







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.).

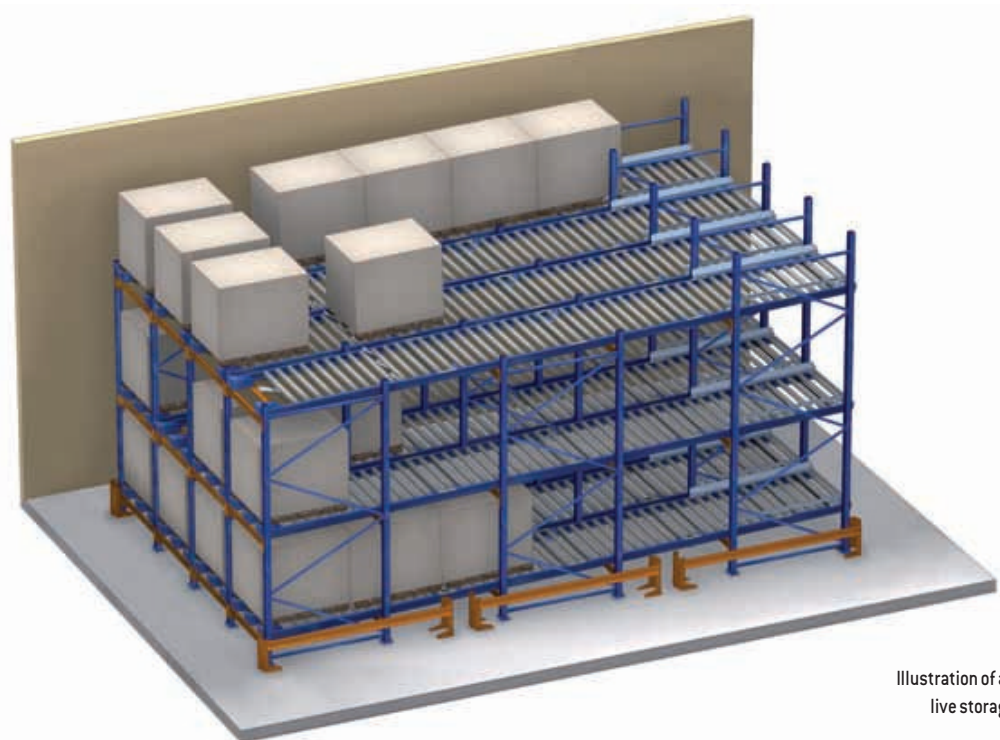
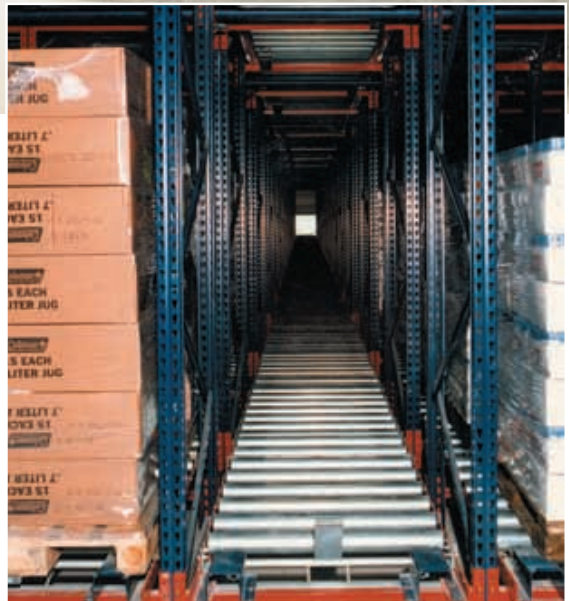
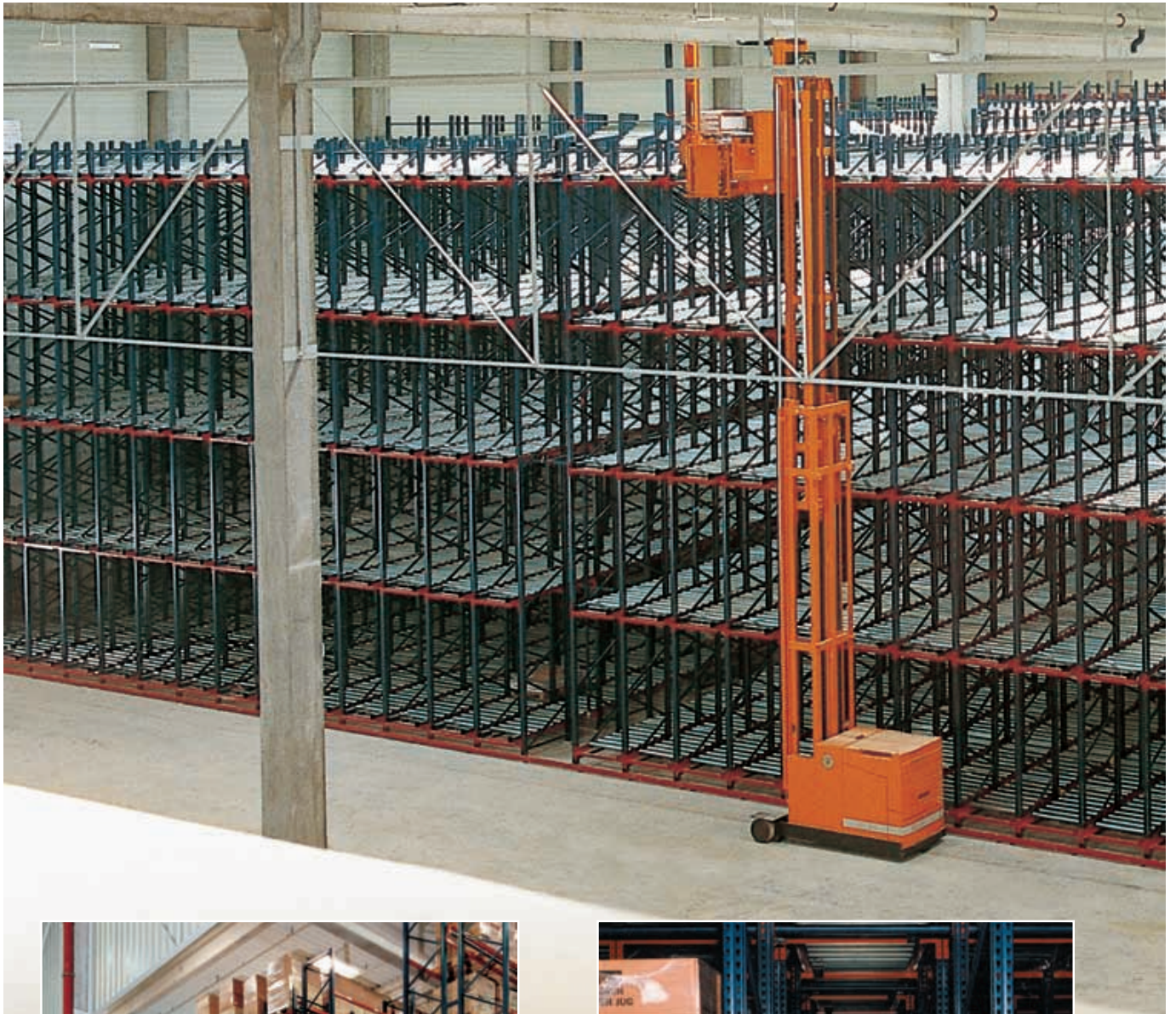
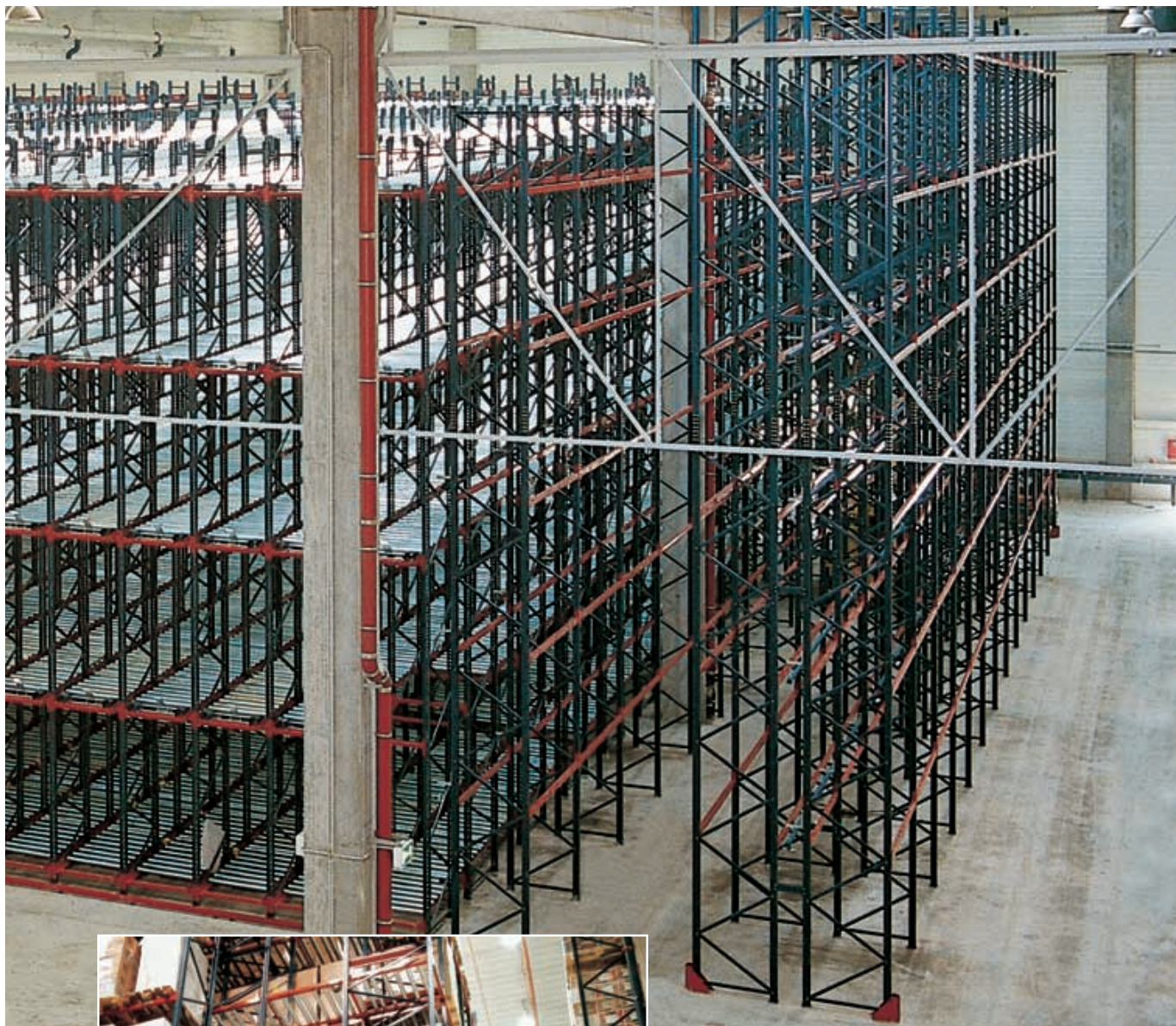


