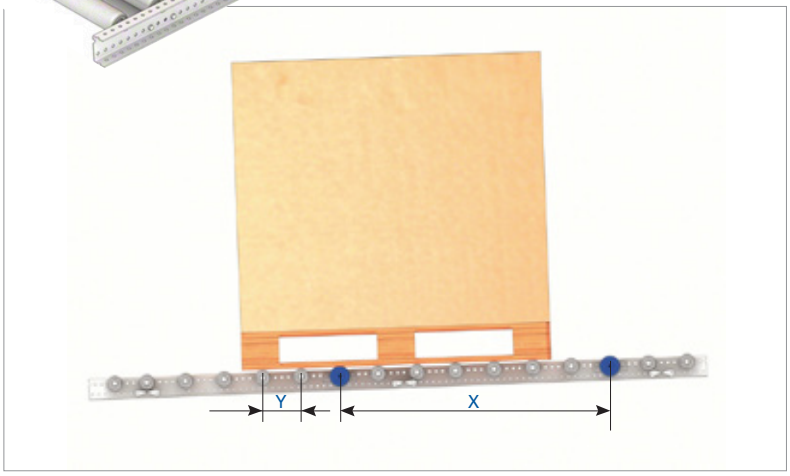


Figure 2. Approximate gradient of roller beds is 4%.

Figure 3

In shallow rolling sections, the pallets can be handled by their widest part. In other words, they move along with their skids parallel to the rollers (figure 3).

The quality and state of the pallets is also very important, although when defining the distance between the rollers it is also necessary to take into account the width of the skids, which shouldnever be less than 100 mm.

In this case, are only installed when storing more than two pallets deep, and depending on the load.

There must be a distance of 75 mm (dimension Y) between rollers and of 100 mm (dimension Z) between rollers and brake rollers (figure 4).

The distance between brake rollers (dimension X) depends on the dimensions and weight of the pallets (figure 4).

This solution can also be used with perimeter-base pallets.

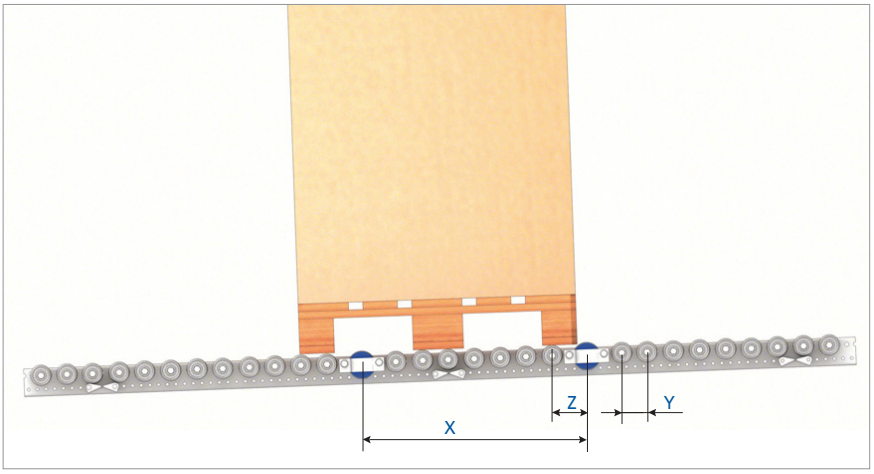


Figure 4. Approximate gradient of roller beds is 4%.

Applications for the live system

There are two solutions, whose main difference lies in the way that goods are managed:

Traditional system (FIFO system)

This is the most commonly used system. The pallet is loaded on the rollers in the input side and rolls by the force of gravity to the output side.

It is the ideal system when the store serves as a buffer between two areas and perfect stock rotation is required.

Various different lifting devices are used: counter-balance forklift trucks, reach trucks, bilateral and trilateral turret truck and stacker cranes amongst others.

Push-back with rollers (LIFO system)

The goods are loaded and unloaded from the same aisle. The first pallet is placed in the first position of each aisle. The forklift puts the second pallet in place. This pushes the first one along, taking up its position, and so on. Thus, the first pallet placed in storage is the last to be retrieved (LIFO system).

