



Carton live storage

Among order picking installations that work according to the operator-to-goods principle, live storage for cartons as well as for pallets is on the increase. Higher investment costs are more than compensated by improvements in efficiency.

Separate working aisles ensure that stock replenishment does not interfere with order picking. Order pickers can rely on the constant availability of goods, as all storage units move continuously and unassisted into the picking position.

Straight working aisles allow an excellent overview of all product lines on stock. Lacking items can be replenished immediately which results in a considerable increase in picking productivity.

Not only drastic savings between 40 and 70% in travel time as compared to conventional shelving and racking, but also reductions of up to 30% in occupied floor space make BITO carton live storage a very compact and economic solution in most storage environments.

BITO

www.bito.com

**Product information****Frequent application**

- supply and order picking store

Service options

- manual order picking and replenishment
- automated replenishment

Storage options

- storage units, either short or long side facing

Surface/volume utilisation

- floor space occupation reduces by 30% and more

System specific solutions

Upright adapters for existing pallet racking

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Roller conveyor stand

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Step-up rail

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**Storage units**

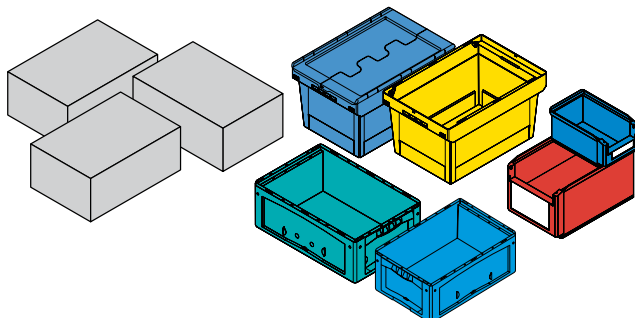
Smaller sized storage units such as plastic bins and containers, cartons or individual items

Stock rotation frequency

- high stock turnover, short shelf life

Stock characteristics

- A-items (fast movers)



As a manufacturer of a broad range of extensive bin and container series, BITO is able to supply shelving and racking complete with the optimum storage container for your goods.

BITO bins and containers are outstanding as to their functionality, rigidity and stability and have been perfectly adapted to the requirements of industrial shelving and racking.

**Information material**

For more information on this product, please contact us on

Tel.: +49 (0) 67 53 / 1 22-1 64

or ask for our DVD

"Dynamic storage"

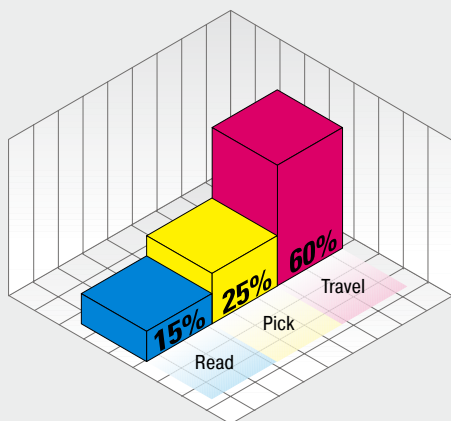
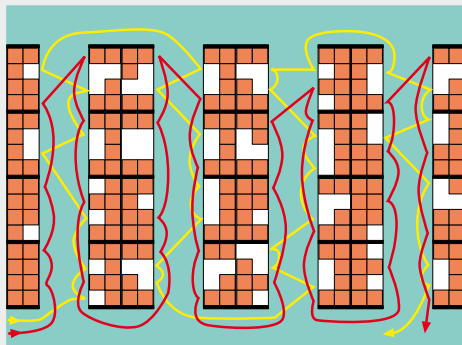
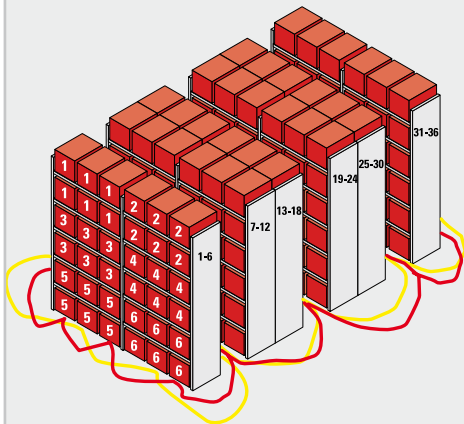
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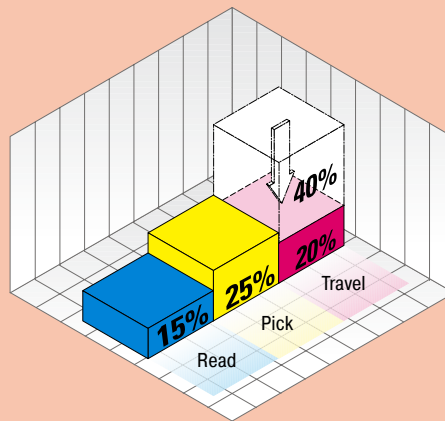
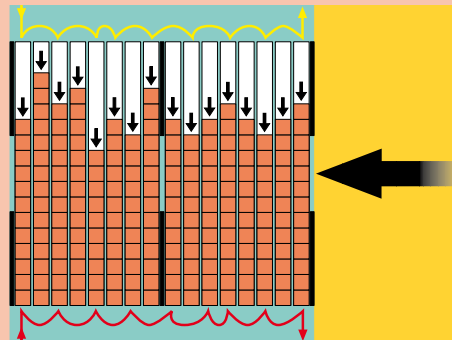
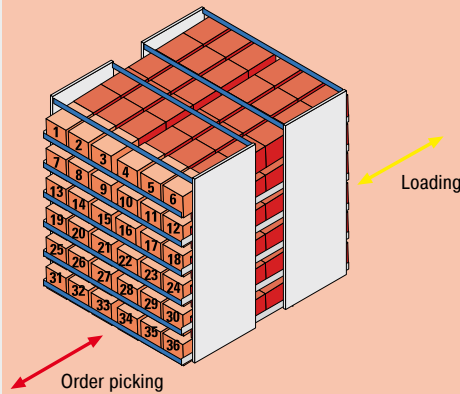


Economic evaluation

Conventional shelving



Carton live storage



Comparison

Our comparison presents two storage installations which both supply 36 different items.

It is evident that storage is more compact and presentation of the goods is much clearer in a carton live storage installation.

Live storage gives immediate access to all 36 items at the picking face. Each item moves unassisted into the picking position. Sufficient replenishment quantities guarantee constant availability of goods.

Compact storage and the elimination of unnecessary aisles results in a gain in floor space of at least 20%. Strictly separated working aisles prevent that replenishment interferes with order picking which increases staff productivity.

Short travel routes reduce order picking times.