Illustration of a warehouse with live storage pallet racking.









### **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.

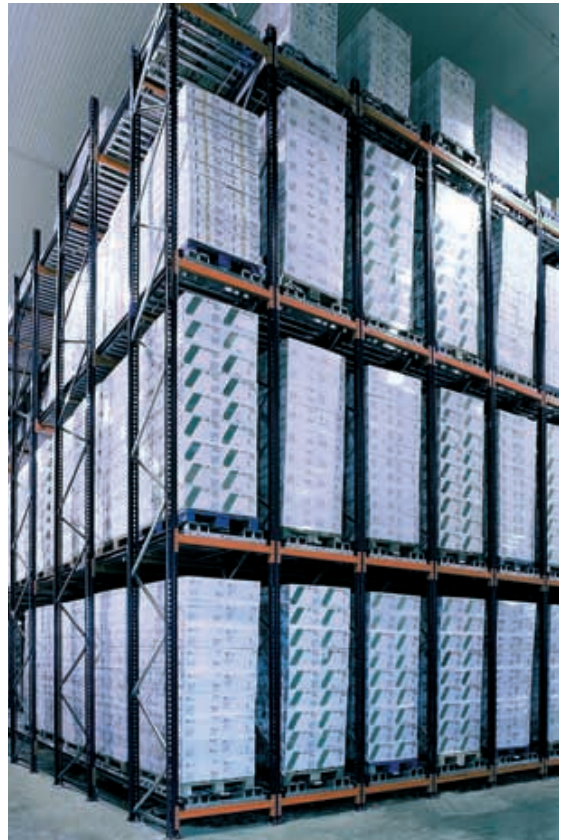
When the first pallet is taken out, the others move forward one position, so the preceding pallet is always at the front.

This makes it ideal for storing perishable goods.



## The main advantages of this system

- **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.
- **Highly efficient operating system.** The loading aisles are separate from the unloading aisles. The forklifts place and remove pallets without interruptions.
- **Excellent stock control.** Only one SKU is stored in each loading aisle.
- **Easy access**, as all the available SKU's are 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 your investment.** The savings in space, the reduction in manoeuvring time and the fact that this system is virtually maintenance-free 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.
- **Quickly installed.**



Frozen bread/bakery sector.



Food sector.





Chemist's - Perfume Sector.



## Sectors where the system can be used

The huge advantages and versatility of this system make it suitable for use in any industry or distribution sector such as food, automobile, pharmaceutical, chemical amongst others.

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.



Components.



Food sector.





Installation for bulk products .



Automotive Industry.



Lubricats Industry.