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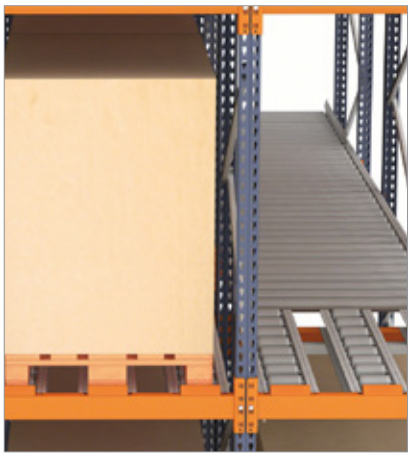
Adaptation of the live system



Combination with split rollers

If the handling equipment has rigid masts (stacker trucks, turret trucks or stacker cranes) it may be necessary to have split rollers at the entrance and exit of each aisle.

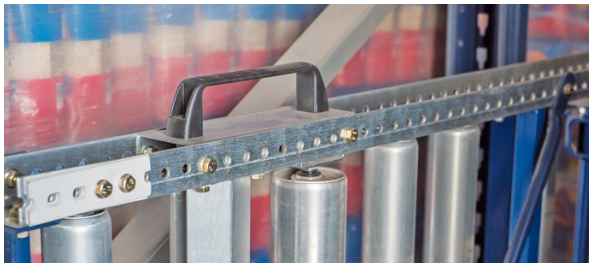
Intermediate retainer

Second pallet retainer, specially adapted for placement between intermediate pallets to reduce pressure in very long aisles.

Adaptable for different types of unit load

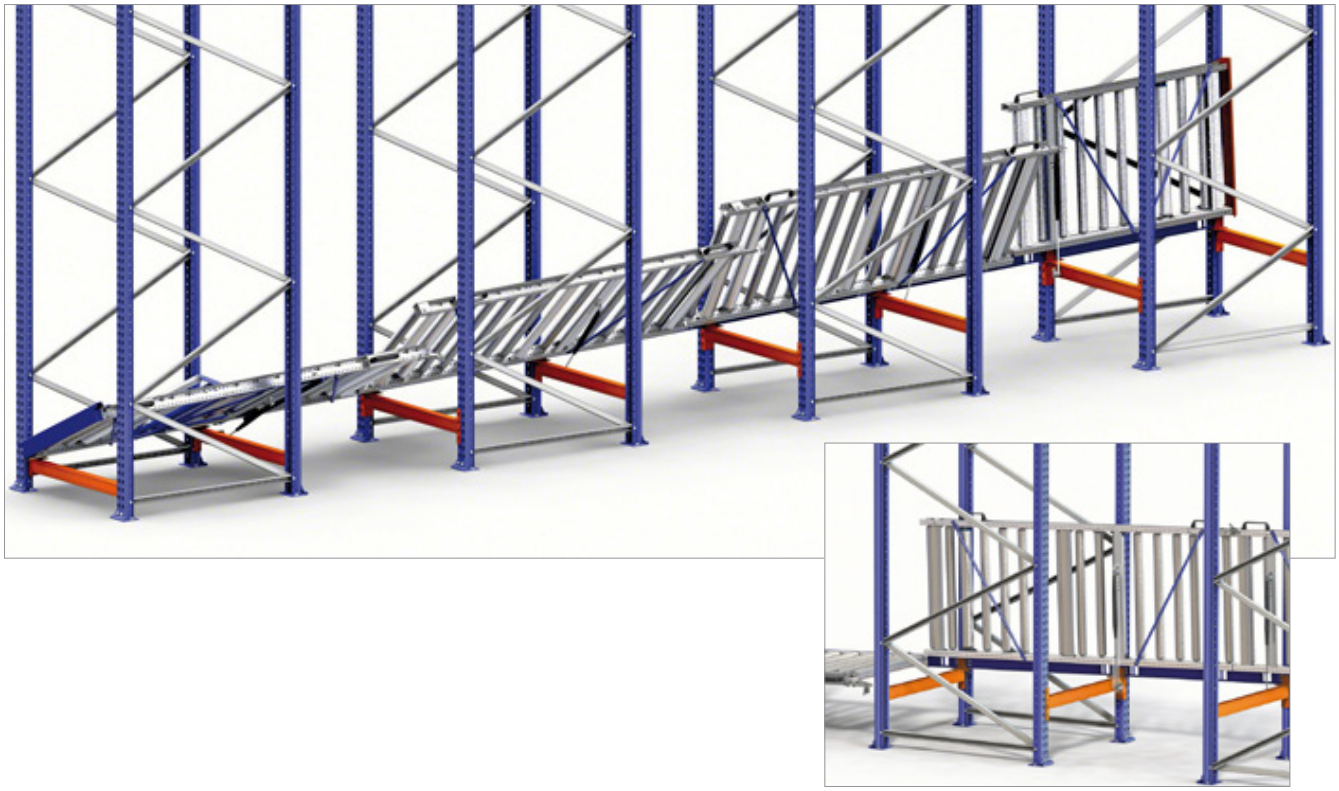
Half pallets
In some situations, half pallets can also be stored on live storage racking.