Whereas information and picking times remain the same for both solutions, travel times are drastically reduced.

This leads to an overall reduction of working time and to an increase in picking performance.

A 66% reduction in travel time results in an overall reduction of 40% of the total order picking time.

Advantages of the system

General advantages of carton live storage

- **drastic time savings in order picking**
Depending on local conditions and work methods, travel time is reduced between 40 - 70%.
- **storage according to the FIFO-principle**
Goods stored first are taken out first. The live storage installation is loaded at the rear, goods are picked at the front. Easy control of sell-by dates.
- **same storage capacity on a smaller surface**
Up to 30 % of space can be saved by the elimination of unnecessary aisles.
- **roller tracks instead of shelves**
Goods move unassisted into the picking position. This allows faster picking and quicker handling.
- **fewer picking mistakes**
Compact and clear presentation of goods leads to improved accuracy in picking.
- **less „lost time“ during order picking**
Long and straight aisles allow a better overview and lead to an improved organisation of work.
- **increased productivity**
Different loading and picking aisles effectively separate staff. This improves staff productivity.

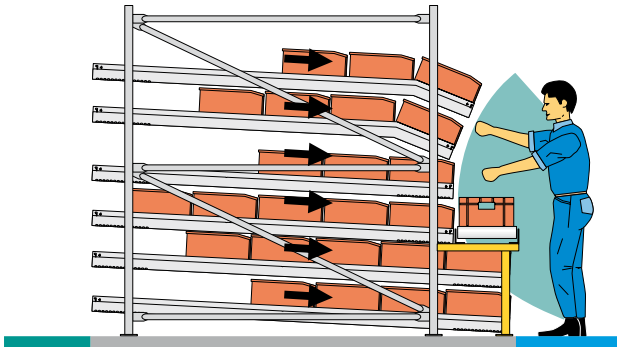


Specific advantages of BITO carton live storage

- **boltless system especially developed for live storage applications**
- **optimum adaptation to the size of storage units**
Roller tracks and dividers can easily be adjusted in 8.5 mm increments. Levels can be repositioned in height in 12.5 mm increments.
- **there are three types of rollers available:**
cylindrical rollers with plastic axle
cylindrical rollers with steel axle
flanged rollers with plastic axle
- **standardised, system specific solutions for VDA containers and conical transportation bins**
- **roller pitch**
of 28 mm guarantees trouble-free travelling of cartons - even those of poor quality
- **comprehensive and useful range of accessories**
Closed sections provide maximum safety.
- **each level can carry up to 1000 kg**
- **due to the high load capacity of the frames it is possible to install a pallet buffer stock on top of the levels or to build a multi-tier installation**
- **further streamlining**
is possible by automated stacker crane replenishment and by introducing paperless order picking
- **5 year warranty on the smooth functioning of BITO roller tracks**



Picking face



The layout of the picking face greatly influences picking performance.

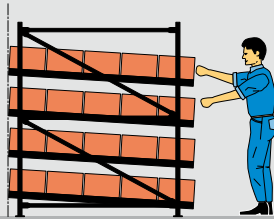
In the first instance, the layout is determined by the type and the size of the storage units or the picking items.

Another determining factor is whether and to what extent conveyors are to be integrated into the installation.

The actual picking activity can also be speeded up by creating optimum ergonomic conditions for the order picker, i.e. the picking face should be designed to take account of the order picker's natural picking curve.

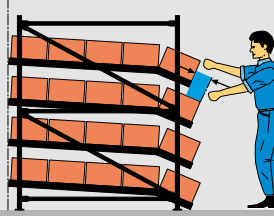
This includes for example the installation of conveyors at the correct working height or a step-up rail to facilitate access to the working levels above the natural reach height.

1 Layout options for picking faces without conveyors



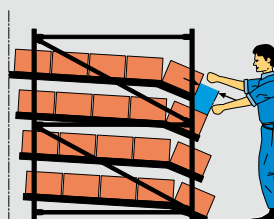
The configuration with flow levels forming a flush picking face is appropriate for picking complete storage units. **Small items** can be picked through the front opening of bins or containers.

- optimum utilisation of racking height



Medium-sized items can be picked through the open top of bins and containers. In order to facilitate access, the flow level front is cranked.

- excellent visibility and fast access to goods



Large items are picked from the open top of bins and containers. Additionally, the flow levels are recessed in depth in order to leave more room for access from the open top.

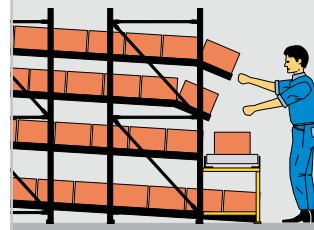
- optimum visibility and fast access to goods
- easy order picking even of bulky goods

2 Layout options for picking faces with conveyors



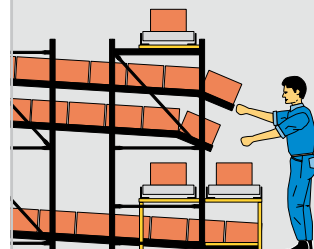
The pick-to-belt configuration is a typical solution of a **product-oriented picking strategy**.

- direct access to the entire picking front
- low investment into conveyor systems



Integrating roller conveyors into the shelving front is ideal for an **order-based** picking strategy, i.e. one order picker collects all items for **one particular order**.

- low investment into conveyor systems
- higher picking efficiency as the order picker does not need to turn to a conveyor in his back



For **order-based picking in several zones**, a combination of powered and non-powered conveyors is ideal. This solution demands a higher degree of organisation and material flow monitoring.

- excellent productivity due to short travel distances and fast return of empty bins
- extremely short order lead times
- no waste of time as no turning to the conveyor is required

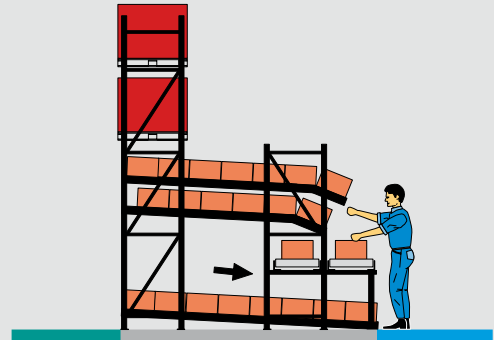
1 Integrated conveyors

- with one roller conveyor in front
- with one integrated roller conveyor for transporting cartons or bins with completed orders

Orders are picked all along the picking face. The roller conveyor in front of the picking face allows to conveniently push the carton or bin into the ideal position. The integrated conveyor takes completed orders to the despatch area.