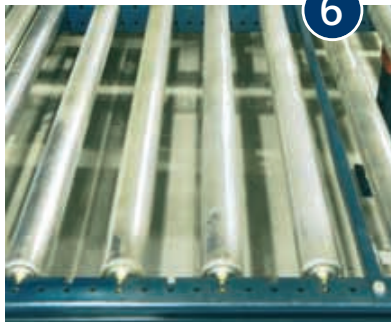


## Structure

- 1) Frames
- 2) Beams
- 3) Levelling plates
- 4) Anchor bolts

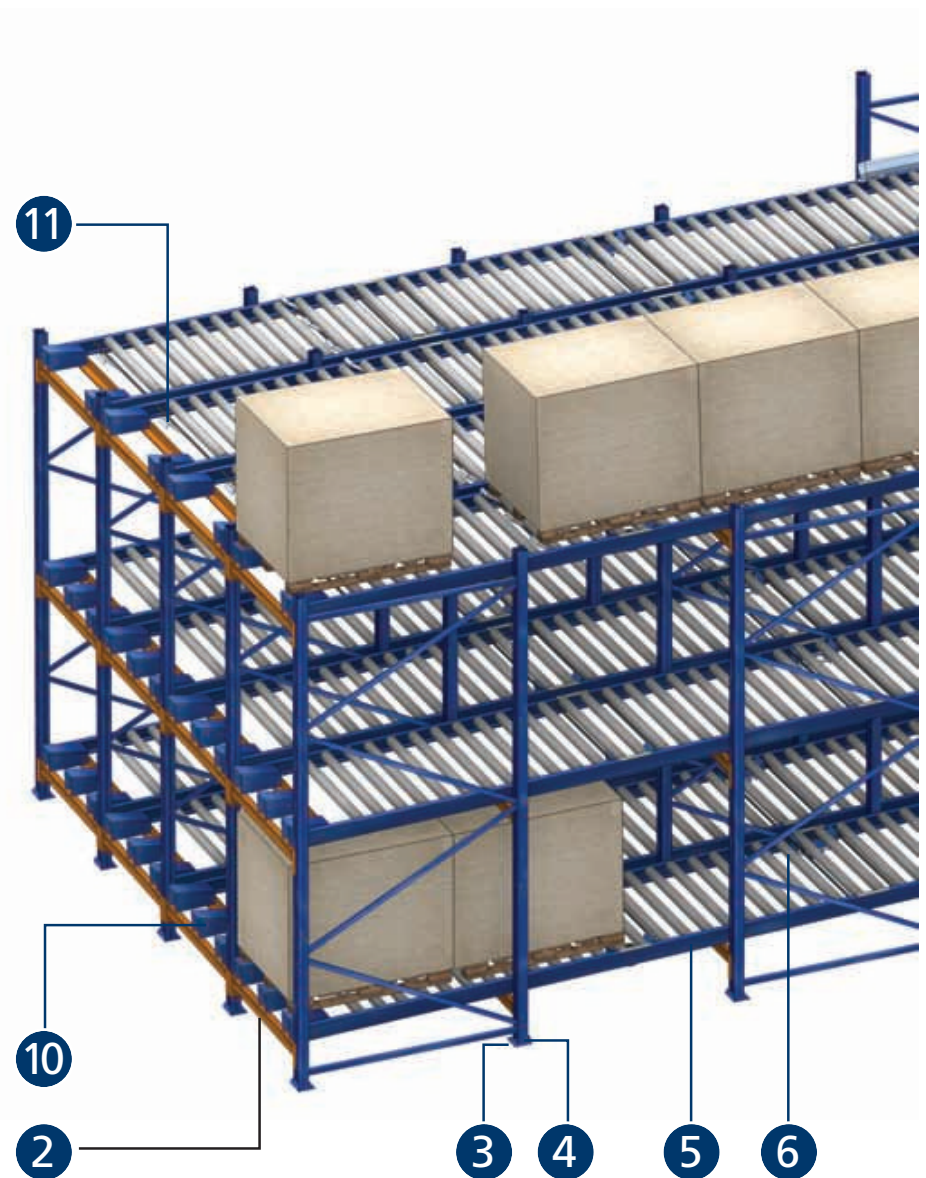
## Rolling sections

- 5) Rails
- 6) Rollers
- 7) Brake drums
- 8) Brake rollers
- 9) Centralising strips
- 10) Brake drums
- 11) Pallet retainers (optional)
- 12) Roller protection



## Rollers

The specifications of the components ensure that pallets move smoothly over the rollers. The axles have flat sections that fit into the slots in the rails. The degree of separation and diameter are dependent upon the specifications and weight of the pallets.



## Brake drums

The brake drums control the speed at which the pallets move, acting simultaneously on two adjacent rollers. They are suspended from springs that guarantee continuous contact with the rollers and slow down any increases in speed that may occur.





**Brake rollers**

The brake rollers have the same function as the brake drums. They are used when it is not possible to install brake drums, either due to lack of space or to specific working conditions.



**Centralisation strips**

These center the pallet at the entrance to the aisle.



**Brake ramps**

The brake ramps slow down and retain the pallets at the exit point. They are installed in line with the stringers of the pallets.



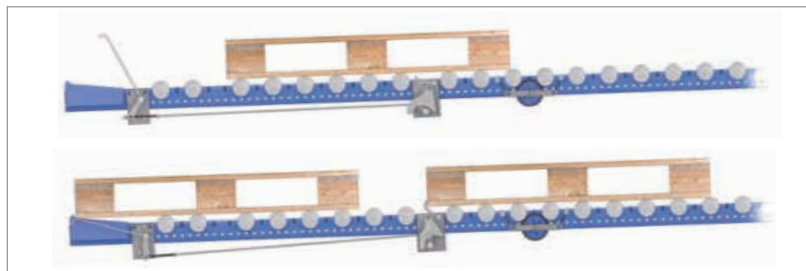
**Roller protection**

This protects the first roller from frontal impacts.



**Pallet retainers**

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 and while it is slightly raised.



The pressure exerted on the pedal by the first pallet activates the flaps that hold the second pallet in place.

They are an optional extra 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).



## Handling Direction

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

This is the most efficient, safest and most economical system. Fundamentally, it is crucial that good quality pallets are used in order for the system to operate correctly.

The separating distance between the rollers can vary, depending mainly on the weight and characteristics of the pallets. Dimension Y must be a multiple of 66.66 mm (figure 2).

