



BITO 2011 – Sustainability is the key to future!

Detlef Ganz | Managing director

Let's establish a sound basis for tomorrow

Dear readers,

Particularly in the field of intralogistics, sustainability is crucial. Energy and raw material prices keep rising, environmental pollution is increasing and the demographic development will have far-reaching impacts on our working environment. Nevertheless, we expect intralogistic processes to operate fast and efficiently. Ecology, economics and social responsibility are today's issues. In all these fields, BITO makes valuable contributions. Our solutions help you reduce order throughput times and increase picking performance. They save on space, are manufactured with environmentally sound production methods and help you cut down your energy demand. And, with a view to the human factor, the ergonomic design of our products ensures fatigue-free working also for older staff members.

The entire BITO product and service range has been developed with a clear orientation towards market specific requirements and individual customer needs. This clearly structured and comprehensive manual is a key to the exciting world of intralogistics, presenting sustainable and innovative technologies and integrated solutions. All shelving and racking types, bin and container series as well as the matching storage and order picking systems are explained in detail and illustrated with numerous case studies. The BITO Project Guide will show you the optimum solution for your specific application – making it the reference book and planning aid of your choice.

We wish you a lot of interesting ideas!

Detlef Ganz



50
Years
of success in
STORAGE SYSTEMS



Products ...

Product variety

- more than 5000 products
- shelving & racking
- bins & containers
- accessories

Sales teams

- competent advice
- telephone ordering

Plants

- company-owned production facilities in Germany on an area of 140,000 m²

Distribution

- subsidiaries and distribution agencies in many countries around the world

Online shop

- certified online shop
- comprehensive information

Projects ...

Technical advisors

- more than 80 local representatives in Europe

Planning

- our know how for a perfect material flow

Project realisation

- target oriented and customer specific

Production

- in our own plants at Meisenheim and Lauterecken in Germany

Assembly

- professional completion on the agreed date

... and service!








Service

- assembly, maintenance, internet shop and more



50
Years
of success in
STORAGE SYSTEMS



BITO	■ Company & business World of storage & handling	Page 4 – 19
	■ Boltless and bolted shelving Multi-tier installations Mezzanines and platforms	Page 20 – 35
	■ Supply shelving and ERGO racks ■ Carton live storage ■ Automated carton live storage	Page 36 – 45 Page 46 – 63 Page 64 – 71
	■ Automated bin and tray storage	Page 72 – 89
	■ PRO Pallet racking	Page 90 – 105
	■ Drive-in racking	Page 106 – 111
	■ PROmotion shuttle system	Page 118-123
	■ Pallet live storage ■ Automated pallet live storage	Page 112 – 137 Page 138 – 141
	■ Cantilever racking / Long loads storage	Page 142 – 151
	■ BITO PROMobile pallet racking	Page 152 – 159
	■ Plastic bins and containers	Page 160 – 173
	■ Integrated solutions and multi-system facilities	Page 174 – 179
	■ Industry guide ■ Key word list	Page 180 – 181 Page 182 – 183



Top quality produced in our own plants!

BITO Shelving & racking...



... for small, large, light or heavy weight, bulky or long goods with load capacities from 50 kg to 4.5 tonnes per storage level are manufactured in our plant at Meisenheim.

The product range ...

... includes boltless and bolted shelving, shelving with extra large shelves, wide span and heavy duty shelving, pallet, cantilever and drum racking, mobile shelving and racking, multi-tier installations, carton and pallet live storage and automated storage facilities.

State-of-the-art technology ...

... is employed without exception for manufacturing any of our products. The high degree of automation such as in the steel bending process and in shelf production makes sure that all products are absolutely true to size and of consistently high levels of quality. Since 2008, BITO operates Europe's most modern production facility for pallet racking. A hall which has been specifically built for this purpose accommodates our fully automated production lines for BITO PRO pallet racking components. Automation ensures fast and error-free production, thus making sure that your orders are handled efficiently and without loss of time.



... for a broad spectrum of applications!

In the plant at Lauterecken, BITO manufactures storage, transport and order picking bins and containers for use in the most diverse of industries and for almost any application.

Customer specific demands ...

... are met by the BITO R&D department who is able to respond to individual requirements, thus providing you with the optimum solution for your application. Our engineers coordinate the introduction of new bins and container types – from the initial steps of development to the three-dimensional, digital model, from the prototype to the final product ready to be manufactured in series. All series are made on the most modern injection moulding machines. Moreover, the plant at Lauterecken also has the facilities to treat special requests, such as the automatic application of barcode labels and the milling or drilling of drainage holes to ensure water permeability required for environments with a fire hazard.

BITO bins & containers



Our site in India

In 2007, BITO established a production plant for shelving and pallet racking in India in order to supply the Indian and the Middle East markets.





BITO – your single source supplier!

One Stop Shop



Shelving & racking, bins & containers and accessories – BITO supplies all you need for storage and handling. From individual products ordered from our catalogue to a huge facility. From a single shelving unit for office and workshop environments to a compact pallet racking installation for your intralogistics chain. From a small-sized storage bin with pick opening for your archive to a large volume container for efficient parts handling. From identification labels to hand pallet trucks.

BITO also is a service provider of all project related tasks from layout planning, project coordination, delivery, assembly to start-up – whether of a complex storage facility combining various systems or of an automated bin or tray storage installation. Your advantage: you can rely on dealing with the same contact partner throughout a project.

The shelving & racking range ...

... includes shelving and racking to be assembled with or without bolts, shelving with extra large shelves, wide span and heavy duty shelving, pallet racking, cantilever and drum racking, mobile shelving and racking, carton and pallet live storage as well as automated installations.

Whether you choose a conventional installation or an automated live storage facility – our experienced and committed project teams will be pleased to assist you in finding the optimum solution for your requirements.

... comprehensive and versatile

BITO Bins and containers

BITO's huge range provides bins and containers for any application: from order picking containers over various Euro-sized stacking container series, the very successful multi-purpose container series to bins and trays for automated storage to containers in pallet size.

- Storage bins with pick opening
- Large volume containers
- Storage & handling bins
- Pallet boxes
- Material flow containers
- Folding pallet boxes
- Euro-sized stacking containers
- Small parts containers
- Multi-purpose / multi-trip containers
- Plastic trays for automated storage



The broad range of accessories ...

... such as workbenches, transport dollies, mobile shelving for order picking and in-house transport, cabinets and cupboards, ladders and access steps, labels and label holders and a broad choice of safety equipment round off the BITO supply spectrum.

Whatever you need for your warehouse and your workshop – BITO is your one stop shop!



Live storage installations from BITO — for efficient storage and order picking!

On time and to the right place ...



... are essential demands for efficient material flow in the intralogistics business. A target which requires reliability and precision work down to the last detail. It is with the same demand that BITO manufacture their live storage systems. Exactly adapted to the intended application and your individual needs, live storage installations clearly raise productivity in your warehouse. BITO roller tracks and roller conveyors are the motor of live storage. They are manufactured in our own plants with greatest care and in premier quality. This is why we can give a warranty on the proper functioning and on the durability of our modules.

Even storage installations which are already in operation offer streamlining potential. In response to changing market situations, the BITO retro-fitting system for pallet racking allows to convert static pallet racking into a live storage installation with the help of flow shelves and adap-ta-flow modules. This allows immediate retro-fitting, when and where required. Expensive and time consuming modifications to existing installations or even the purchase of new storage facilities can thus be avoided.

All BITO shelving and racking systems are ideally suited for a link-up with modern conveyor technology and integration into computer-monitored warehouse management systems.

BITO holds all the aces!

A fast flow of goods, lean operations and efficient procedures within the logistic supply chain can only be achieved with cost-oriented and reliable storage and order picking systems.

Companies such as BITO who produce all components in their own plants and, on top of this provide project planning and support project realisation, have a clear advantage. This allows us to keep an eye on quality, push product innovation and constantly increase our already comprehensive product and service portfolio – to your advantage.

BITO works out the optimum solution for any requirement and any sector: from the automobile industry and their suppliers to manufacturers of fittings, clothes, books, sound storage media, electro-technical products, bicycles, household articles and appliances, cosmetics/body care products, food, semi-luxuries, beverages, optical products, paper and stationery, pharmaceuticals and chemicals to providers of transport logistics.

The implementation of your specific requirements into practical storage and order picking solutions is coordinated by competent and committed project teams.

Different systems

In order to be able to choose the optimum shelving or racking system or the right combination of various systems, BITO will make an exact article analysis first. Only then, and in agreement with the customer, will the project team decide on the optimum solution:

- **single or multi-tier shelving and racking**
- **pallet racking for order picking and in buffer stores**
- **mobile shelving or racking**
- **carton or pallet live storage**
- **automated bin or tray storage**

Planning and realisation





A comprehensive service package!

On-site support ...



... and genuine customer orientation come first at BITO. A dense network of experienced technical advisors guarantees fast and competent support and service. Moreover, almost every standard product can be viewed and ordered on-line in the BITO internet shop. Our website also provides details on storage and order picking systems plus up-to-date news, information on the company and contact data of our subsidiaries and partners.

Are you planning to realise a large-scale project? Benefit from our comprehensive service package which not only includes in-depth consultancy, layout planning and project management, but also professional assembly by BITO-trained teams. In cooperation with the assigned project managers, our assembly managers will coordinate all steps, see to the proper start-up of your installation and make an allround check on site. As to delivery, BITO relies on a strong partner who is one of the European leaders in the transport logistics business.

We are pleased to assume your duty!

Have mandatory inspections done by BITO

As stipulated by DIN standard EN 15635, operators of shelving and racking installations are obliged to have their facilities inspected at least once a year by a qualified person. BITO provides this inspection service. Our inspectors are trained and authorised to conduct all necessary tests and to initiate all measures necessary to correct defects. Please check the safety relevant regulations applicable in your country.