Your advantages:

- automatic transport of finished orders into the despatch area
- separate working aisles prevent that loading interferes with order picking
- immediate re-stocking from the pallet buffer on top



2 Pallet live storage at floor level height

- with pallet live storage on the floor level

Individual items are picked from the carton live storage levels, whereas complete storage units are supplied for order picking from the pallet live storage level on the ground.

Your advantages:

- order picking of individual items as well as of complete storage units in one and the same storage area/picking location
- balanced work load in each storage area/picking location
- re-stockers and order pickers work in separate aisles and cannot get into each other's way



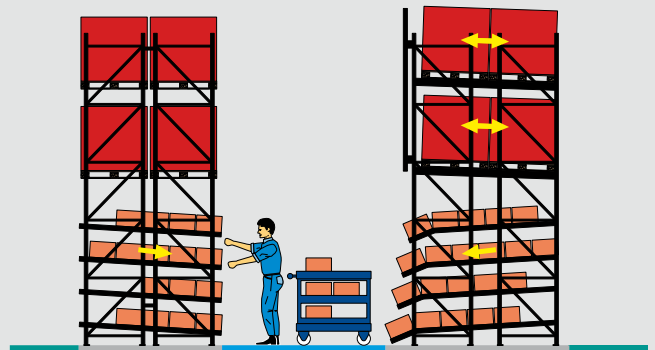
3 Pallet buffer stock on top

- with a two pallet deep buffer stock on top
- left: static configuration, right: dynamic configuration

With the help of upright adapters, the lower part of an existing pallet racking installation can be retro-fitted with carton live storage flow levels.

Your advantages:

- quick and easy re-stocking from the pallet buffer on top
- maximum utilisation of headroom
- highly suited for integration into existing pallet racking installations
- for dynamic solutions: separate working aisles ensure that order pickers are not disturbed by stock replenishment



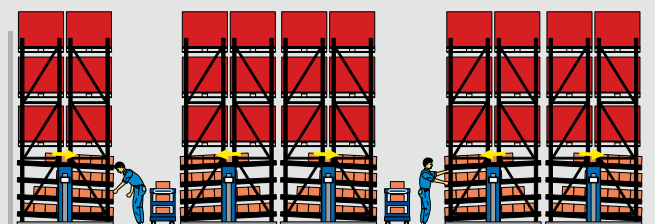
4 Mobile installation

- mobile carton live storage installation with a pallet buffer on top

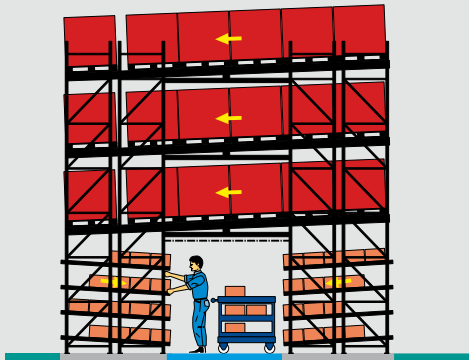
Service aisles can be opened as needed which eliminates the necessity of having several „fixed“ service aisles as is required in static installations. This allows to make maximum use of floor space.

Your advantages:

- space-saving solution with short travel routes as no separate replenishment aisles are required. FIFO-principle is realised.
- service aisle width can be chosen to requirement
- unrestricted use of pallet buffer stock, as service aisles can be opened wherever required. This means that the pallets do not have to be pushed back and no special trucks for double deep storage are necessary.



5 Central order picking tunnel



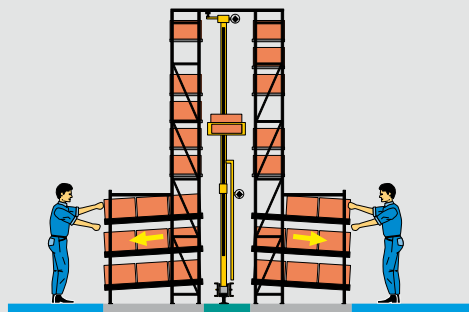
- with pallet live storage buffer stock

The picking tunnel provides a safe working environment. The levels on top of the carton live storage area serve as buffer stock.

Your advantages:

- high operational safety
- separate working aisles prevent that loading interferes with order picking
- constant availability of goods
- maximum utilisation of warehouse space

6 Integrated buffer stock for bins



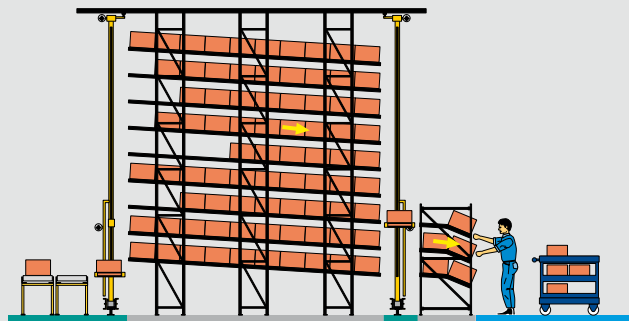
- the bins can either be stored in an automated bin storage installation or in highbay shelving serviced by an automatic stacker crane

Order picking is effected manually. Centrally monitored replenishment by an automatic stacker crane.

Your advantages:

- immediate stock replenishment due to short travel routes
- good utilisation of available headroom
- allows computer-controlled material flow management including permanent stock level control
- constant availability of goods

7 Automated carton live storage installation



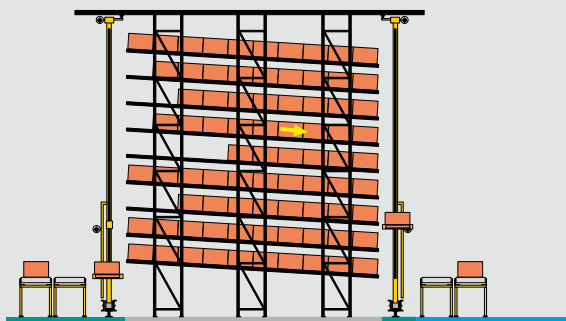
- manual order picking from a carton live storage installation - a fully automated carton live storage buffer constantly feeds the order picking installation

The automated live storage installation serves as buffer store. Goods arriving on the conveyor lane are automatically fed in. According to requirement, the goods are relocated into the picking installation.

Your advantages:

- automatic computer-controlled replenishment
- greatly reduced travel times for loading both installations
- excellent utilisation of warehouse floor space and height
- space saving and cost efficient order picking installation

8 Automated carton live storage installation



- automated carton live storage installation stores complete storage units which are fed in and out by automatic stacker cranes

An automatic stacker crane picks up the incoming storage units from the conveyor and feeds them into the carton live storage installation. Upon requirement, the automatic stacker crane at the picking side feeds out the ordered storage units and places them onto a conveyor at the picking face for transport into the picking area.