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

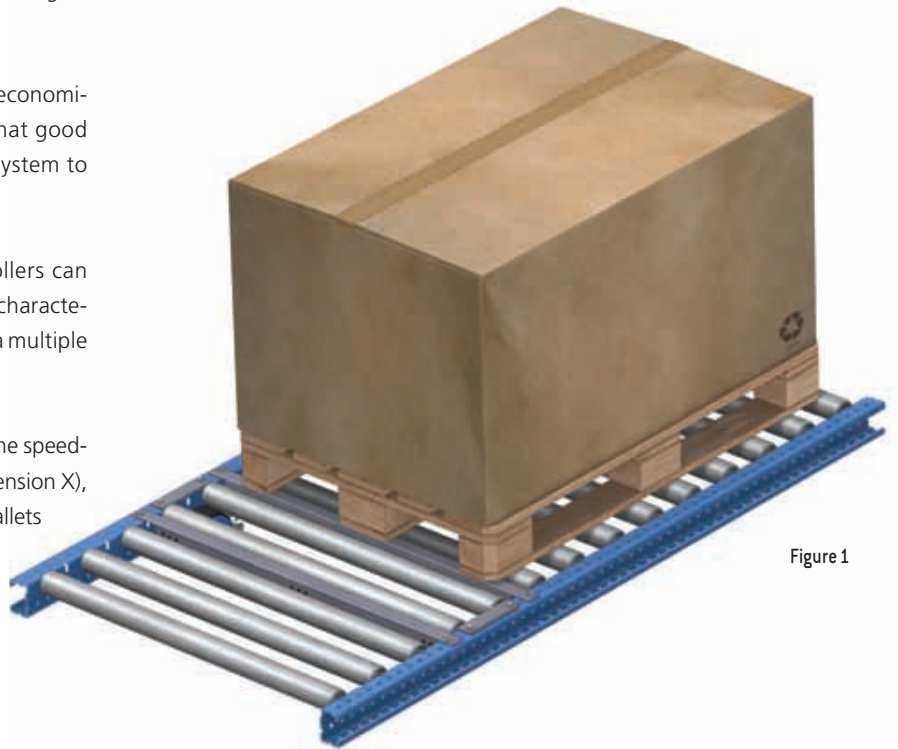


Figure 1

### Approximate slope: 3.5%

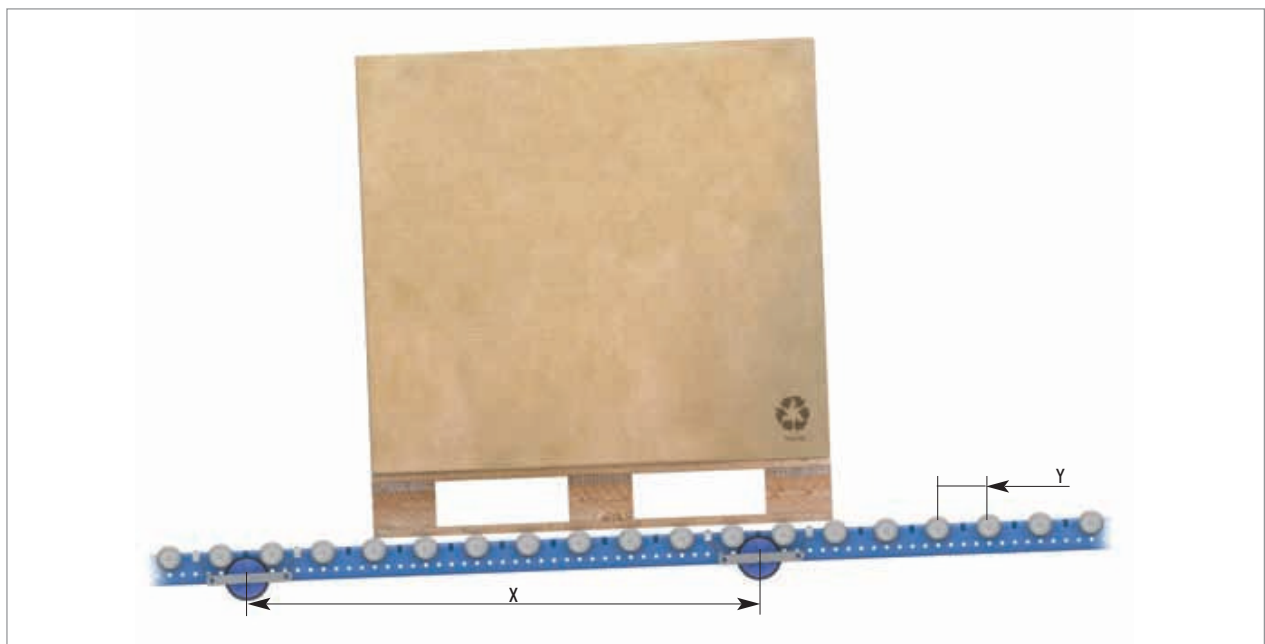


Figure 2





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

The quality and state of the pallets is also very important, although when defining the separation distance between the rollers it is important to take into account the width of the stringers. This must never be less than 100 mm.

With this solution, speed-controlling brakes are only installed when storing more than two pallets deep, and depending on the load. The type of brake used is the brake roller, as opposed to the brake drum.

There must be a distance of 66.66 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).