To be checked at a regular basis:

- pallet racking
- drive-in racking
- drive-through facilities
- cantilever racking
- shelving
- multi-tier installations
- live storage installations

Your benefits are:

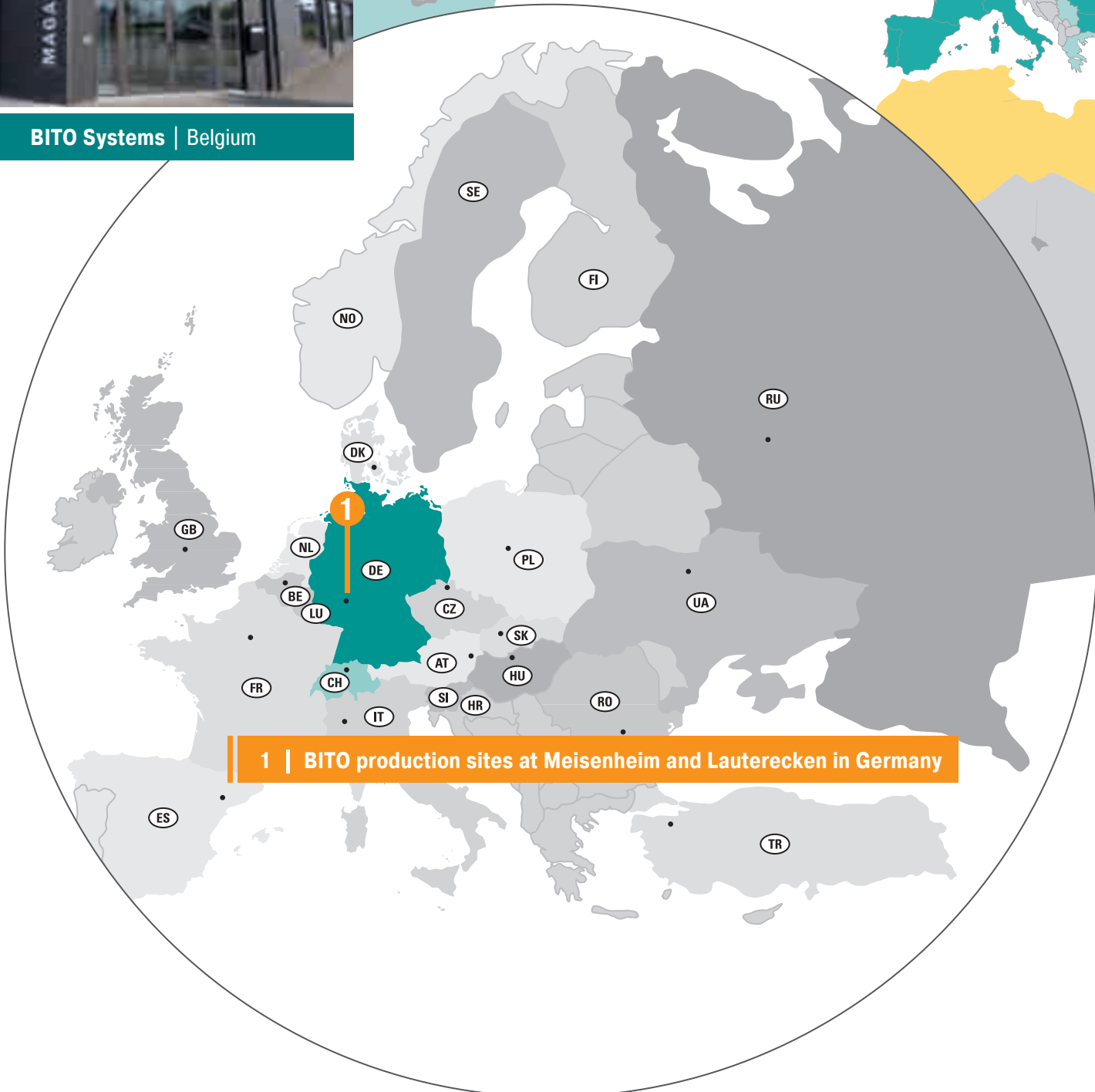
- + operational safety
- + lower repair costs
- + long service life
- + compliance with inspection regulations & terms



... always close to our customers!



BITO Systems | Belgium





BITO Storage Systems | England

... our subsidiaries in:

- | | |
|-----------------------|------------------|
| ■ Austria | ■ Poland |
| ■ Belgium | ■ Romania |
| ■ Bulgaria | ■ Russia |
| ■ Czech Republic | ■ Slovakia |
| ■ France | ■ Spain |
| ■ Denmark | ■ Switzerland |
| ■ Dubai (Middle East) | ■ Ukraine |
| ■ Hungary | ■ United Kingdom |
| ■ Italy | |

... our partners in:

BITO also cooperates with distributors in many countries outside of Europe.

Please contact us!

+49 - (0) 67 53 - 122 164

2 | Production site in India



BITO Lagerteknik | Danmark



BITO Polska | Poland



... efficient **warehouse design** – we build **storage systems that work!**

Intralogistics ...



... is about material flow in the widest sense. Hardly any industry offers as much potential for savings and streamlining as the intralogistics business. Point of departure of all considerations in this business are warehousing and order picking, related material flow issues, and finally storage technology. However, not two warehouses are alike. Productivity makes the difference. In times of increased competition for market shares, streamlining is a must for companies. Short throughput times, low stock levels and high levels of transparency lead to a lower capital lockup. Moreover, the clever combination of products and systems offered in the field of storage & handling allows to significantly reduce order picking errors.

In other words: companies who store their products efficiently and are able to organise fast and faultless delivery have a clear competitive advantage.

Material flow ...

... comprises all automated or manual movements of goods and products related to a company's purchase, production and distribution activities. If a material flow process connects more participants, a supply chain is created which is also referred to as value stream in the sense that any good or product entering a material flow process should come out with a surplus value for the customer.

Improvements in the material flow process lead to:

- shorter order throughput times
- lower quota of rejects due to defective goods
- better conditions of work
- lower costs
- reduced energy consumption
- less environmental pollution

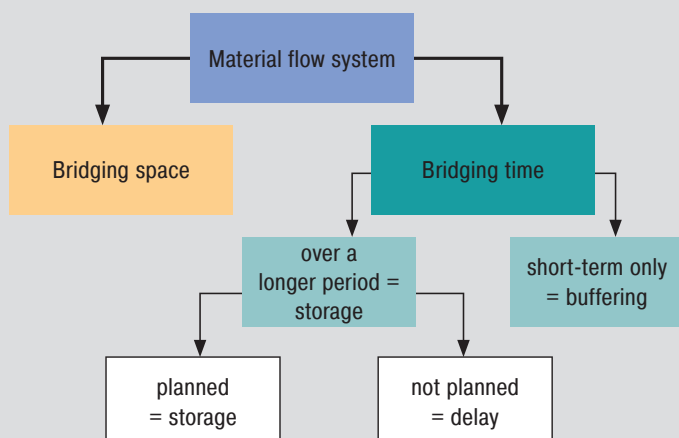
Storing goods ...

... is a part of enterprise resource planning. Storage aims at keeping raw materials and supplies as well as finished or partially finished products in stock, thus taking them out of the material flow process until they are needed.

In general, goods can be kept in three 3 types of stores: supply stores, buffer stores and distribution stores. Short travel routes and storage areas of a limited size ensure efficient and economic order processing.

■ **Storage:** Allocation of raw materials and supplies as well as partially finished or finished products to a designated storage area for production purposes or for later distribution within the material flow chain.

■ **Buffering:** Storage of raw materials and supplies as well as partially finished or finished products for a short period of time only.



Layout planning for a warehouse ...

... has to consider several factors, such as the intended purpose of a storage area, material flow routes, a good degree of surface and space utilisation and efficiently designed workplaces. Efficient layout planning also leaves the door open for later facility modification and enlargement or for further expansion of a warehouse or a building. Criteria which help to determine the appropriate shelving and/or racking type are for example the product range and stock rotation frequency.

Product range

Stocked items can be classified into three categories: A-, B- and C-items. A-items have the highest stock rotation frequency, C-items the lowest. For this reason, all items should be stored in a way that allows efficient access at any time in view of their picking frequency. A-items should therefore be placed at the front, C-items at the rear.

Stock rotation

The stock rotation frequency designates the ratio of the quantity of items effectively on stock and the number of items required. This ratio shows in how far demand for a specific item can be met from the existing stock level. The quantity to be stocked per item is made up of a procurement quantity and a safety stock.

Shelving and racking compared by ...

... investment costs

Investment costs are all costs incurring until a shelving or racking facility has been completely installed.

... flow costs

Flow costs are the costs per item which result from in-house transport including labour costs.

... handling capacity

(Picks) Quantity of items picked per time unit.

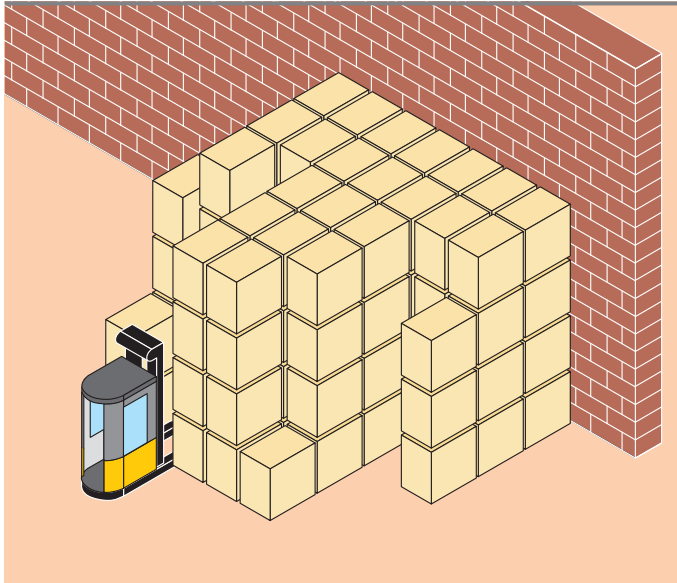
... volume utilisation

Optimum utilisation of the existing warehouse volume.