Your advantages:

- fully automated computer-controlled warehouse management
- no picking mistakes
- maximum space utilisation
- "closed" system prevents unauthorised access to goods
- also very efficient as buffer store in production or dispatch areas

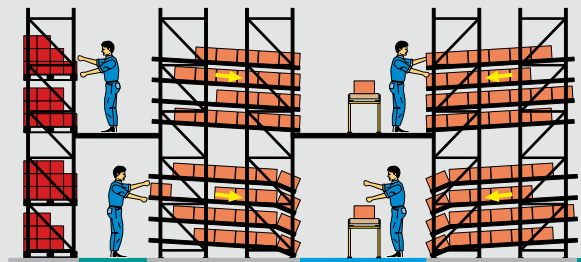
9 Multi-tier order picking

- multi-tier carton live storage installation combined with a pallet buffer stock in the rear
- centrally located roller conveyors in the picking aisles

The multi-tier construction allows parallel order picking on several tiers.

Your advantages:

- replenishers and order pickers work in separate aisles and cannot get into each other's way
- constant availability of goods
- maximum utilisation of headroom
- immediate replenishment from the near-by pallet buffer stock



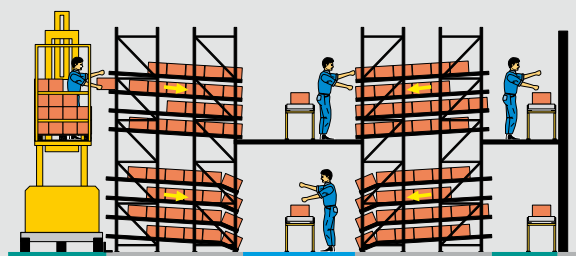
10 Multi-tier order picking

- multi-tier carton live storage installation combined with roller conveyors in the centre of each picking aisle
- re-stocking by man-operated stacker cranes
- optional replenishment via conveyors

Replenishment is assumed by stacker cranes. It is also possible to organise replenishment via powered conveyors at the loading side.

Your advantages:

- maximum utilisation of space and headroom
- separate working aisles ensure that loading does not interfere with order picking
- immediate replenishment



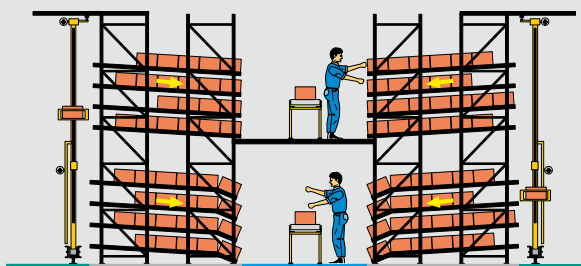
11 Multi-tier order picking

- multi-tier carton live storage installation combined with roller conveyors in the centre of each picking aisle
- automatic stacker crane re-stocking

The live storage lanes are fed by automatic stacker cranes with picking stock. Order picking is done manually on several levels at the same time. After an order is completed, it is placed onto the conveyor for further transport into the despatch department.

Your advantages:

- maximum utilisation of space and headroom
- constant availability of goods is monitored by data management systems
- computer-controlled replenishment from the buffer stock



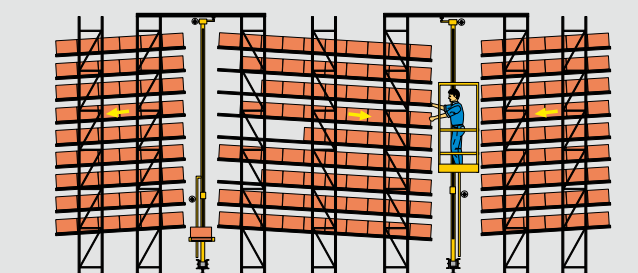
12 Highbay installation

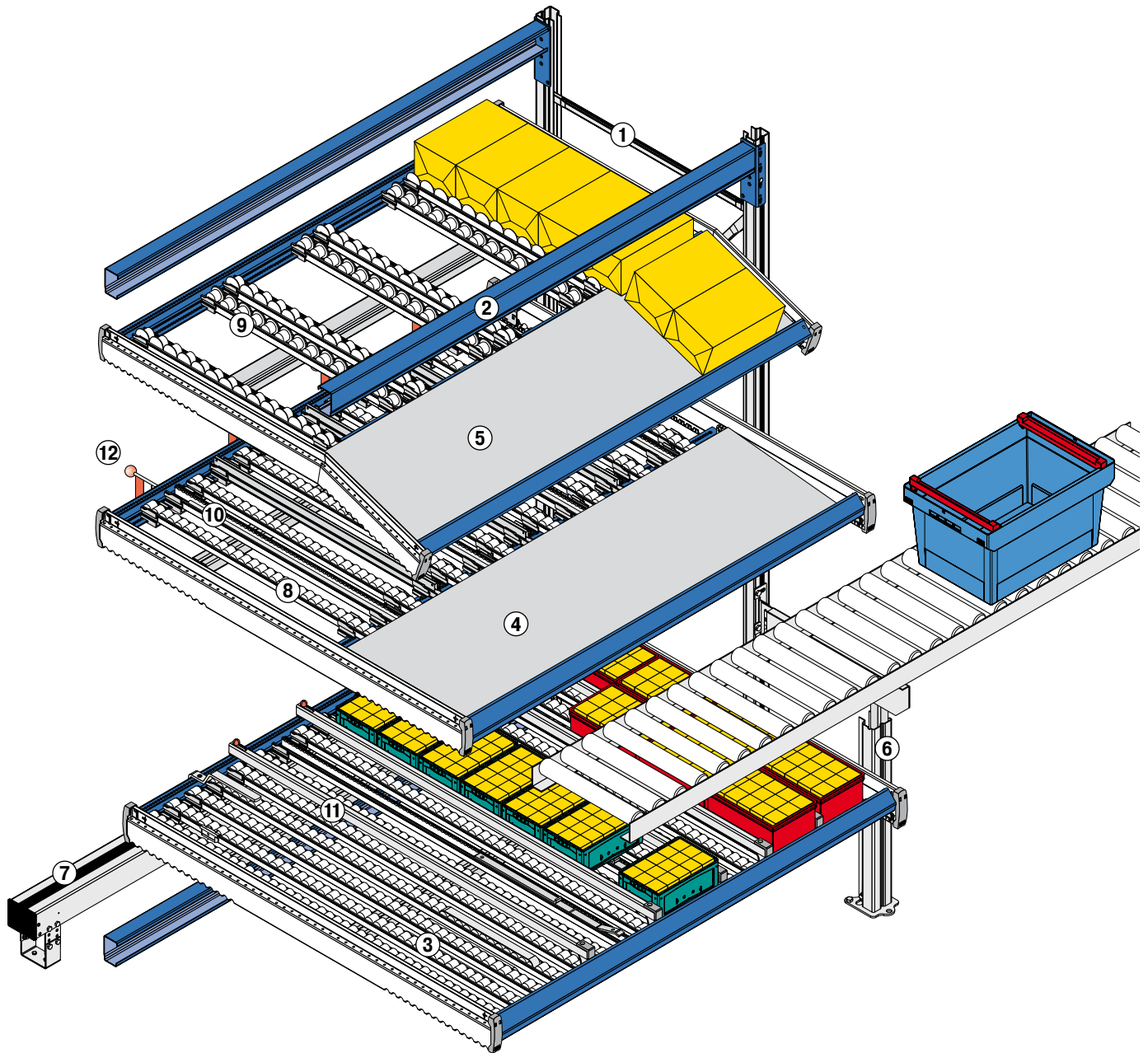
- carton live storage highbay installation
- order picking with man-operated stacker crane
- re-stocking by automatic stacker-crane