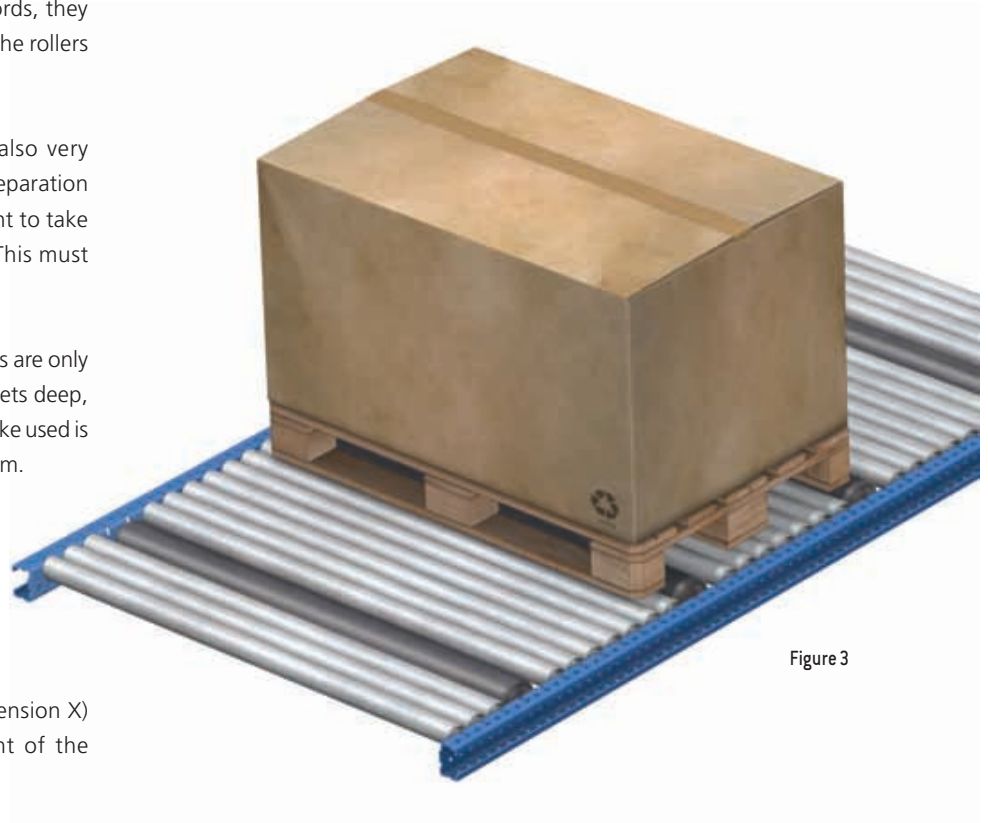


Figure 3

**Approximate slope: 3.5%**

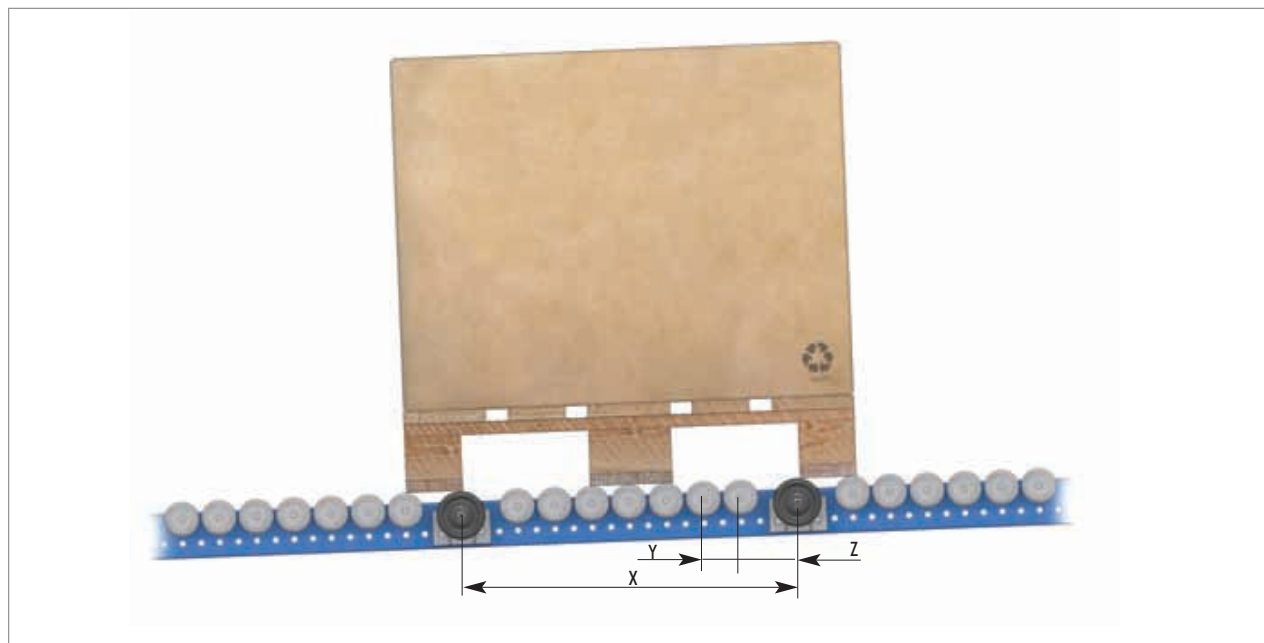


Figure 4



# Levels of Tolerance

The levels of tolerance 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 most usual levels of tolerance are shown below.

## 1. Bay width and height

The separating distance between uprights or the measurements of the beams (dimension H) is equal to the frontal measurement of the pallet, including the load (dimension A), plus 230 mm - 115 mm on each side (dimension B).

The roller length (dimension G) must be 100 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 does affect the width of the aisle and therefore also affects the length of the beams (figure 5).

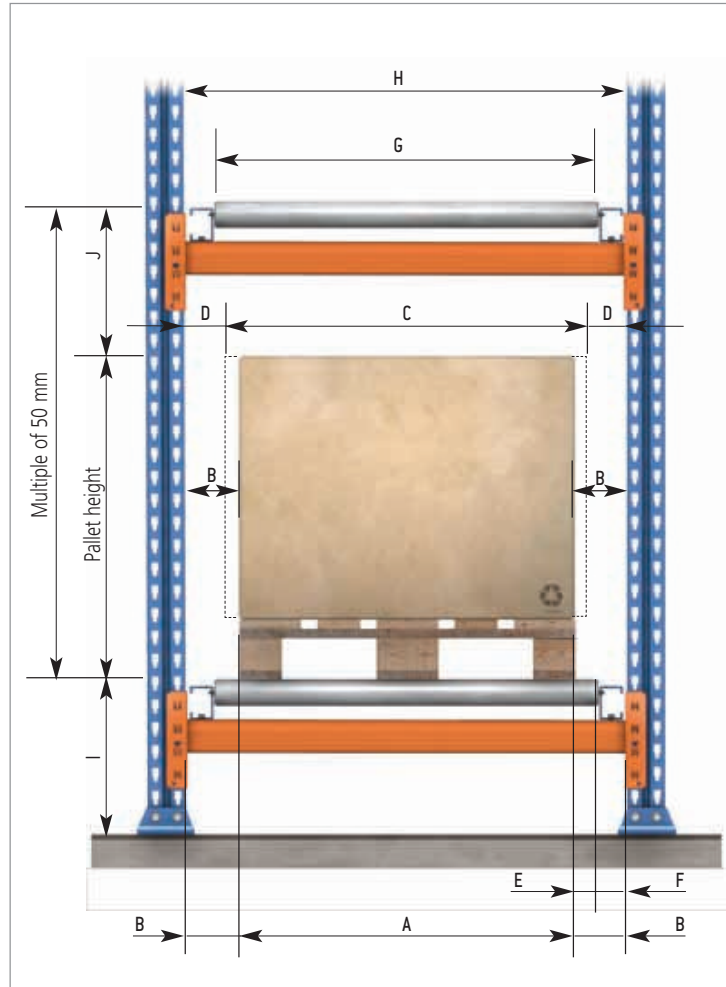


Figure 5

A	B	C [1]	D [1]	E	F	G	H	I [2]	J
800	115	880	75	50	65	900	1030	350	350
1000	115	1080	75	50	65	1100	1230	350	350
1200	115	1280	75	50	65	1300	1430	350	350

[1] Possible maximum overhang of the load and minimum tolerance.

[2] Height with solution on the beam.

Figure 6 below shows how the edges are placed directly on the floor to reduce the height.



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 gradient of the slope must not be less than 3.4% or more than 3.7%.

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 and the second example does (figures 7 and 9).