		Investment costs	Flow costs	Handling capacity (picks)	Volume utilisation	Maintenance
Static storage systems	Storage without shelving and racking (block storage)	—	● ●	● ●	● ● ● ● ● ● ● ●	—
	Conventional shelving for unit loads	●	● ●	● ●	● ● ● ●	●
	Conventional pallet racking	●	●	● ●	● ● ● ●	●
	Double deep pallet racking	●	●	●	● ● ● ●	●
	Narrow aisle racking	●	●	● ●	● ● ● ●	●
	Drive-in racking	● ●	● ●	● ● ●	● ● ● ● ● ● ● ●	●
Live storage systems	Live storage / push-back installations	● ● ● ● ● ● ● ●	● ●	● ● ● ●	● ● ● ● ● ● ● ●	●
	Mobile shelving and racking	● ● ● ● ● ● ● ●	● ●	● ●	● ● ● ● ● ● ● ●	● ●
	Automated installations – BITO types “AKL” (automated bin and tray storage) and “APL” (automated pallet racking)	● ● ● ● ● ● ● ●	●	● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●	● ● ● ●

● ● ● ● ● = high
● = low

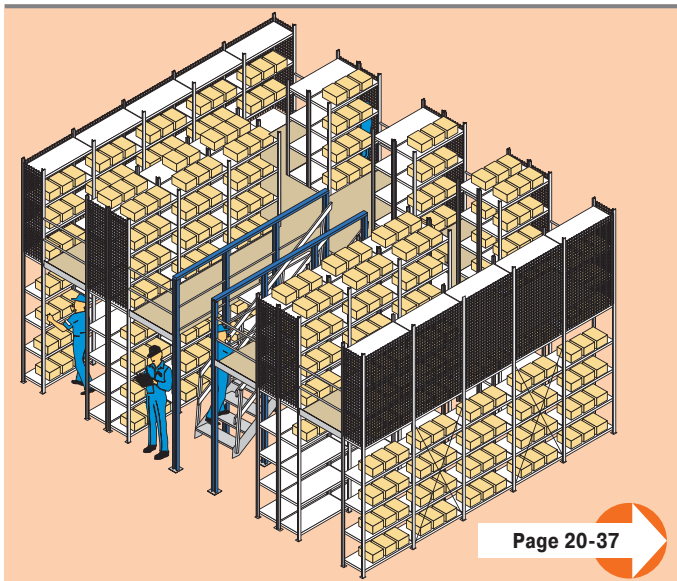
Static storage systems



Storage without shelving or racking (block storage)

Block storage means to store stackable cardboard boxes, cases or pallets besides or on top of each other without using shelving & racking or other structures. Goods which are typically stored in this way are stackable, palletised goods, beverages, drums or tyres. Block stacking is relatively cost-efficient, because it requires no additional investment into pallet racking. However, this solution takes a lot of storage space.

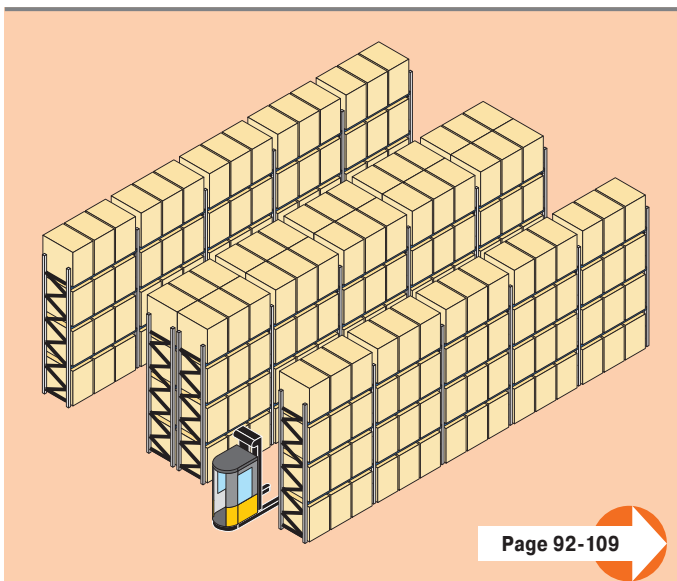
- **easiest way to store pallets in loose stacks**
- **appropriate for high storage quantities of the same item, because re-positioning storage units is time-consuming**



Conventional shelving for unit loads

Shelving allows to store goods on levels with a continuous surface. There are no auxiliary means required. The fact that goods can be stored without specific bins or pallets constitutes the most important advantage of this storage solution: it is very flexible in use. For this reason, it is particularly appropriate for storing unit loads such as small parts or bulky goods. Moreover, this solution allows to make use of the entire warehouse surface, even of corner areas.

- **maximum utilisation of warehouse surface**
- **loading and unloading of unit loads without auxiliary means**
- **manual replenishment and retrieval**



Conventional pallet racking

This frequently used racking type offers easy access to each pallet. Changing storage requirements can be met by retro-fitting this racking type into order picking systems with very little effort and whenever required. A broad range of accessories ensures that almost any load carrier can be stored in this system.

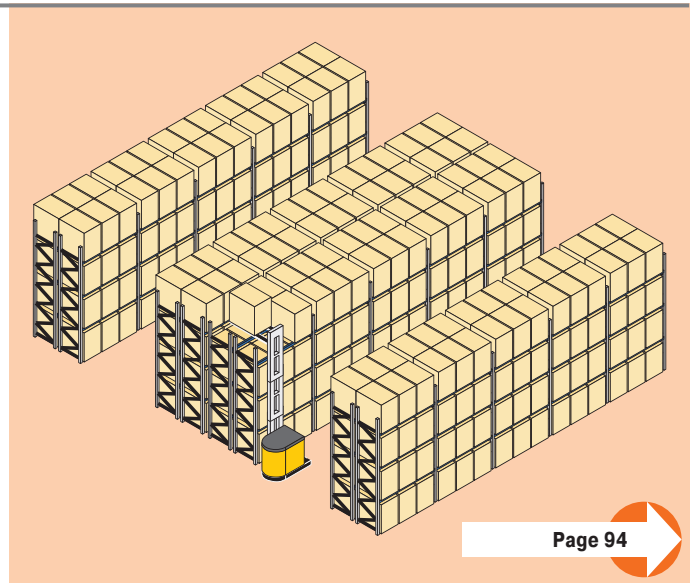
- **each pallet is directly accessible**
- **racking can be easily retro-fitted to create optimum storage conditions for the load carrier to be stored (comprehensive range of accessories, storage levels can be converted without loss of time)**
- **low investment costs**
- **flexible solutions**

Static storage systems

Double deep pallet racking

This storage solution allows two pallet deep storage on the same level. Servicing is done with telescopic fork lift trucks. One aisle thus gives access to four pallets per level, two on either side. This saves one aisle which in turn improves the utilisation ratio of warehouse space.

- **less warehouse surface occupied**
- **increased storage capacity**
- **compared to one pallet deep storage, up to 25% of the storage space in a warehouse can be saved due to improved volume utilisation**

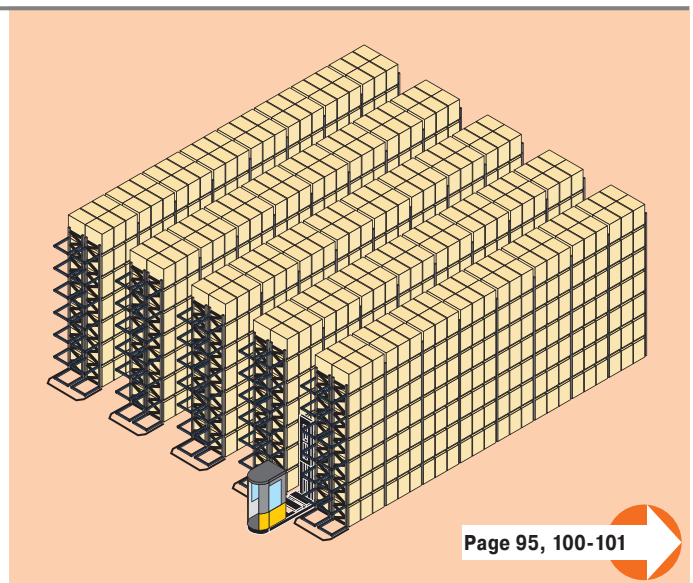


Page 94

Narrow aisle racking

Narrow aisle configurations improve the degree of warehouse compacity. Reduced aisle width and a high-rise built make this solution particularly appropriate for warehouses with limited floor space. As a rule, narrow aisle trucks operate on rails or by induction which accelerates loading and picking operations as compared to conventional pallet racking.

- **high-rise configuration ensures a very good volume utilisation**
- **fast replenishment and picking with narrow aisle trucks**

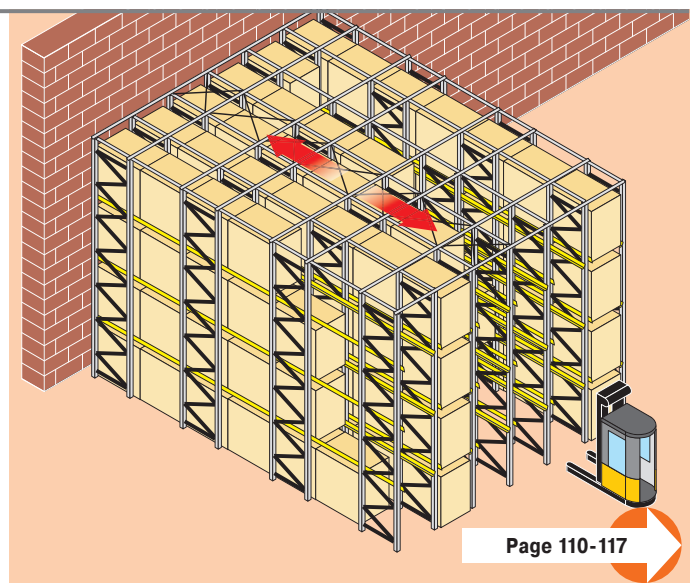


Page 95, 100-101

Drive-in racking

Drive-in racking consists of several adjoining lanes with angled seat profiles mounted to the uprights at the required level spacing. The storage units are loaded into the racking with lift trucks. Unloading is done according to the LIFO-principle which is why drive-in racking is only suited if no specific pallet must be retrieved.