Metal containers
Live storage can be adapted to store metal pallets or containers. In these cases, specific analysis is required.



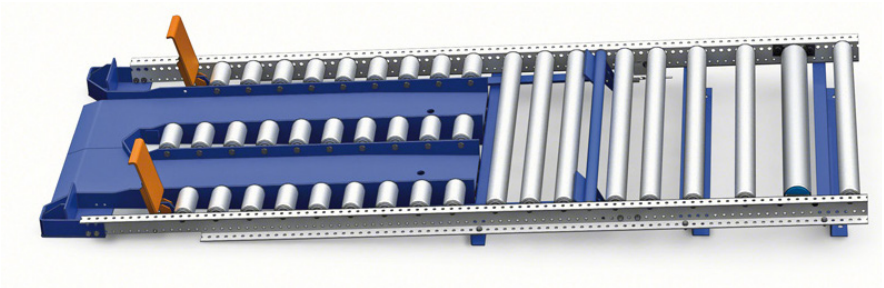
Hinged channels

Hinged channels can be installed at the bottom of installations as needed, in order to allow for the performance of maintenance tasks at ground level.



Levels set into the floor for pallet trucks

These are common in production and dispatch areas, allowing for the unloading of pallets at ground level using pallet trucks.



Live racking for picking operations

It is very common to install live racks for picking high consumption products (A products), fitting channels at ground level, or just above.

Normally these channels have a capacity of two, three, or four pallets in depth, which means stock reserves are always available in the same channel.

With this solution, there is no potential for clashes between equipment for loading pallets and personnel preparing orders, since work is completed in separate aisles. There are different types of channel for picking directly from pallets.

The dimensions, the shape of the channel and the distribution of the rollers are determined by the pallet itself, its weight, and the side by which it is inserted into the rack.

Combinations with picking operations

Different combinations of picking channels are possible, along with storage methods and the distribution of stock reserves.

1 In these two illustrations, dynamic levels are installed in one direction. This enables replenishment of picking posts, which are also live storage, but in the opposite direction. Pallets from the upper levels are placed on the lower picking levels.

In figure 10, only one dynamic picking post is replenished. A static picking post can be installed on the other side of the aisle.

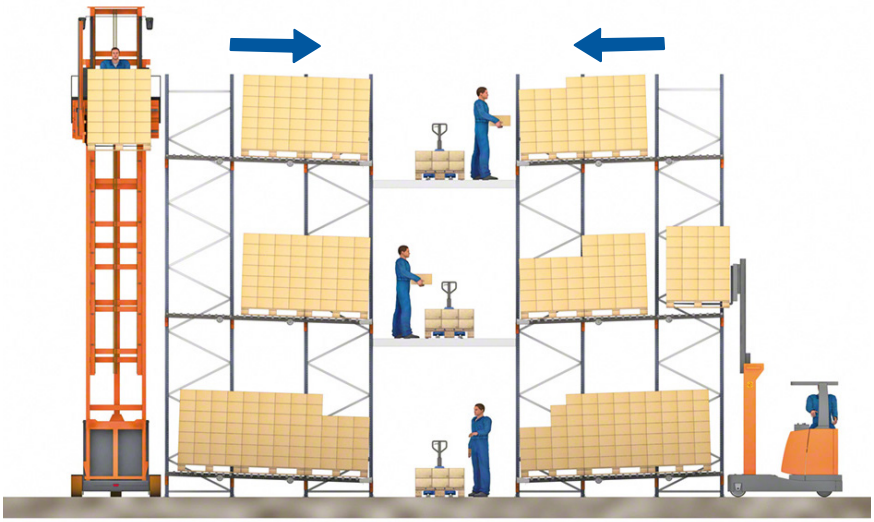
In the second solution (figure 11), there are live storage picking posts on both sides of the aisle.