**Example without pallet retainer (minimum slope 3.4%, maximum 3.7%)**

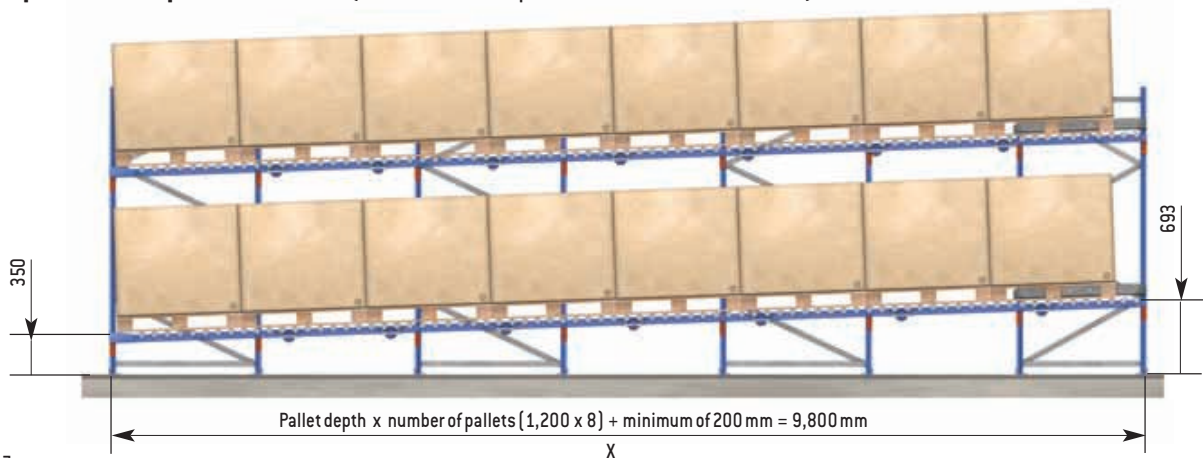


Figure 7

**Example with pallet retainer (minimum slope 3.4%, maximum 3.7%)**

The detail on the right shows the tolerance level that is needed between two pallets, for the retainer to be activated (figure 8).

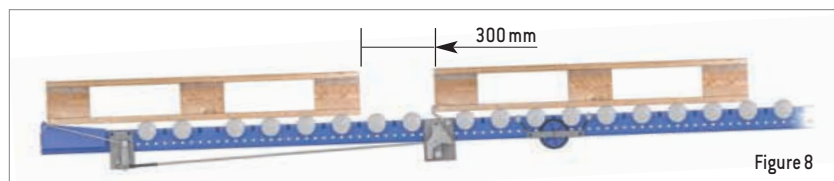


Figure 8

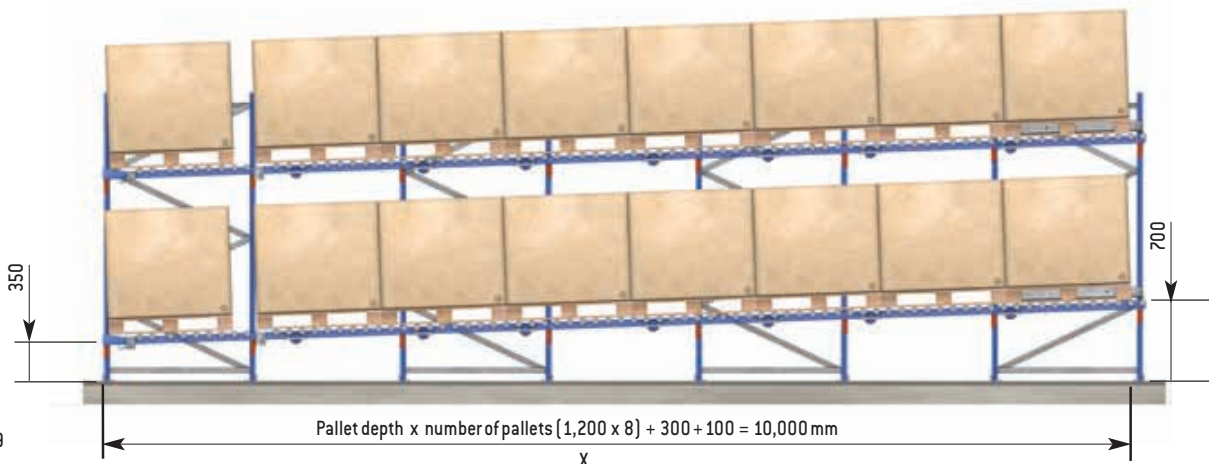


Figure 9



# Applications

## Traditional system

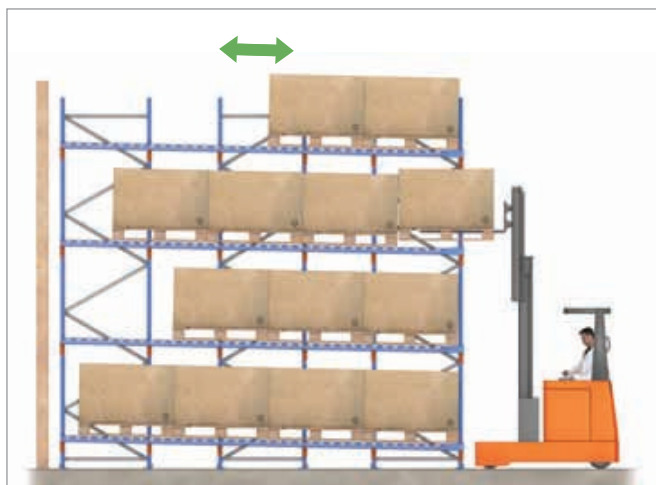
This is the most commonly used system. The pallet is put in from the loading aisle and moves due to the force of gravity along the rollers to the unloading aisle, on the other side.

Various different lifting devices are used: counter-balance forklift trucks, standard reach trucks, VNA man-up turret truck, VNA man-down turret truck and stacker cranes amongst others.



## Push-back

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. Logically, the first pallet in is the last one out (LIFO system).









## Applications







**Combinations**

Any of the previous solutions can be combined with picking operations, as set out below.

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.

Figure 10



Figure 11

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

## Applications

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 protected with nets in order to avoid any items falling down. As is the case in the previous pictures, the pallets from the upper levels are placed on the lower levels.



Live storage levels with entry and exit from both sides to replenish lower picking levels. In this case, the boxes are taken off the pallets and placed on carton live storage levels.