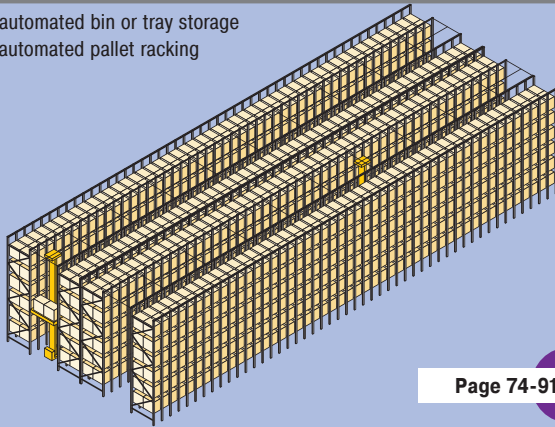
- **storage on small floor surfaces**
- **ideal for a limited number of product lines and warehouses with high maintenance costs (climatisation etc.)**
- **no service aisles**
- **block storage, however with improved access to products and easier stock control**



Page 110-117

Live storage systems

AKL= automated bin or tray storage
APL= automated pallet racking

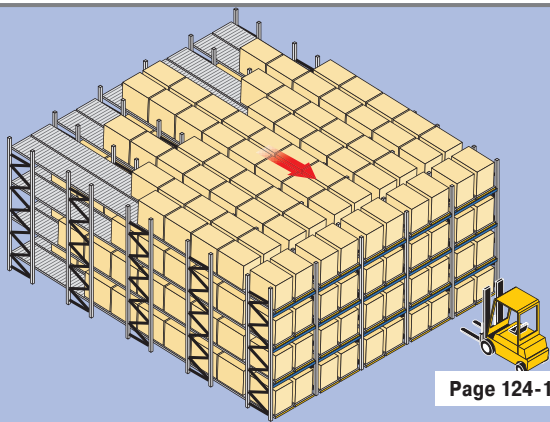


Page 74-91

Automated installations, BITO type “AKL” and “APL”

“AKL” installations are bin or tray storage installations with automated servicing, “APL” installations operate in the same way, however, they accommodate pallets and wire-mesh box pallets. Replenishment and order picking is done by automated, computer-monitored stacker cranes. These are very compact and do not take a lot of space. Automated installations must be precisely adapted to their intended purpose, because the degree of flexibility is quite low.

- very high degree of space utilisation
- permanent inventory control due to computer-monitoring
- high investment levels

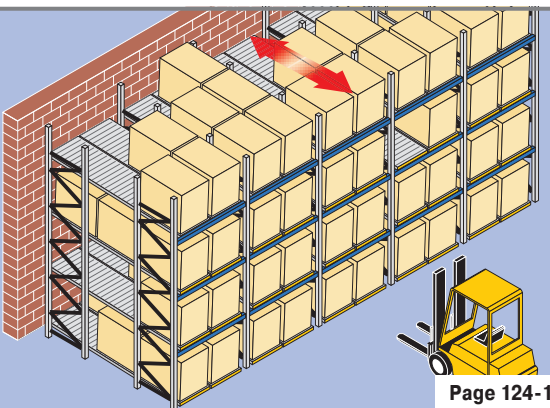


Page 124-153

Carton and pallet live storage

These storage systems allow to build very compact installations. Live storage facilities are replenished from one side only. Goods are picked from the opposite side only. Due to the incline of the storage levels, stocked goods, either stored on pallets or in bins and containers, move unassisted from the loading to the picking side. The live storage system ensures adherence to the FIFO-principle.

- compact storage on a small floor surface
- adherence to the FIFO-principle allows easy control of production batches and sell-by dates
- separate loading and order picking aisles increase operator performance

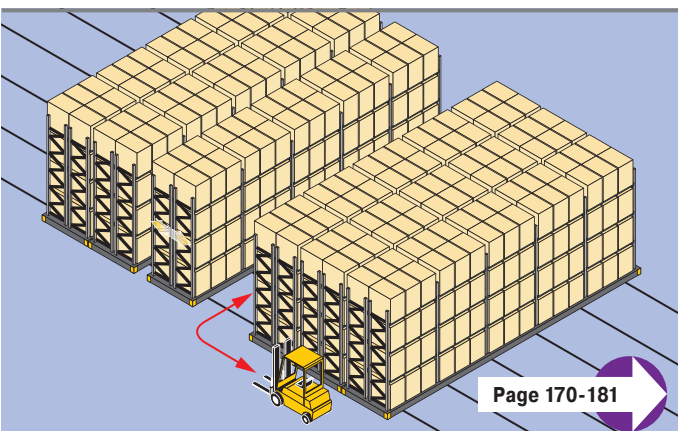


Page 124-153

Push-back racking

In view of the flow levels which are mounted with a slight incline from rear to front, push-back pallet racking is similar in configuration to live storage racking. Pallets are stored in a very compact way, however according to the LIFO-principle (last in – first out). Pallets are fed into the installation by pushing them “up” into the lane, thus pushing the pallet which up to then was at the picking face back to second position in the lane. Upon retrieval of the pallet which was last fed in, the second pallet in line moves gravity-driven to the picking face.

- space saving storage solution
- only one aisle required for loading and picking
- all goods are always accessible at the picking face



Page 170-181

Mobile shelving and racking

Mobile shelving and racking is based on the same components as static shelving, cantilever or pallet racking. Mounted on light or heavy duty carriages, the racking runs can be moved in parallel direction to each other. The truck driver opens the required service aisle by remote control. Light barriers at the sides of an aisle guarantee safe trafficways. As aisles have to be opened and closed after each picking operation, this storage system should only be used if the turnover of goods is low. On the other hand, this system allows to achieve an optimum degree of storage space occupation.

- excellent utilisation of floor space and warehouse volume
- ideal for warehouses with a low stock rotation frequency



Single tier and multi-tier shelving and racking

Shelving and racking are mainly used for storage and order picking of non-palletised goods, small parts stored in bins, cartons or other storage units and for bulk storage. A broad range of accessories which can be added later on to this modular system allows efficient storage of almost any imaginable product, part or component.

Additional levels do not only create extra order picking, storage, manufacturing, assembly or office areas – thus „multiplying“ available floor space. Simultaneous picking on several tiers also helps to considerably reduce order throughput times.

Stairs and/or lifts connect the walkways/aisles on different tiers.

BITOwww.bito.com



Product information

Frequent application

- multi-tier order picking facility

Service options

- manual replenishment and order picking

Storage options

- goods can be stored short or long side facing or standing

Surface/volume utilisation

- multiple use of available floor space
- high volume utilisation due to multi-tier construction



Storage units

Goods stocked in plastic bins, containers and cartons, individually wrapped single items

Stock rotation frequency

- medium stock rotation frequency (B-items)

Stock characteristics

- any product, from standard size packages to bulky or single items with an odd shape



BITO Bins and containers

As a manufacturer of a broad range of comprehensive bin and container series, BITO is able to supply shelving and racking complete with perfectly matching storage, handling, order picking and distribution containers 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"

Our **PRODUCT CATALOGUE** provides detailed information on our entire delivery programme.

Ask for your free copy!



Boltless shelving system

The basic components of boltless shelving are frames, stiffening beams, shelves and cross bracing.

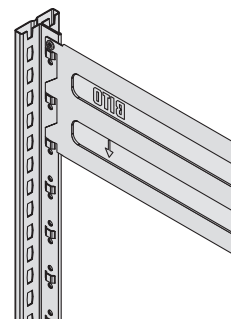
These light weight components provide optimum rigidity of the installation and allow to stock high load capacities.

- **shelf loads: from 100 kg to 400 kg**
(300 kg for a bay width of 1300 mm)
- **bay loads: up to 2400 kg**
- **bay widths: 750, 1000 and 1300 mm**
- **broad range of accessories such as solid or wire-mesh side/back cladding, solid sheet/wire-mesh/wire dividers.**

1 Frames

Structurally ideal slotting allows to realise shelving heights of up to 8 metres. The frames are completely riveted.

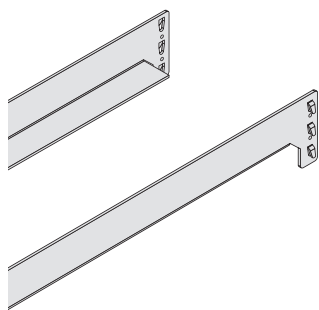
- **high load capacities and great rigidity**
- **uprights are only 50 mm wide**
- **minimum loss of clear shelf length**



2 Stiffening beams

Each hook connector has 3 solid hooks to ensure reliable force locking of beams and uprights.

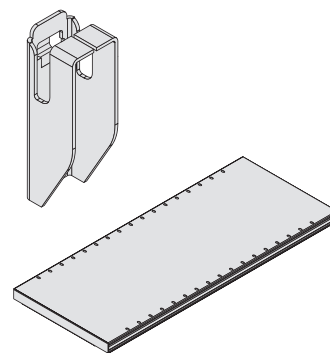
- **excellent lengthwise rigidity**
- **convenient fitting of shelves**
- **levels are height adjustable on a 25 mm pitch**
- **fast and easy push-in assembly**



3 Shelves

The shelves are simply placed onto the stiffening beams or onto 4 shelf clips. Both options allow to use the full shelf load capacity.