Figure 10

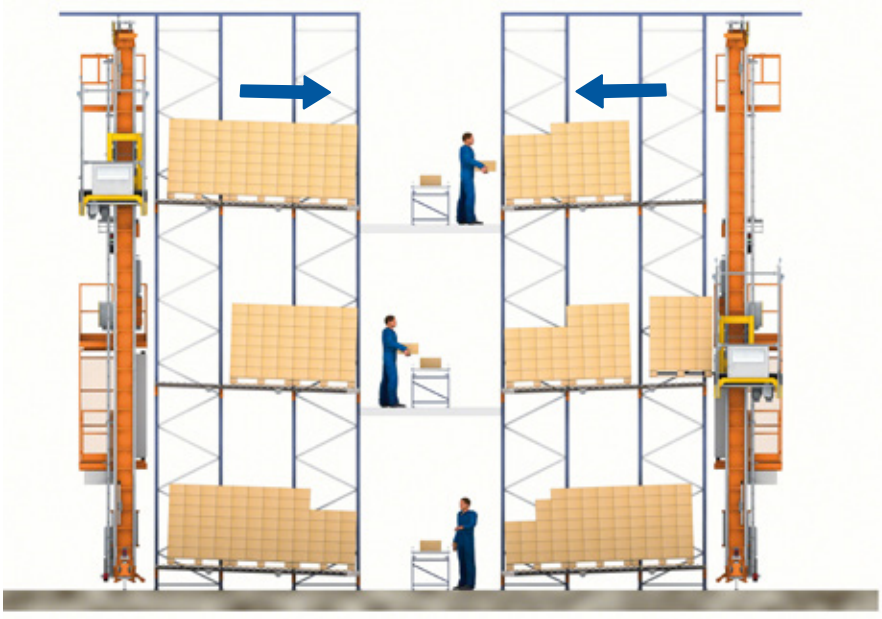
Figure 11

2 Live storage levels with entry and exit from the same aisle, replenishing picking levels located underneath. The top of the racking on the same side as the picking aisle must be fitted with mesh to protect from falling goods. As is the case in the previous pictures, the pallets from the upper levels are placed on the lower levels.

3 Live storage levels with entry and exit from both sides to replenish lower picking levels. Here picking from the pallet is combined with picking from boxes. The boxes are taken from the pallets and placed in the live channels for boxes.



4 Picking posts for pallets on various levels, replenished with pallets from the reserve warehouse. In this solution, the lifting device used is a turret or reach truck. The person preparing the orders places the goods on a trolley or a pallet truck.