In order to ensure fast access to all items, order picking is done with a stacker crane which lifts the order picker to any level required and into the most ergonomic picking position.

Your advantages:

- optimum working conditions for the operators
- high operational safety due to separate working aisles
- computer-controlled availability of goods
- immediate computer-monitored stock replenishment without intermediate buffer stock
- „closed system“ prevents unauthorised access to goods





1 Frame
suited for high load capacities

2 Beam
easy boltless assembly

3 Straight flow shelf

4 Straight flow shelf with inclined picking tray

5 Cranked flow shelf

6 Roller conveyor stand
available in different height and depth options

7 Step-up rail
for convenient working

8 Roller track
with cylindrical rollers with plastic or steel axle

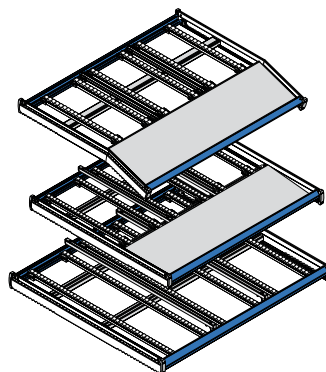
9 Roller track
with flanged rollers for lane subdivision without dividers

10 Standard divider
ideal for a steady product range

11 Universal divider
fast lane re-adjustment for frequently changing product lines

12 Stock control system

③ ④ ⑤



Flow shelves

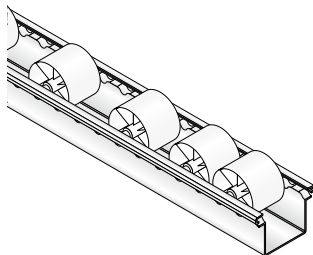
Available in three different variations for an ergonomic picking face design. All flow shelves are assembled without bolts. This allows easy and fast flow shelf adaptation to other load capacities or storage units while using the same components again.

- boltless assembly
- easy adaptation to other load capacities

8 Roller track with cylindrical rollers on a plastic axle

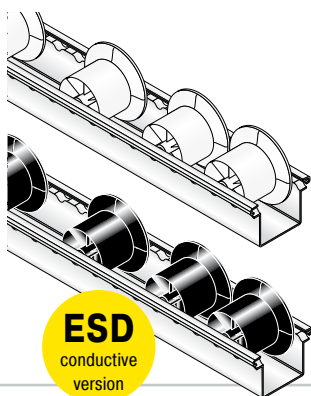
The robust, smoothly operating rollers from high quality plastic allow an optimum adaptation to all kinds of storage units. The smallest roller pitch is 28 mm.

- **broad roller surface guarantees good travel characteristics**
- **load capacity 4 kg per roller**

**9 Roller track with flanged rollers on a plastic axle**

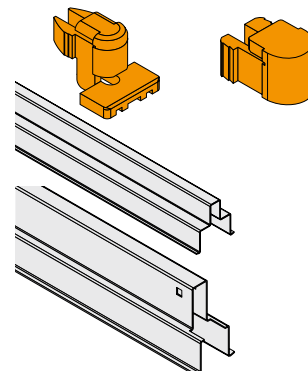
Flanged rollers are mainly used for storage units with stable pre-formed edges. The smallest roller pitch is 42 mm.

- **no additional dividers required**
- **good travel characteristics**
- **load capacity 4 kg per roller**

**10 Standard divider**

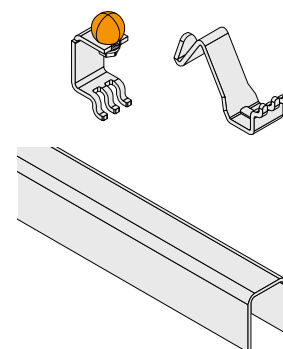
Dividers subdivide a flow level into lanes and prevent interference of storage units travelling on adjoining lanes. Available in two heights.

- **easy boltless assembly**
- **capable of absorbing high lateral forces**

**11 Universal divider**

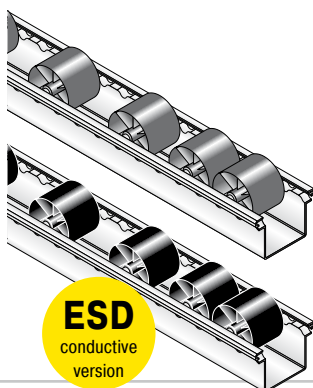
The universal divider allows even faster re-adjustment of the lane width without having to remove the roller tracks. Very appropriate for roller beds and when changes in the product range require frequent adaptation of the lane width.

- **fast re-adjustment of lane width in the case of changing product lines**
- **easy boltless assembly**

**Roller track with cylindrical rollers on a steel axle**

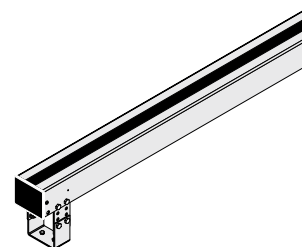
These cylindrical rollers operate on a galvanised steel axle. The smallest roller pitch is 28 mm.

- **highly impact resistant**
- **conductive version available**
- **good start-up and conveying qualities**
- **load capacity 8 kg per roller**

**7 Step-up rail**

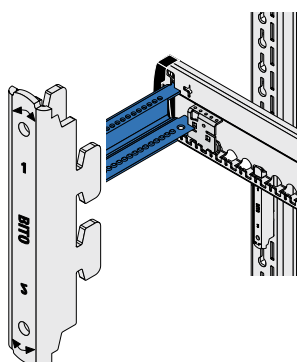
Adjustable in 3 heights for convenient and safe access to the upper storage levels.