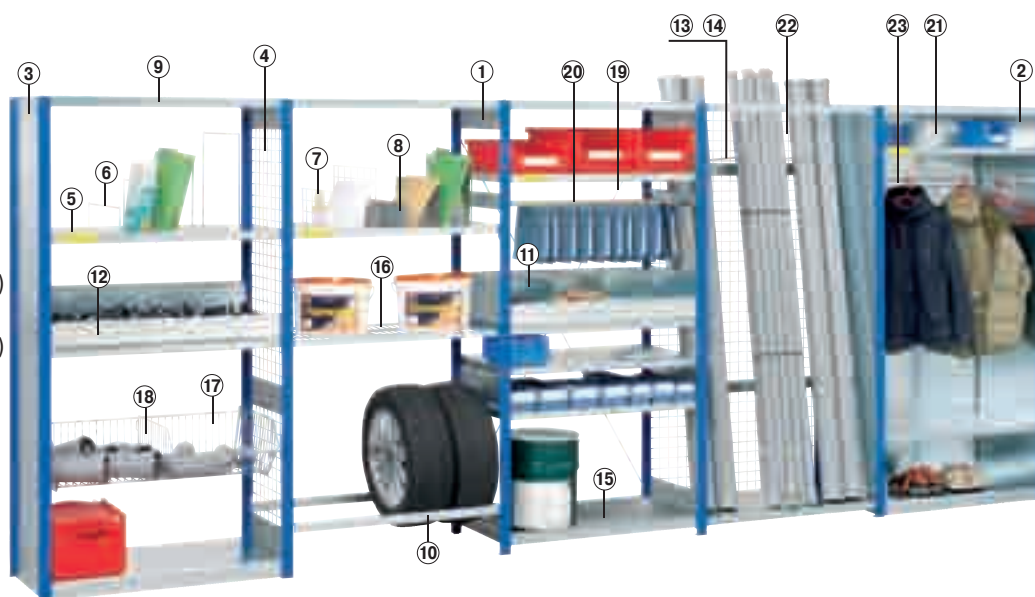
- **high load capacities**
- **height adjustable on a 25 mm pitch**
- **fast and easy fitting**



Accessories

- | | |
|-------------------------------------------------------------------|------------------------------|
| 1 Frame | 21 Solid sheet back cladding |
| 2 Solid sheet side cladding | 22 Wire-mesh back cladding |
| 3 Perforated side cladding | 23 Clothes rail set |
| 4 Wire-mesh side cladding | |
| 5 Shelf with perforations to accept dividers | |
| 6 Wire divider | |
| 7 Wire-mesh divider | |
| 8 Solid sheet divider | |
| 9 Stiffening beam | |
| 10 Beams for tyre shelving | |
| 11 Bin shelf for loose goods | |
| 12 Bin shelf front panel | |
| 13 Support rail for divider bars (vertical storage of long loads) | |
| 14 Divider bar (vertical storage of long loads) | |
| 15 Tray shelf | |
| 16 Wire shelf | |
| 17 Wire basket | |
| 18 Wire divider for wire baskets | |
| 19 Cross bracing | |
| 20 Suspension file unit | |

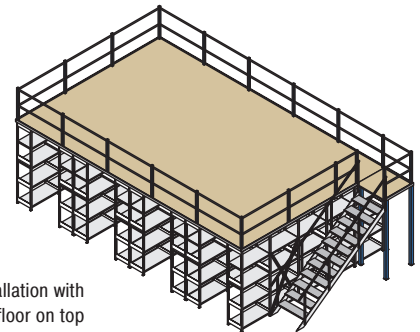
Further accessories upon request



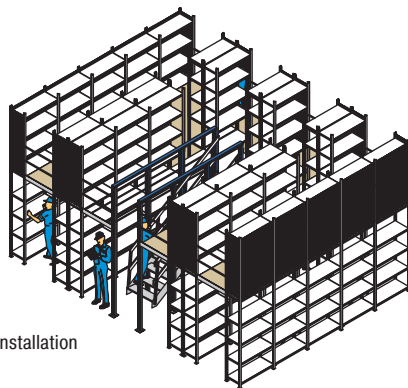


Options

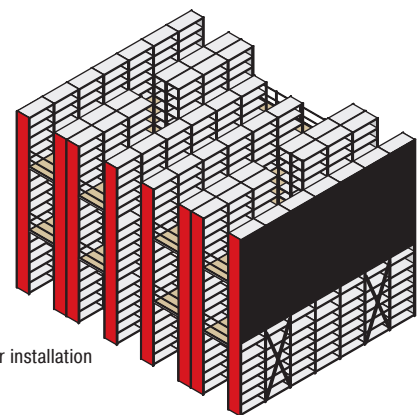
Multi-tier installations can be designed either as single tier shelving or racking with a mezzanine on top or as a multi-tier construction. Additional work areas can be created on the floor level as well as on the tiers on top.



Single tier installation with a mezzanine floor on top



Two tier installation



Three tier installation



Economic evaluation

Maximum space utilisation with compact storage on several tiers

Good use of the available warehouse volume with respect to floor surface and building height is crucial for the efficiency of a storage facility.

Multi-tier shelving and racking – whether used as independent solution or as part of a facility combining several storage systems – provide good space utilisation by indirectly multiplying the available surface. Moreover, they are a very economic solution, as the components of the system serve as integral and supporting elements for the tiers on top.

Efficiency can further be boosted by appropriate warehouse management and by integrating suitable conveying equipment, e.g. powered conveyors or lifts.

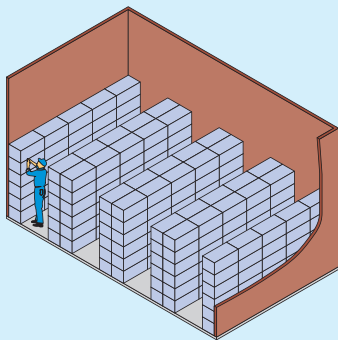
Comparison between single tier and two tier installations in view of optimum space utilisation

Particularly in the case of smaller shelving installations, determining the right place of the stairway is of paramount importance (compare solution 1 and 2).

The second tier

- improves surface utilisation and cuts down on occupancy costs
- increases the available storage volume by up to 100%

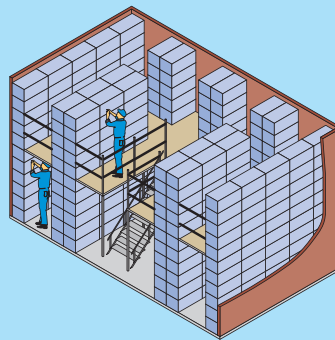
Single tier shelving



Dimensions of the facility:
8.60 m x 5.09 m x 2.20 m (W x D x H)

Floor space	43.7 m ²
Room height	4.5 m
Shelf dimensions	1.0 x 0.5 m
Number of shelves	240 shelves
Storage volume	47.3 m ³
Volume utilisation (based on gross storage volume)	24.1 %
Surface utilisation (based on total surface)	48.7 %

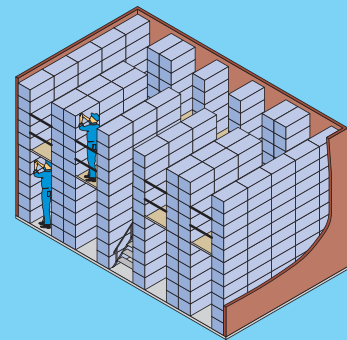
Two tier shelving Solution 1



Dimensions of the facility:
8.60 m x 5.09 m x 4.15 m (W x D x H)

Floor space	43.7 m ²
Room height	4.5 m
Shelf dimensions	1.0 x 0.5 m
Number of shelves	338 shelves
Storage volume	73.6 m ³
Volume utilisation (based on gross storage volume)	37.4 %
Surface utilisation (based on total surface)	41.5 %

Two tier shelving Solution 2



Dimensions of the facility:
8.60 m x 5.09 m x 4.15 m (W x D x H)

Floor space	43.7 m ²
Room height	4.5 m
Shelf dimensions	1.0 x 0.5 m
Number of shelves	404 shelves
Storage volume	87.9 m ³
Volume utilisation (based on gross storage volume)	44.7 %
Surface utilisation (based on total surface)	48.7 %

Advantages of the system

General advantages of multi-tier shelving and racking

- utilisation of storage volume can be increased by up to 100 %
- high degree of floor space utilisation
- simultaneous order picking on several tiers
- additional floor space is gained for storage and assembly

Specific advantages of BITO multi-tier shelving and racking

- assembly without bolts of all basic components
- full length frames – no joining plates required
- stiffening beams and additional cross bracing make for a high load capacity and give structural safety to all bays
- boltless system allows flexible shelf spacing
- safe and convenient stairways secured by guard railing
- useful equipment and accessories
- galvanised surface finish
(epoxy-coating upon request)



- 1 Frame
- 2 Stiffening beam
- 3 Shelves
- 4 Cross bracing
- 5 Platform/walkway decking
- 6 Guard railing
- 7 Stairway
- 8 Pallet access position