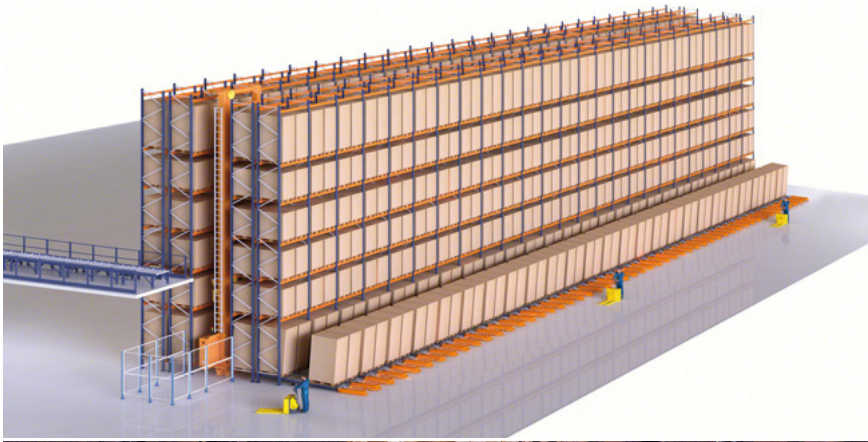


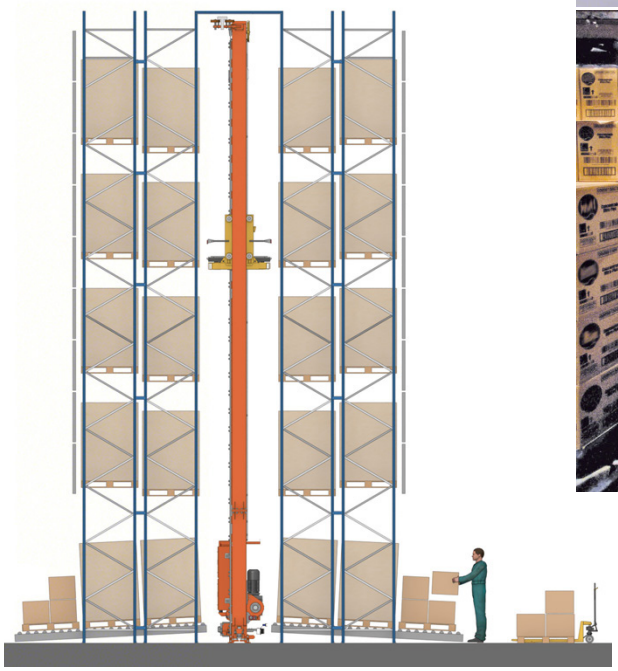
5 This solution is similar to the previous one, except that in this case the lifting devices used are stacker cranes and the prepared goods are placed on conveyor belts.

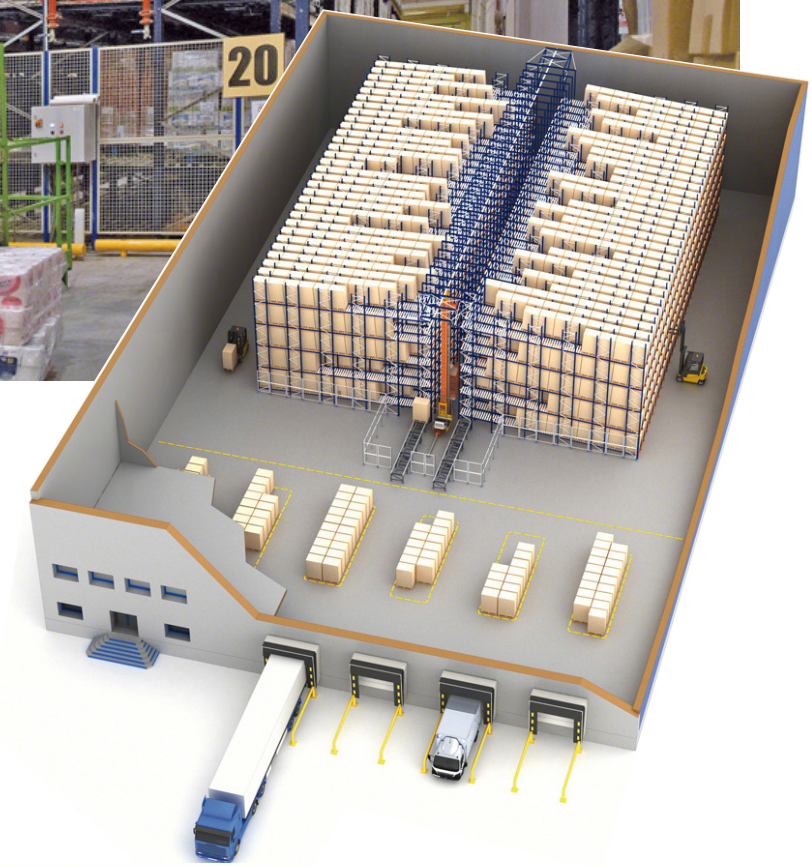
Of course, in addition to the examples shown here, there are many other possible applications, combining any of the aforementioned solutions.

6

Another common solution is to combine an automated warehouse with live racking. The live channels are installed in the lower level, while the reserve stock is placed in the spaces of the upper levels.