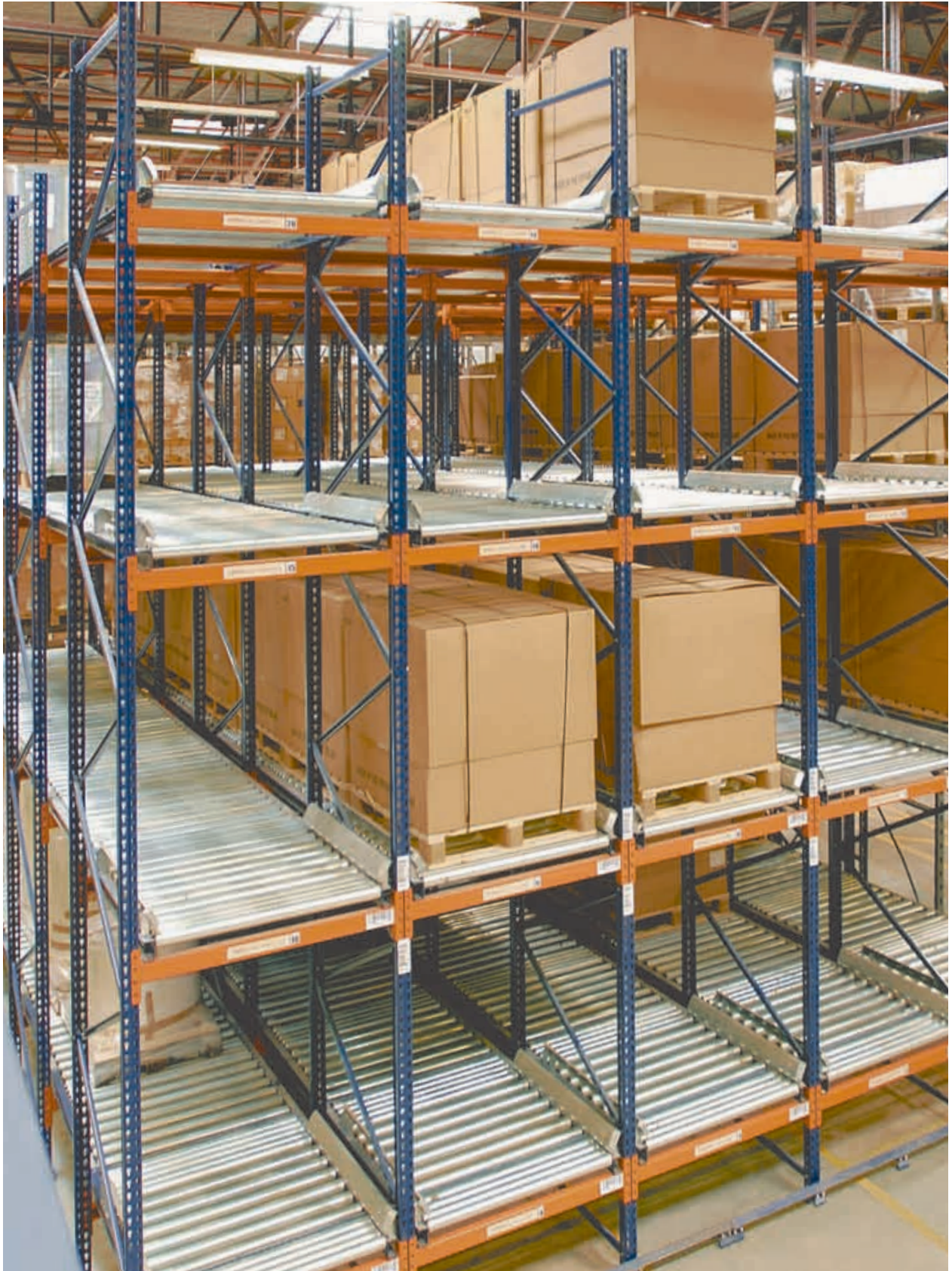








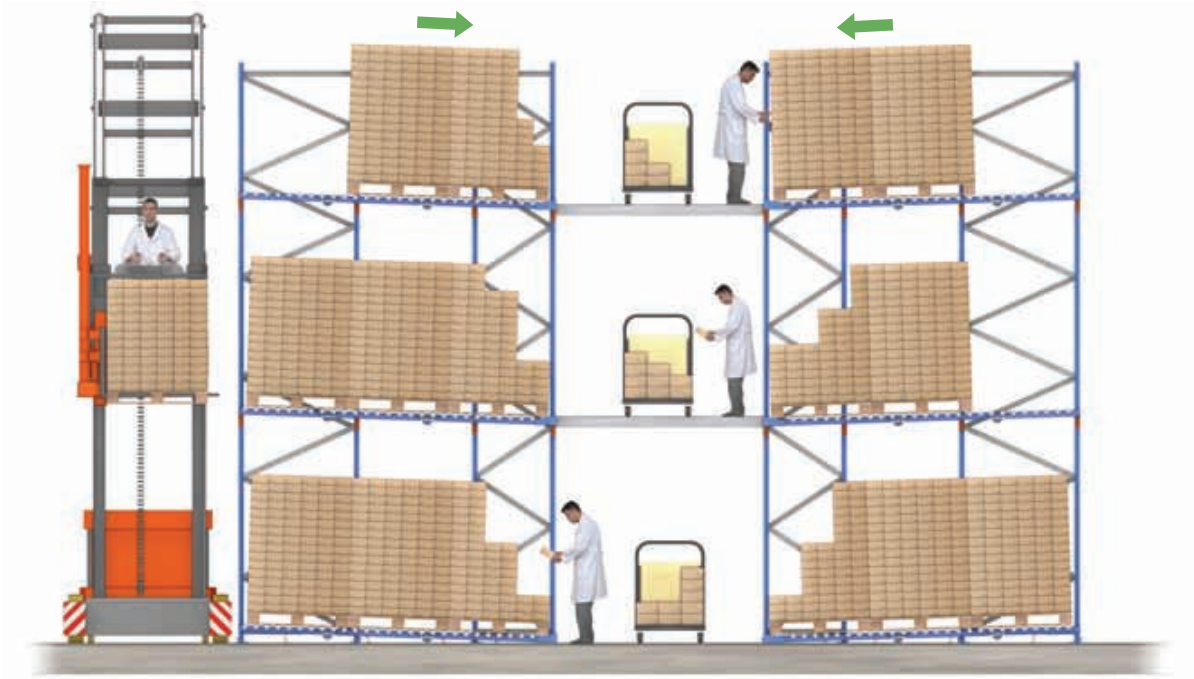
## Applications







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



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.



Logically, different applications from the ones shown can be installed by combining any of the different systems.

## Adaptations



### Split rollers

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



### Peripheral pallets

Specially-adapted corridors to place both peripheral pallets and europallets, handled from the wide part to make picking easier.



### Half pallets

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



### Intermediate retainer

2nd pallet retainer, specially adapted for placement between intermediate pallets to reduce pressure in very long aisles.





**Picking retainers**

A device is installed to stop the second pallet moving along when the first one is removed. The device is unlocked manually, using a lever.



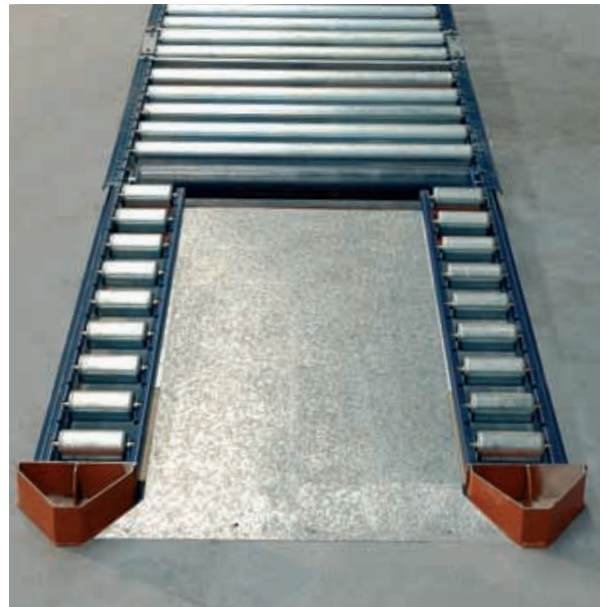
**Stillage containers**

Live storage can be adapted to store containers.



**Special containers**

This adaptation enables storage of special pallets or containers with wheels which can be handled manually when not on the shelves.