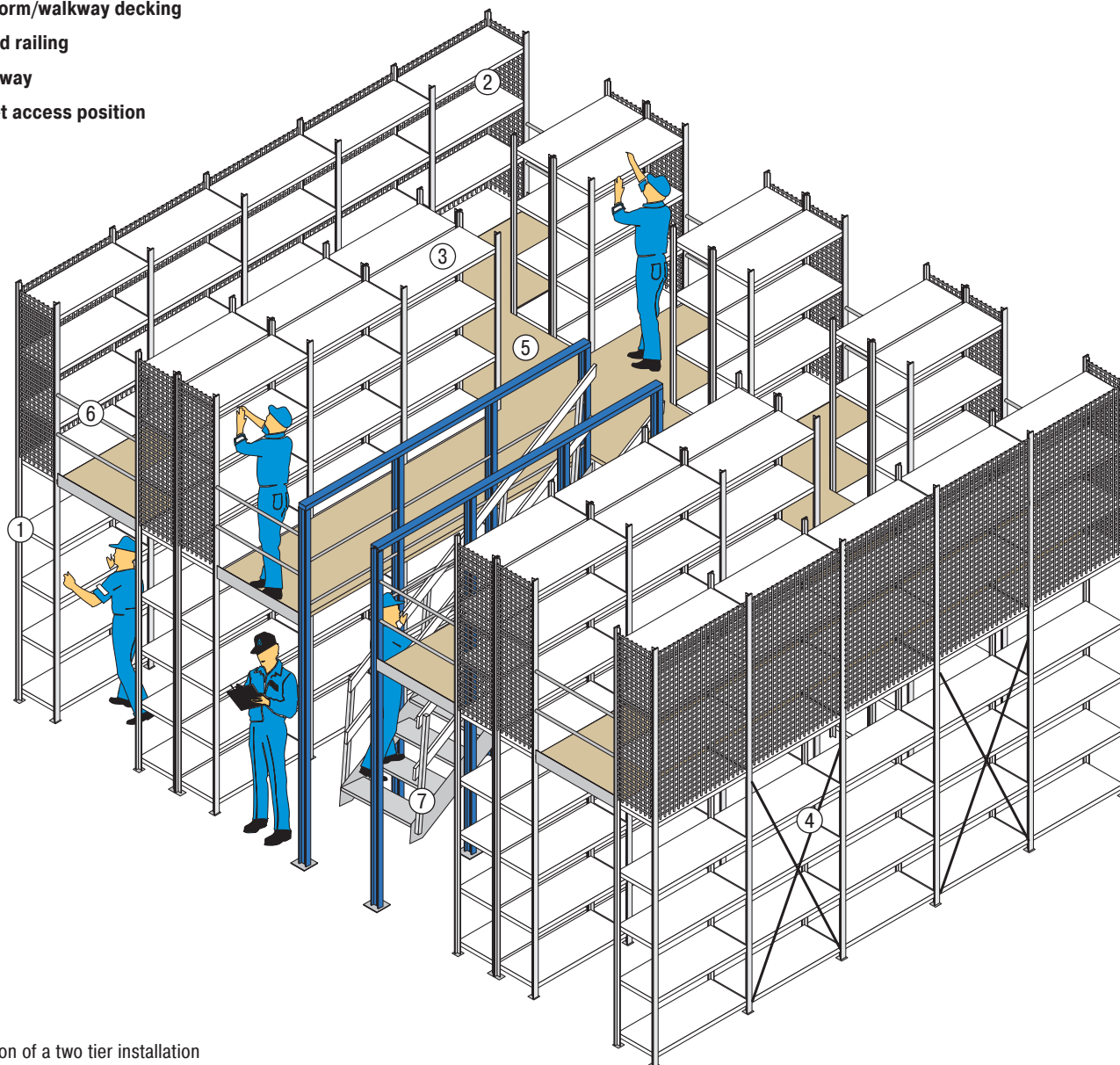


Illustration of a two tier installation with boltless shelving

Variations of the system

Multi-tier installations can be constructed from different shelving or racking systems:

- boltless shelving
- wide span/heavy duty shelving
- pallet racking

The boltless shelving system is most commonly used for multi-tier installations.

For basic components (frames, stiffening beams and shelves) refer to page 22

Platform and walkway decking

Platforms and walkways of BITO multi-tier installations are decked with high-quality chipboard panels with tongue and groove or with solid, galvanised mesh decks with a mesh width of 30 x 30 mm or 30 x 10 mm.

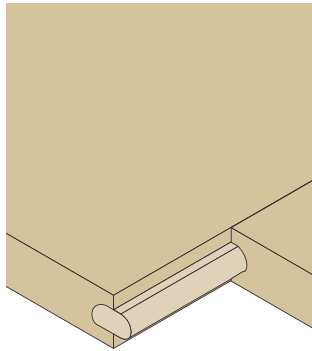
The chipboard panels are available in different options:

- both sides untreated
- with white underside
- with anti-slip upper side
- with white underside and anti-slip upper side
- **high-quality chipboard panels**
- **solid wire-mesh decks**
- **load capacity of walkways 250 kg/m²**
- **load capacity of mezzanine floors 500 kg/m²**

5 Chipboard decking

The chipboard panels are supplied in customer specific dimensions. Tongue and groove fitting forms a solid unit and a smooth, snag-free surface.

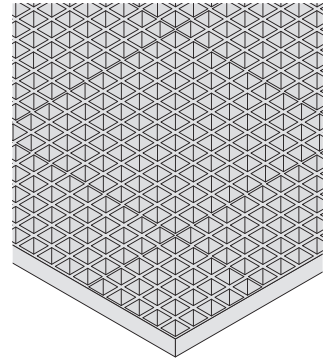
- **tongue and groove fitting**
- **high-quality chipboard panels**



Mesh decking

Solid mesh deck segments from galvanised steel.

- **mesh width 30 x 30 mm or 30 x 10 mm**

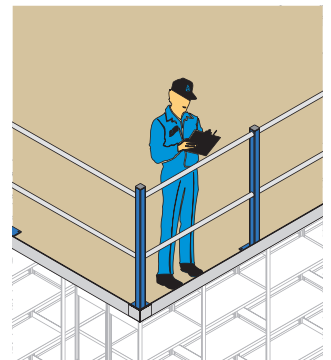


Guard railing and kickplates

BITO guard railing and kickplates have been designed in accordance with the latest safety regulations. The guard railing consists of solid, tubular hand and knee railing. Our kickplates have been made from bended steel sheet which is fitted around the edges of platform levels and walkways to prevent small parts from dropping to the levels underneath.

6 Guard railing around mezzanine floors

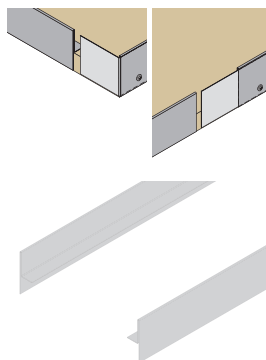
The guard railing consists of hand and knee railing as well as a kickplate. The sturdy square-tubed posts are slotted to accept hand and knee railing.



Kickplates

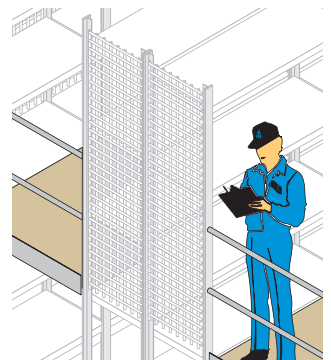
Made from bended steel sheet and fixed around platform levels and walkways to prevent parts and components from falling onto persons working underneath.

- **joining plates for kickplate lengths and angled joining plates for corners provide reinforcement**
- **optimum design protects decking**
- **height 52 mm**



Guard railing for walkways

Includes hand and knee railing. The round tubes are flat-ended and riveted to the frame uprights at either side of the walkway.



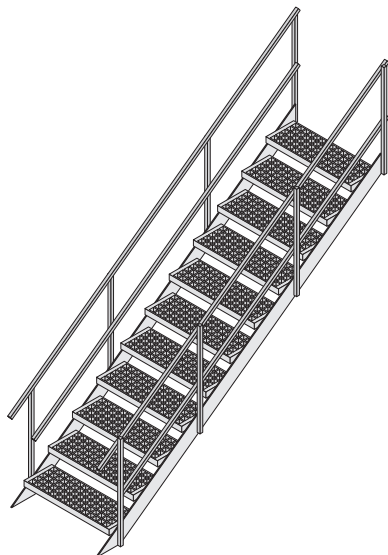
Stairways

Decisive for the location of stairways is the type of use of the storage area and the mezzanine floor as well as the position of the walkways within the installation.

Stairway without landing

This stairway can be mounted between the racking rows or directly in front of the installation.

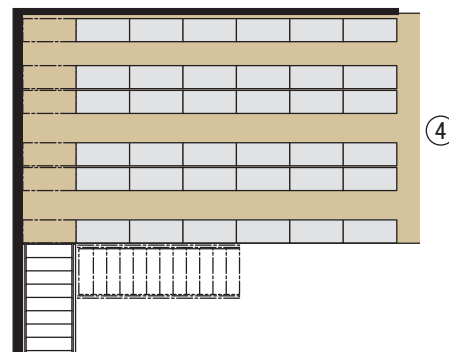
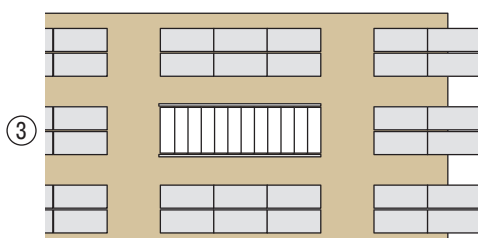
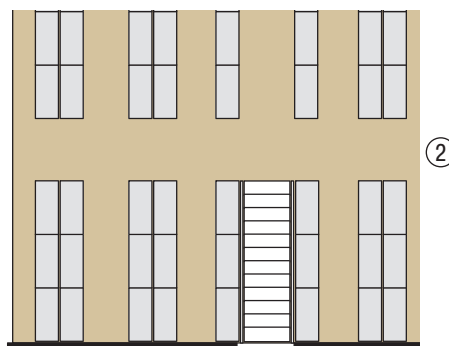
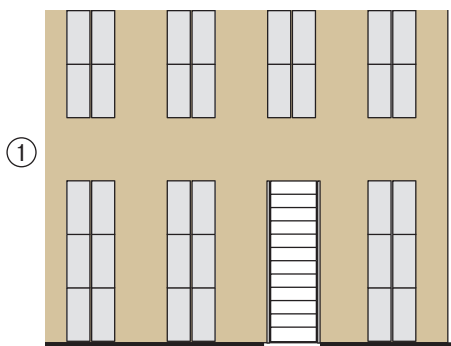
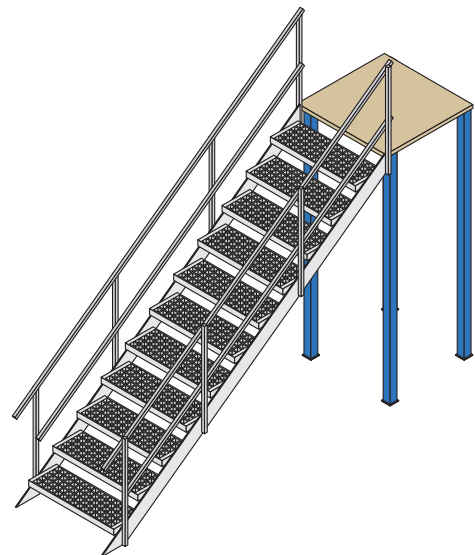
- with hand and knee railing
- mesh tread width 800 or 1000 mm
- tread depth 260 mm



Stairway with landing

This type is used if the stairway is to be located outside the installation.