Automated warehouses with live racking

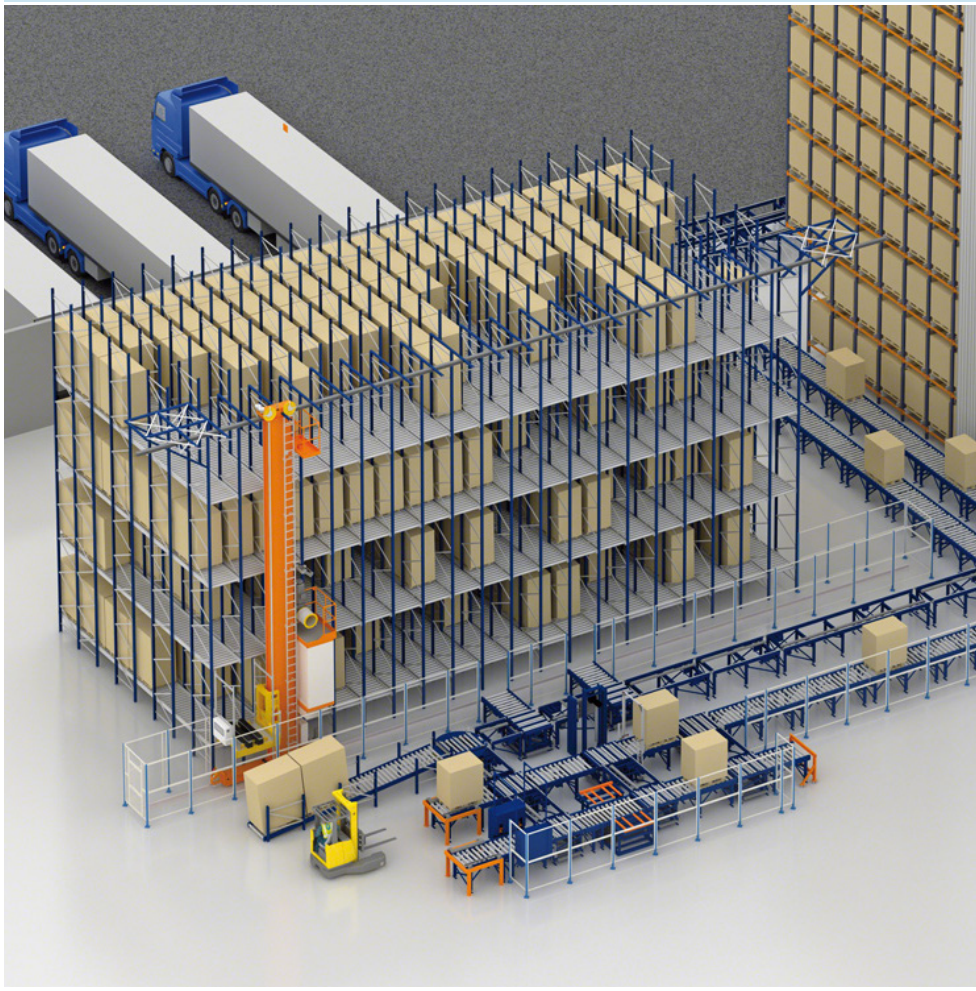
Live racking can be served by fully-automated stacker cranes.

The computerised warehouse management system issues orders to the machines' own systems. The machines then carry out these orders, without human intervention.

Goods can be taken out using stacker cranes or more conventional forklifts, which receive their orders via radio frequency.

In many cases, a single stacker crane is installed on one side of the racking, to place the pallets into storage. On the other side, retrieval of the pallets is carried out by counterbalanced forklifts or reach trucks that, in turn, load the vehicles for dispatch.