- **easy servicing of the upper storage levels**
- **supplied with anti-slip covering for operator safety**

**Support clip**

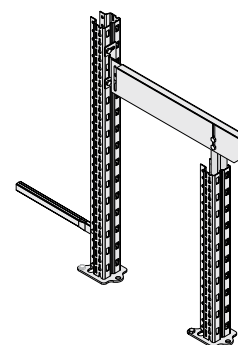
The support clip is hooked into the side perforations of the uprights and provides a safe seat for flow shelves. A simple turn through 180° allows to fix flow shelves on a 12.5 mm pitch.

- **easy boltless assembly**

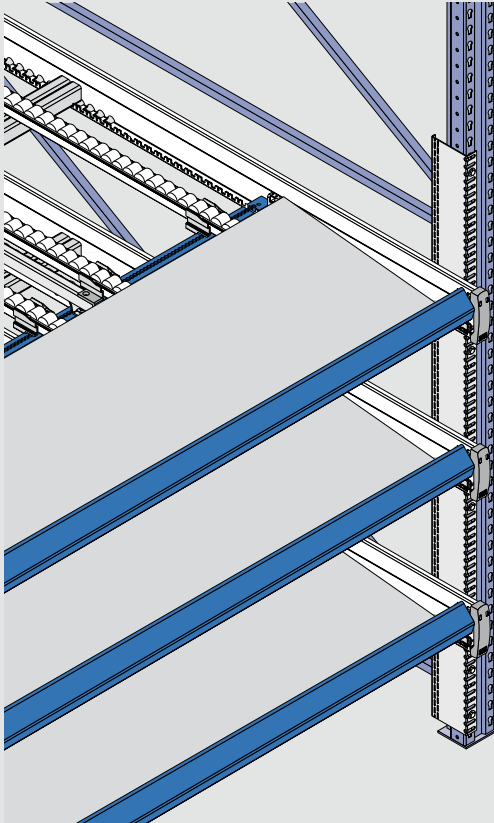
**6 Roller conveyor stand**

The stand is bolted to the racking frame uprights at the picking point and to two shorter uprights in front. It accommodates roller conveyors or worktable tops.

- **height adjustable**
- **various depths available**
- **safe seat for roller conveyor segments**



Upright adapters



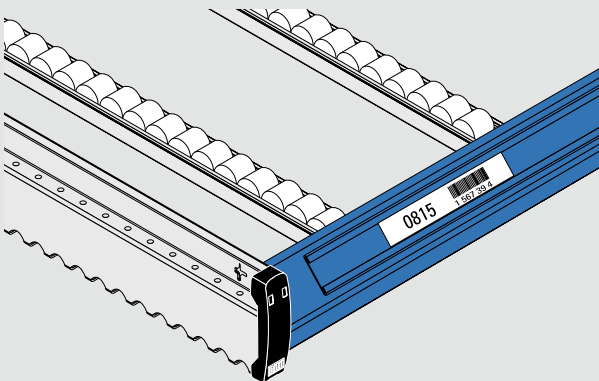
Retro-fit your existing pallet racking with flow shelves and benefit from a combined pallet/carton live storage racking!

Upright adapter sections allow to integrate the BITO carton live storage system into a standard racking construction of any brand. For this purpose, the adapter sections are directly bolted to the uprights of the existing installation. Support clips which safely locate into the perforations of the adapter sections serve as a seat for the self-supporting flow shelves.

- **fast retro-fitting of existing installations, also those of other manufacturers**
- **easy mounting**

Refer to page 61 for a case study.

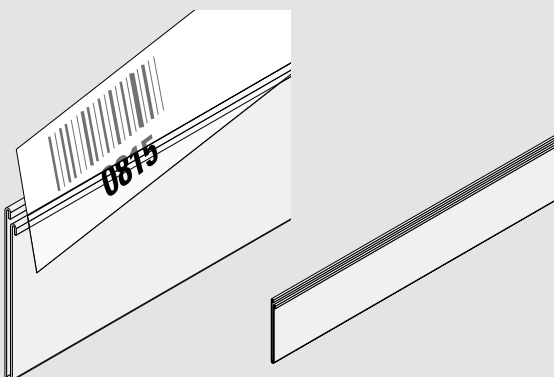
Metal label holder



The label holder extends over the full width of the flow shelf and comes riveted to the flow shelves' front and/or rear beam as stated in the order. The metal label holder is mainly used in cold storage or deep-freeze areas.

- **particularly suited for cold stores and deep-freeze areas**
- **holders can be supplied 30 or 40 mm high**
- **epoxy-coated in the same RAL colour as the beam**

Plastic label holder



Supplied with easily insertable card labels and self-adhesive strip on the rear.

- **26 mm or 39 mm high**
- **highly adhesive**
- **the cards can conveniently be inserted from the open top edge**

Our complete marking and labelling equipment is shown in our **PRODUCT CATALOGUE**. Ask for your free copy!

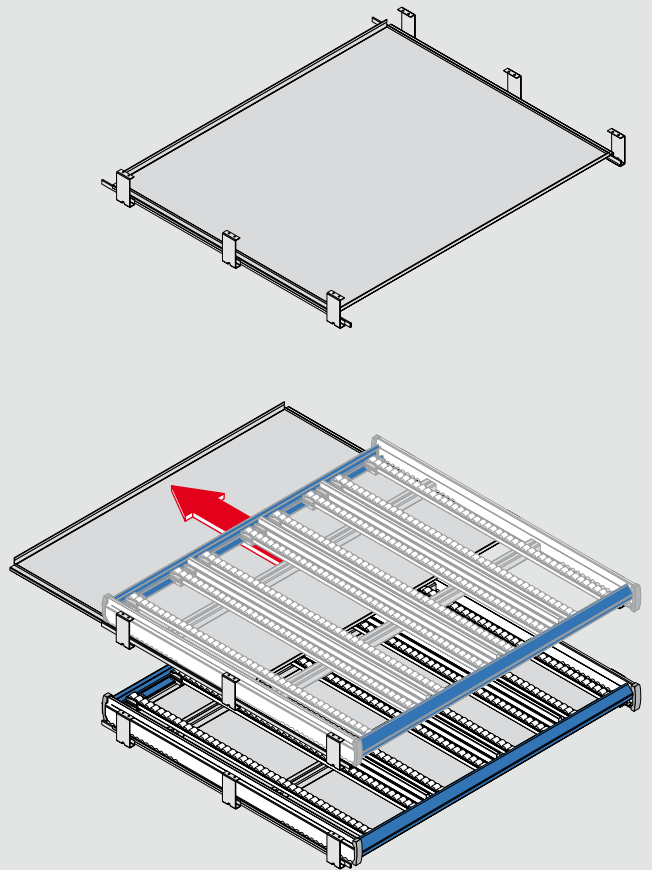
Dust protection sheet

The dust protection sheet can be easily adjusted later on by mounting it directly underneath the flow shelf.