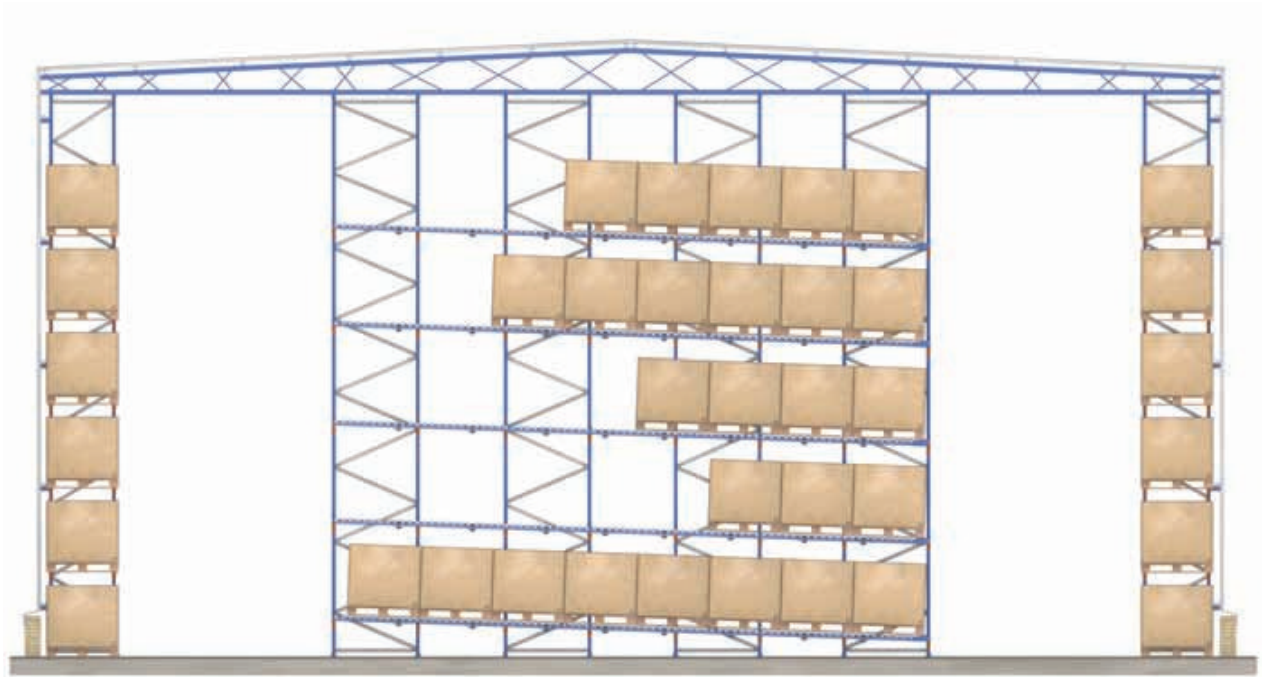
**Levels set into the floor for transpallets**

These are common in production or dispatch areas.

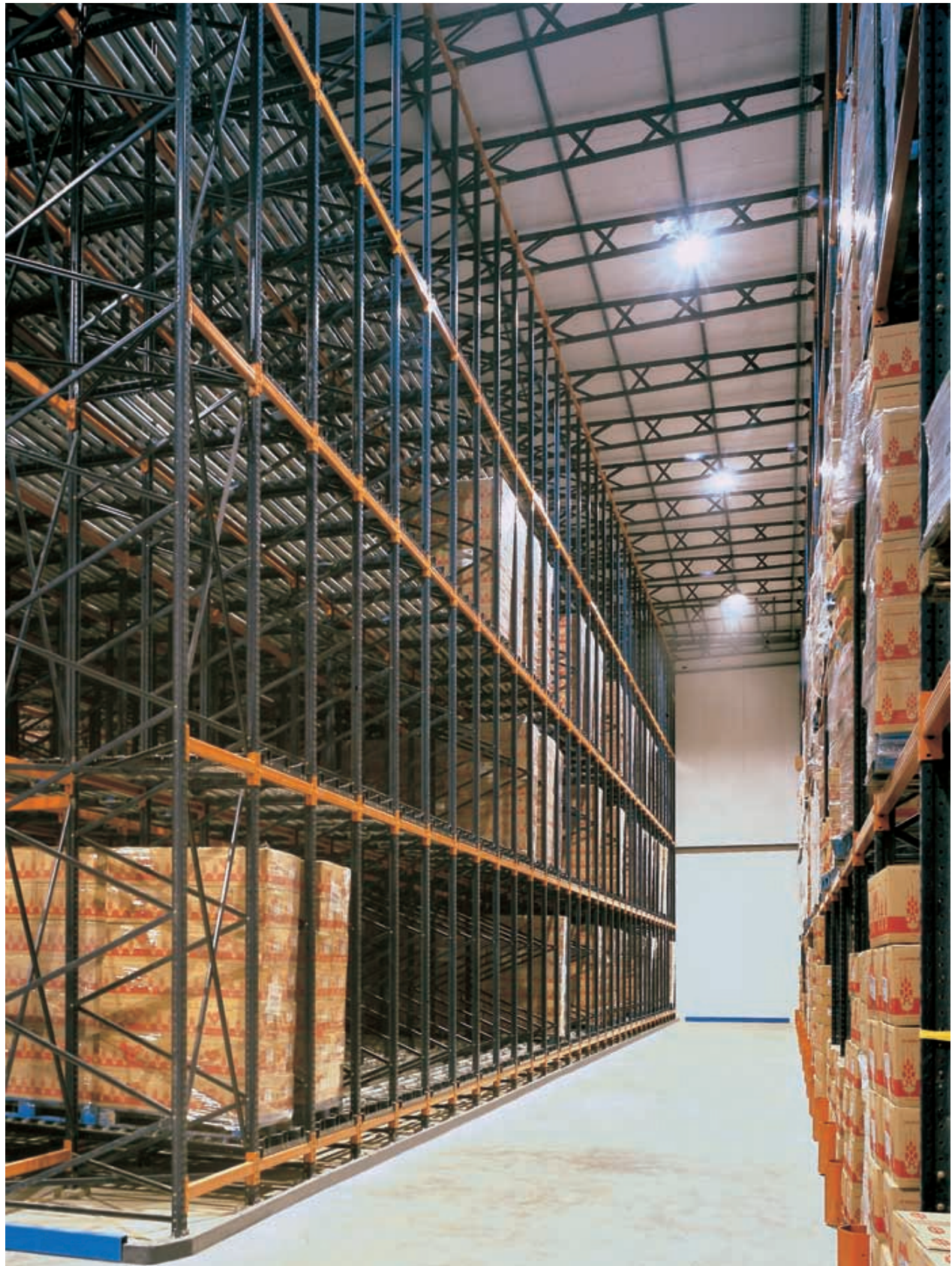
## Self-Supporting Warehouse Incorporating Live Storage

As is the case with all the other pallet racking systems, live storage can make up a 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 panels are fixed.









## Automated Warehouses With Carton Live Storage

Carton live storage can be served by fully-automated stacker cranes. The warehouse management computer 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 by radio.

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