- full use of the mezzanine area
- with hand and knee railing
- mesh tread width 800 or 1000 mm
- tread depth 260 mm



Stairway configuration

The illustrations 1-3 show stairway configurations **integrated** into a shelving or racking installation. For most installations, solution 2 fits ideally into the overall construction and therefore offers a cost advantage. Illustration 4 presents an **external** stairway configuration – either built in a 90° angle or parallel to the mezzanine floor.

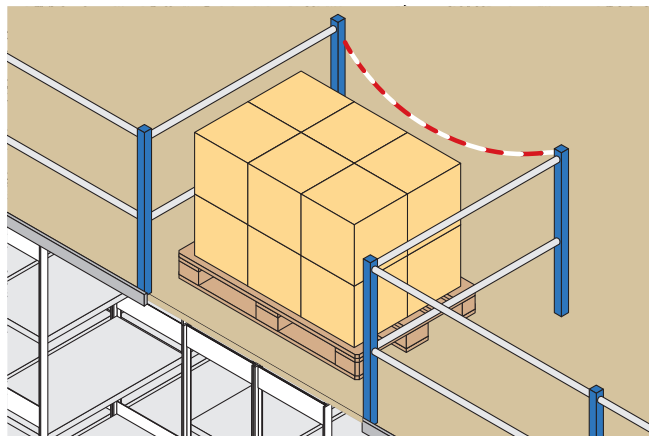
Pallet access positions

In order to ensure constant material supply, mezzanine floors or walkways are equipped with pallet access positions. Depending on the requirements and the application, there are three variations available.

Set-back pallet access position

Composed of two posts fitted at a distance of 800 mm from the mezzanine edge, hand and knee railing and a red and white plastic chain which can be unhooked as required.

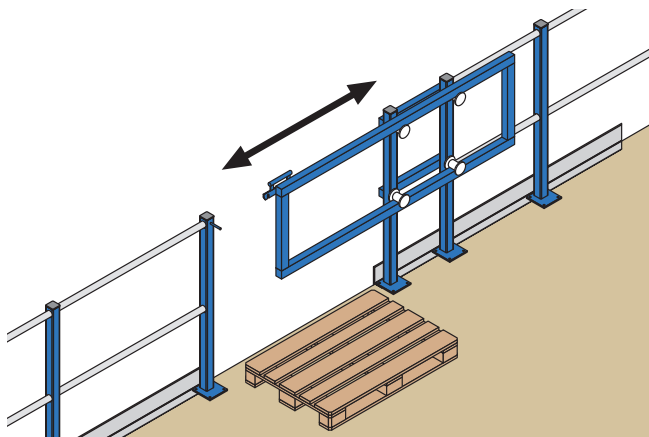
- low cost variation



Sliding access gate

Sliding access gates are manually operated and consist of a railing segment, guide rails, rollers and a push handle. To protect the chip-board flooring, the gate area comes with an edge protection profile.

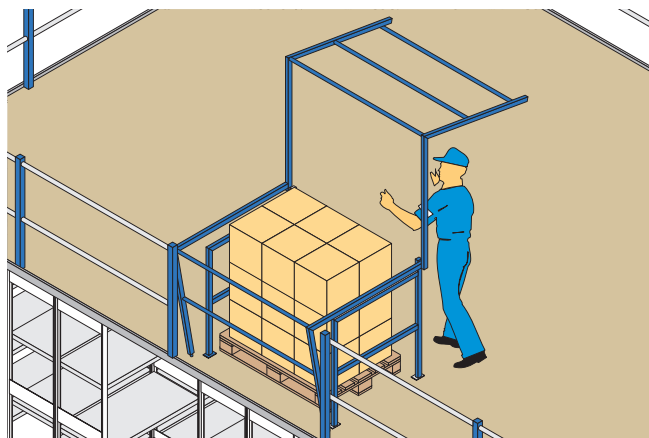
- no loss of mezzanine floor space, as the sliding gate is integrated into the railing



Swing access gate

Provides optimum operator protection as the gate is always closed – either behind the pallet position when the pallet is deposited onto the mezzanine floor or at the mezzanine's edge in front of the pallet position when the operator removes the goods.

- optimum protection against falls, as one side of the swing gate is always closed
- easy operation



Anita®
UniqueBodyWear
since 1886

Anita Dr. Helbig
Specialist supplier of corsetry



Features

- multi-tier shelving
- manual order picking on three tiers

Function

Anita Dr. Helbig GmbH in Brannenburg manufacture and distribute corsetry and bathing fashion for mothers-to-be and breast feeding mothers, but also special clothing for woman who have had a breast operation. All goods are manually picked in the specialist supplier's warehouse. The shelving installations feature slightly inclined levels equipped with roller tracks into which the products are fed in from the rear. The goods move gravity-driven to the picking face, from where they can be immediately accessed from the picking aisle. A-items are supplied for picking in live storage installations, B- and C-items are provided in conventional shelving.

Benefits

- compact storage, direct access to all product lines
- easy-to-reach product presentation
- efficient storage according to the FIFO-principle
- multi-tier configuration allows optimum utilisation of available warehouse volume
- separate loading and order picking aisles increase operator efficiency





ASWO

ASWO GmbH
Spare parts provider for
consumer electronics



Features

- storage in smaller size bins in conventional shelving
- operator-to-goods order picking

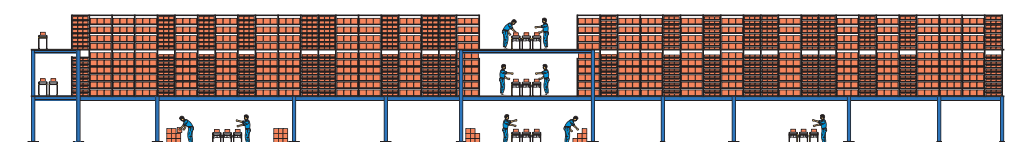
Function

ASWO International Service GmbH in Eime supplies spare parts, service and repair workshop demand for electronic appliances. The distribution centre accommodates more than 120 000 references in shelving installations. The company opted for fast-to-assemble boltless shelving which is located on a mezzanine steel construction. The shelves can be adjusted in height on a 25 mm pitch and feature perforations to accept dividers. All orders are dispatched on the same day to customers within Germany. Order picking of A-, B- and C-items is done manually on several tiers according to the operator-to-goods principle.



Benefits

- high degree of availability of all reference lines
- simultaneous order picking on several tiers
- optimum utilisation of available warehouse space
- shorter travel routes





CTDI GmbH
Global Engineering,
Repair & Logistics



Features

- high-bay shelving
- orders are picked manually
- fast order picking with rail-guided man-up stacker crane

Function

CTDI Europe is a non-proprietary partner of companies in the telecommunications industry who provides innovative and cost efficient solutions to operators as well as to independent and contractual manufacturers of telecommunication equipment. More than 75.000 different component groups of various manufacturers are included in CTDI's test, measurement and repair portfolio. After repair, all systems are stocked by model in a pool store for exchange items. Any component or group can be delivered to the customer on call within a few hours. Ensuring fast and direct access to any item on store, the new 4,50 metre high shelving installation provides the basis for a smooth workflow which is additionally supported by a man-up stacker crane.

Benefits

- very good utilisation of warehouse height and floor surface
- narrow aisles allow compact storage
- all storage positions are directly accessible
- fast access due to short travel routes
- operators do not need a fork lift truck permit; initial instruction is sufficient





**Schott Music
GmbH & Co. KG**
Music publisher



Features

- multi-tier shelving installation
- high-bay pallet racking
- order picking carts

Function

In 2004, Schott Music GmbH & Co. KG at Mainz, one of the world's leading music publishers, and music distribution services GmbH (mds) have established a joint logistics and distribution centre to ensure delivery of publications from the Schott range as well as from 60 other publishers around the world.

The multi-tier facility has been designed as two-tier shelving installation topped by a mezzanine floor which accommodates the already existing two-tier BITO boltless shelving facility. The new facility provides 10.500 picking positions for small volume orders. The high-bay racking with 1.300 pallet positions stocks supplies for the shelving area and serves as intermediate storage facility for palletised products. For the in-house transport of some 130.000 music sheets, notebooks, audio and record carriers, BITO has also supplied order picking carts that can be moved from floor to floor with integrated goods lifts.

Benefits

- optimum space utilisation
- low cost project realisation due to the use of standard components
- easy assembly; the boltless shelving system allows convenient and instant reconfiguration at any time
- fast adaptation to changes in the product range or in stock volumes
- customised installation layout



Mezzanine floor system »BBS«

This particularly robust variation of our mezzanine floor system integrates perfectly into a number of space utilisation concepts. The multi-tier configuration allows to “multiply” expensive floor space, thus offering the possibility to use the additionally created floor space for a wider variety of activities.

Columns and joists form a rigid base structure which does not require cross bracing, permitting access from all sides. Mezzanine platforms/tiers can be adjusted at any required height.

Benefit from our experience from the many projects which we realised in very different industries!