This solution is applied particularly in the automotive industry where parts and components must be free of dust for further processing. Sliding smoothly on rails, this sheet protects the storage levels underneath from dust and falling parts.

Dust protection sheets can be manufactured in customer specific dimensions.

- **protection of goods stored underneath from soiling**
- **protection from falling goods**
- **easy later on adjustment**
- **convenient handling**
- **extractable**





SK Pharma Logistics GmbH
Logistic services provider



Features

- paperless order picking
- integrated conveyors
- subdivision into four order picking zones

Function

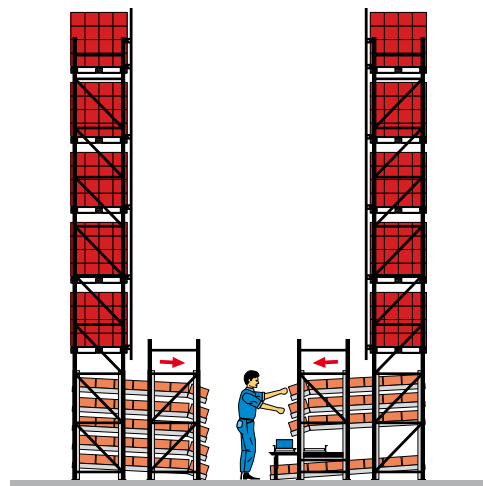
SK Pharma Logistics GmbH in Herford is a logistic services provider of pharmaceuticals. Their warehouse now features a carton live storage system. The 664 live storage lanes are grouped into four picking areas which are again subdivided into several zones stocking different reference item groups.

Picking operators are guided by a pick-to-light system. Products are picked directly into the despatch carton, either in one picking zone only or in all picking zones. These are linked to each other by non-powered conveyors on which the despatch cartons can be conveniently pushed along. Only when order preparation is finished will the picking cartons be pushed onto the powered conveyor lane. After passing the automatic weighing station, they are directed to one of the four packing stations where they will be lidded and automatically corded for despatch.



Benefits

- very short picking routes allow efficient order picking
- considerable increase in picking performance
- shorter order throughput times





TEGUT

Food + Non-Food

TUNING



Features

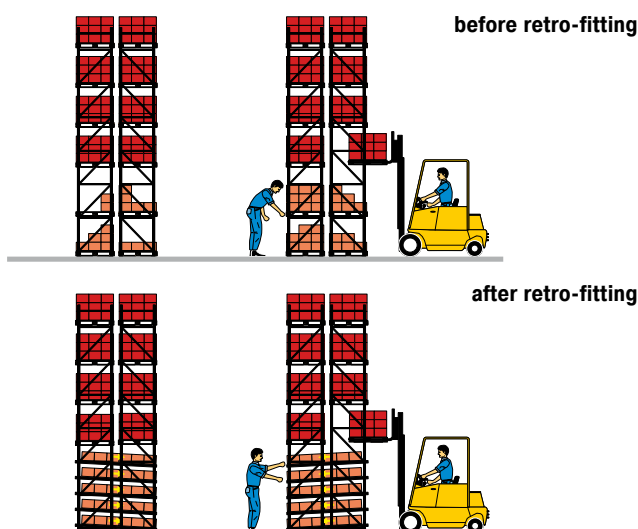
- pallet racking retro-fitted with flow shelves at floor level height
- static pallet buffer on top

Function

Since the 80s, Tegut in Fulda has been widening their product range by organic food. Meanwhile, the organic range includes 2500 stock lines which are kept in pallet racking according to their stock rotation frequency.

In order to improve the picking volume, the levels in operator reach height have been retro-fitted with flow shelves. Upright adapters allowed fast and easy hook-in fitting of these live storage levels into the already existing pallet racking installations from BITO and from other manufacturers.

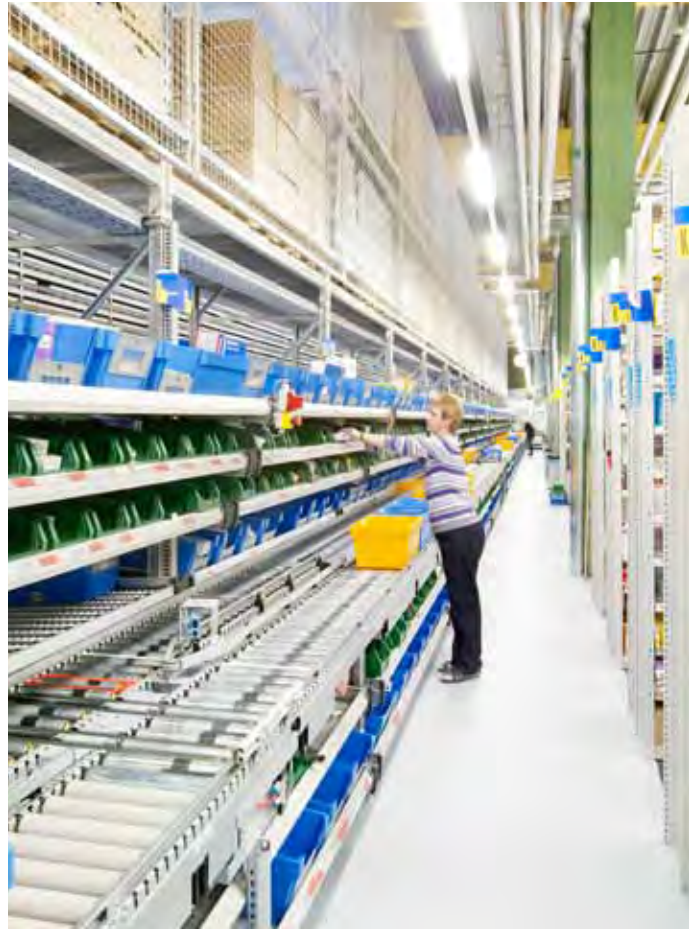
The Tegut pallet racking facilities now combine easy access live storage lanes at floor level height and a huge product reserve in the static pallet buffer on top.



Benefits

- enormous savings on time
- lower operating costs
- adherence to the FIFO principle
- the number of stock lines in direct access at the picking face has increased considerably and together with this picking performance as well

Andreae-Noris Zahn AG Pharmaceutical wholesaler



Benefits

- pallet buffer on top of order picking levels
- integrated conveyors
- picking facility combines live storage with static shelving

Function

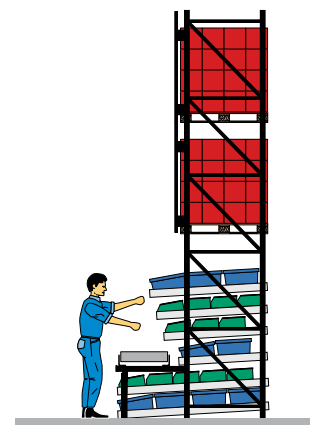
Headquartered in Frankfurt on the Main, Andreae-Noris Zahn AG (ANZAG) is one of the largest pharmaceutical wholesalers in Germany. With 25 branch establishments, the company can boast the densest delivery network of the sector.