Adaptation of the live system



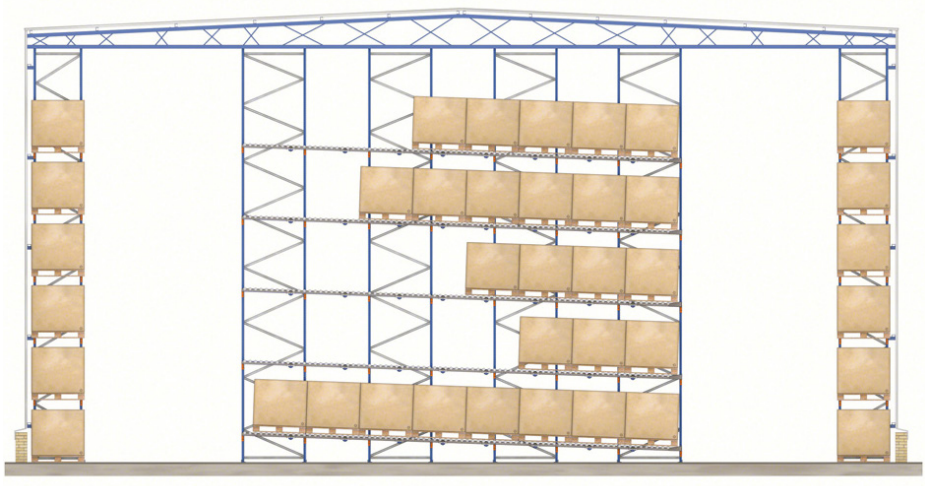
In order to sort orders or routes, in docking areas it is common to install live racking which is stocked by shuttles or automated roller conveyors.

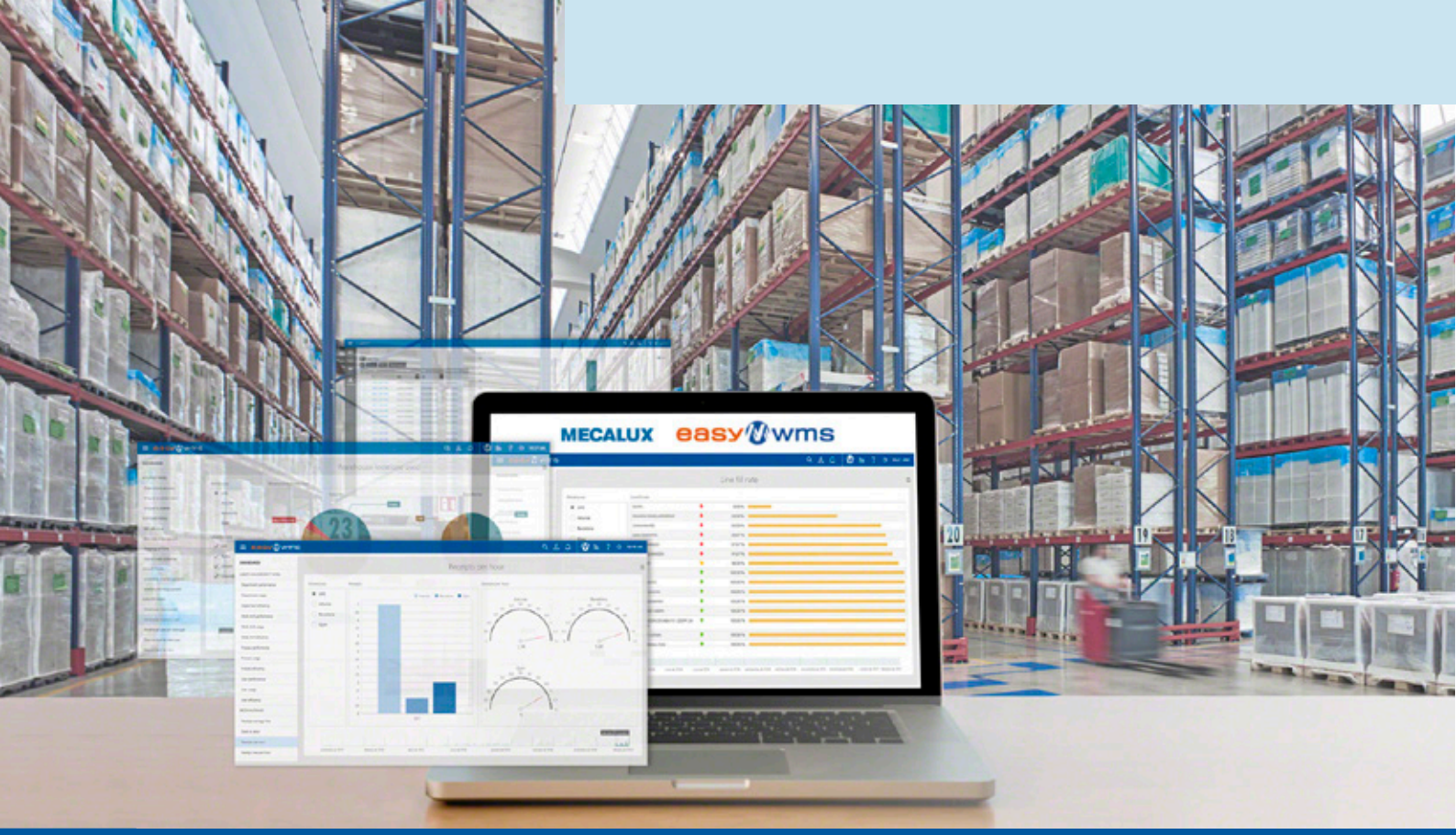
The technical department at Mecalux will study the solution that best suits your needs.

Clad-rack warehouses using live systems

As is the case with all other pallet racking systems, live storage can be used for the construction of a clad-rack or self-supporting building.

As well as storing the goods, the racking or shelving structure support the trusses and joists of the building, upon which the outer cladding is fixed.





Easy WMS Warehouse Management System

The brain of the installation

Easy WMS is a powerful, versatile, scalable and flexible software program that can manage a manually operated warehouse (paper or radiofrequency device run), a mixed facility or a large automated warehouse with the same efficiency.

Use it to streamline physical product flows and document management, from warehouse inputs to dispatches, for guaranteed full end-to-end traceability.

Advantages

- Receive real-time stock control
- Lower logistics costs
- Increase storage capacity
- Reduce handling tasks
- Eliminate errors
- Get precise, high-speed picking
- Adapt to new ecommerce needs
- Manage omnichannel operations
- Achieve a fast ROI (in 12-18 months)

Mecalux works with leading suppliers that attest to the quality, reliability and technical level of the Easy WMS platform:

SAP Certified Integration with SAP Applications · ORACLE Gold Partner Specialized Oracle Database · Microsoft Partner Gold Application Development · ZEBRA TECHNOLOGIES SEE MORE. DO MORE.

Interconnected solutions for your supply chain

WMS for Ecommerce

Ensures efficient multichannel logistics. Optimises the logistics operations of online shops, regardless of their size, number of daily orders or storage capacity.

Multi Carrier Shipping Software

Automates product packaging, labelling and shipping. Coordinates direct communication between the warehouse and the various transport agencies.

Store Fulfillment

Synchronises inventory and workflows to ensure optimal stock management between the central warehouse and the network of brick-and-mortar shops.

WMS for Manufacturing

Facilitates traceability in manufacturing processes. Guarantees the continuous supply of raw materials to the production lines.

Supply Chain Analytics Software

Analyses the thousands of pieces of data generated daily in a warehouse, allowing the manager to make strategic decisions based on the real throughput of operations.

Marketplaces & Ecommerce Platforms Integration

Synchronises the stock in the warehouse with the online catalogue in real time.
Easy WMS automatically connects to the main digital sales platforms and marketplaces such as **Amazon, eBay** and **PrestaShop.**

3PL Warehouse Managemment Software

Manages billing between a 3PL and its customers. A dedicated access platform provides information on stock condition and how to place orders or request customised shipments.

Labor Management System (LMS)

Maximises operational productivity. It objectively measures the throughput of operators, detecting opportunities for improvement for the company.

Warehouse de Slotting Software

Optimises slotting management in the warehouse. DIt determines the optimal slotting for each SKU based on a set of predetermined rules and criteria (historic, current and future demand).

Yard Management System

Supervises the movement of vehicles in the yard at the warehouse or distribution centre. Optimises loading dock operations to improve vehicle flow and avoid bottlenecks with entering and exiting goods.

Easy WMS in the cloud

- **Lower initial investment** since in-house servers are not needed.
- Faster, simpler **implementation**.
- Easier, more affordable **technical support and maintenance**. Total security with Microsoft Azure.
- Software **version up-to-date** at all times.
- **Maximum availability** to guarantee business continuity.
- **Fees adapted** to the needs of each business.

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