ANZAG's logistics centre in Bremen features pallet racking equipped with live storage lanes at picking height to improve picking performance. Orders are picked according to the FIFO principle in several picking zones that are linked to each other by conveyors.



Benefits

- adherence to FIFO principle
- very good picking performance
- high storage density
- short order throughput times

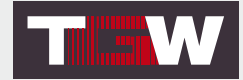




Zwilling J.A. Henkels AG
Manufacturer of cutlery



Project realised in
cooperation with



TGW, Wels (A)



Features

- paperless order picking
- integrated conveyors

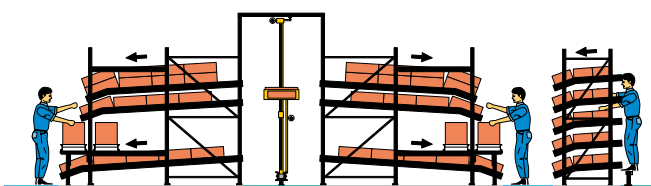
Function

Products are picked manually with the help of a pick-to-light system directly into despatch cartons (pick and pack system). The cartons are transported on a computer controlled conveying system, identified via barcode scanning and fed out at the required station.

The live storage racking for A-items (fast movers) is fed with new containers from the automated bin storage installation. The lanes with B-items are filled manually. C-items (slow movers) are picked from BITO small parts containers, series »KLT«, which are provided directly from the automated bin storage installation.

Benefits

- drastically reduced travel routes
- visible improvement of order throughput times
- very low error rate due to the pick-to-light system



BITO Adapta-Flow Modules

Convenient retro-fitting of a static pallet racking level into a live storage level – while using the beams available in the existing racking, no matter which brand.

- ready-mounted drop-on modules allow rapid reconfiguration
- modules can be removed at any time to restore the original state as static pallet racking and can be re-used at another place in the racking
- suited for 50 mm deep beam profiles
- accommodates storage units weighing up to 30 kg

Levels equipped with conveyor rollers

- accommodate cartons and bins in lanes with a pre-defined width
- ideal for storage units with difficult travel characteristics
- for heavy-weight goods of up to 30 kg
- galvanised rollers, \varnothing 25 mm, roller pitch 84 mm

Levels equipped with roller tracks

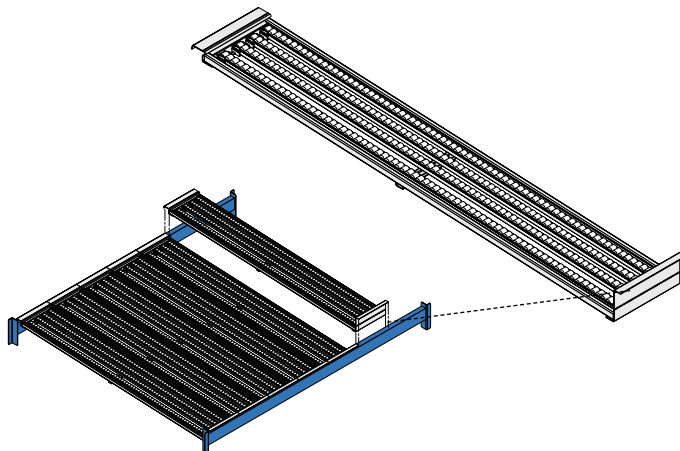
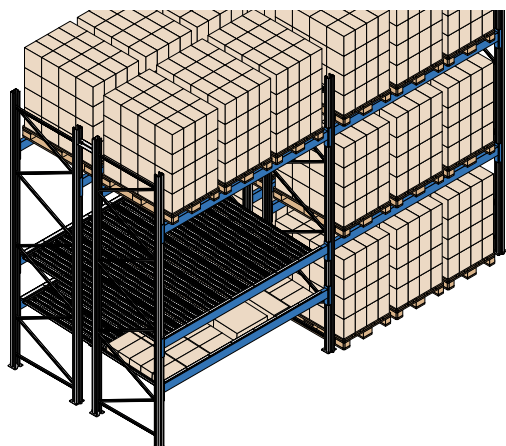
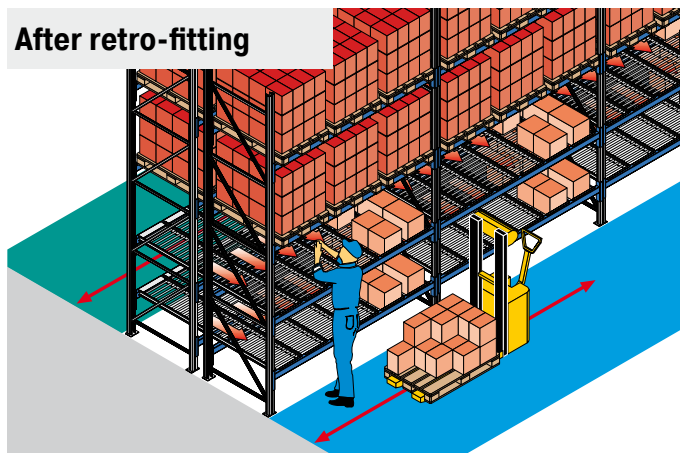
- suited for cartons and bins of any size
- roller tracks are mounted with a spacing of approximately 100 mm and can be adjusted in 8.5 mm increments
- cylindrical plastic rollers, \varnothing 26 mm, roller pitch 28 mm
- even track spacing turns a level into a roller bed without pre-defined lanes



Before retro-fitting



After retro-fitting





Features

- retro-fitting of static pallet racking with BITO Adapta-Flow modules
- dynamic and highly flexible live storage system

Function

Dachser counts among Europe's leading forwarders. Their logistics centre in Kempten features pallet racking which, at operator reach height, has been retro-fitted into a live storage system with BITO Adapta-Flow modules. These provide total flexibility for a dynamic response to changing requirements.

Retro-fitting is very convenient and keeps assembly costs low: the modules which are equipped with roller tracks or conveyor rollers are simply placed onto the beams. Instead of six pallet positions per racking bay, there are now 50 lanes on which different product lines in packaging units of various types and sizes are presented to the order pickers.



Benefits

- high degree of flexibility
- shorter order throughput times
- clearly defined areas for loading and retrieval ensure that order pickers are not disturbed by restocking
- direct and safe access
- adherence to FIFO principle