BITO

www.bito.com

Advantages of the system

- optimum utilisation of available storage space
- fits in perfectly into existing concepts
- particularly sturdy design
- short set-up time
- load capacities of up to 1000 kg/m²
- static calculations made in accordance to the criteria of your local building authorities can be provided upon request

Components of the system**1 Columns**

Made from unslopped steel sections which are dimensioned in accordance with the required load capacity

2 Joists

Made from unslopped or slopped steel sections which are dimensioned in accordance with the required load capacity

3 Decking

Available in various materials and finishes such as

- chipboard panels, grade V20 E1
- galvanised mesh decks
- steel panels with embossed anti-slip surface

4 Railing

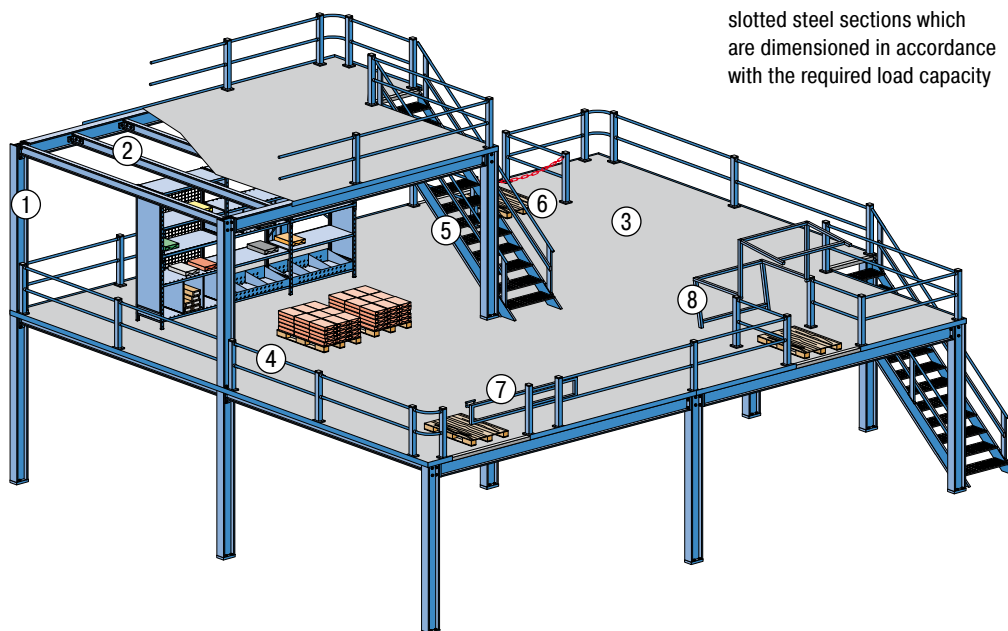
Consisting of hand and knee railing and kickplate

5 Stairways

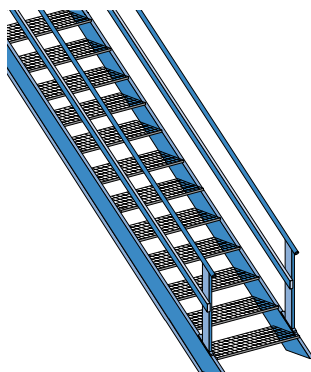
6 Pallet access position
with chain barrier

7 Pallet access position
with sliding access gate

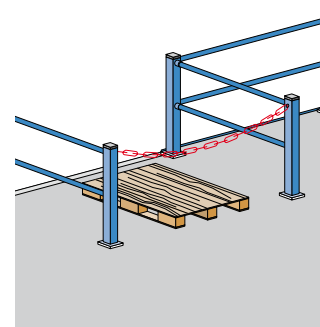
8 Pallet access position
with swing access gate

**5 Stairways**

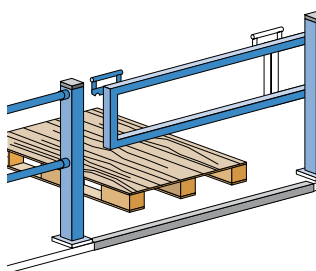
Can be supplied in different variants. Choice of tread types: mesh-decked, steel sheet with embossed anti-slip surface, timber. Standard tread lengths 800 or 1000 mm. Longer treads upon request.

**6 Pallet access position with chain barrier**

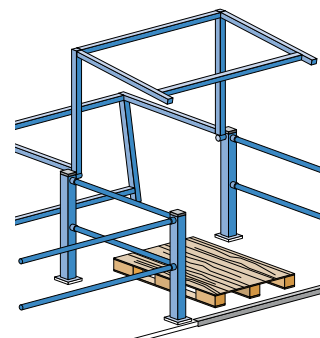
Pallet depositing area delimited by two posts, side railing and a hook-in plastic chain.

**7 Pallet access position with sliding access gate**

This smoothly operating sliding gate has the advantage that full use of the platform surface can be made.

**8 Pallet access position with swing access gate**

The swing access gate ensures that the pallet position is always closed on one side for optimum operator protection.





RUKO GmbH
Precision tools



Features

- mezzanine installation
- two-tier storage
- optimum utilisation of warehouse space
- high degree of flexibility
- immediate access to goods and fast collation of different reference lines to make one dispatch unit

Function

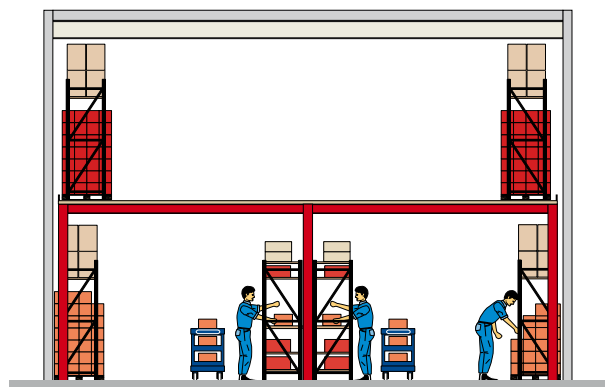
The world's leading manufacturer and supplier of drilling and counterboring tools, RUKO GmbH, who can boast an export share of 70%, opted for a mezzanine installation in their distribution centre in Holzgerlingen close to Stuttgart. With this gain in floor space, the company was able to optimise order picking, assembly and packaging.

Palletised goods are now stored in the racking set up on the mezzanine platform. This keeps the assembly workstations clear of goods and allows to make full use of the warehouse height.



Benefits

- optimum utilisation of the warehouse volume
- customer specific configuration
- operators at the assembly workstations are not disturbed by goods standing about





Cena

CENA GmbH
Plastics processing industry



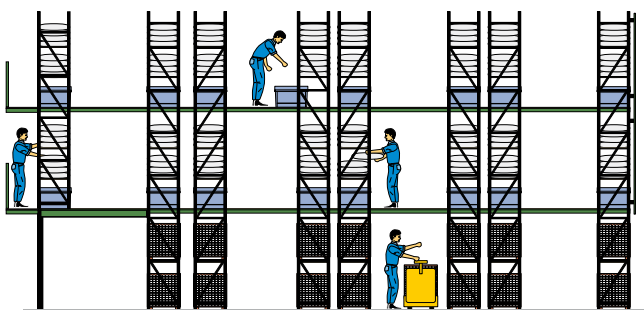
Features

- three-tier installation (steel mezzanine with two-tier pallet racking on top)
- 800 mm deep (double runs 1800 mm deep), steel panel decking
- multi-purpose containers, type MB84421 sized 800 x 400 mm
- manual order picking

Function

The product range of Cena Kunststoff GmbH in Battenberg stretches from protective elements such as plugs and caps over torque parts such as bolts and nuts made to DIN standards, cable screw connections and accessories to purpose-built items. In the production department, the plastic screw connectors are filled into multi-purpose containers or sacks which are stored in the pallet racking installation for later order picking and dispatch to the customers.

The platform spans a part of the production area which, for optimum floor space occupation, is also used to manually stock and pick plastic parts.



Benefits

- optimum utilisation of floor surface and warehouse height
- high storage capacity
- all goods are directly and immediately accessible which reduces picking times



Carton live storage Supply of parts and components

Made especially for the automotive industry and their suppliers

This racking system is particularly suited for the supply of VDA/KLT containers as well as other load carriers and cartons carrying small items directly to the workplace. This means that the assembly operators do not need to be involved in organising replenishment.

The permanent availability of goods for further processing and assembly increases productivity and avoids idle times.

Depending on the characteristics of the goods or the storage units, this supply system can be realised with different shelving or racking types: with carton live storage, Kanban shelving, boltless shelving or pallet racking.

BITO

www.bito.com



Product information

Frequent application

- supply and order picking store

Service options

- manual order picking and replenishment

Storage options

- long and short side handling



Utilisation

- in the automobile industry

- as supply racking along assembly lines
- for intermediate storage in order picking areas

- in the suppliers' industry

- for single item order picking

- in distribution

- for preparing one-on-one deliveries



Storage units

- VDA/KLT containers
- other types of plastic bins and containers
- cardboard boxes/cartons
- specific load carriers used in the automotive industry

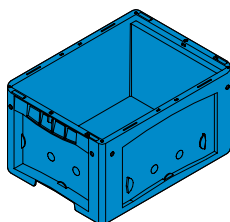
Base variations of
KLT or VDA/KLT containers:

BITO-KLT flat

C-KLT castellated

R-KLT castellated

RL-KLT flat



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"

Our **PRODUCT CATALOGUE**
provides detailed information on
our entire delivery programme.

Ask for your free copy!



Advantages of the system

- flexibility and cost efficiency
- reduction of travel routes between 40 and 70%
- adherence to the FIFO principle (first in – first out)
- containers travel gravity-driven to the picking face
- increased productivity through separation of loading and order picking activities
- permanent availability of goods
- mobile racking units allow fast adaptation of the workplace to changing product lines
- ergonomically favourable supply of A, B and C-items
- although a lot of stock items are consistently provided at the workplace, all items are presented neatly and easy to find, keeping the workplace tidy



VDA/KLT flow shelves guarantee a smooth workflow

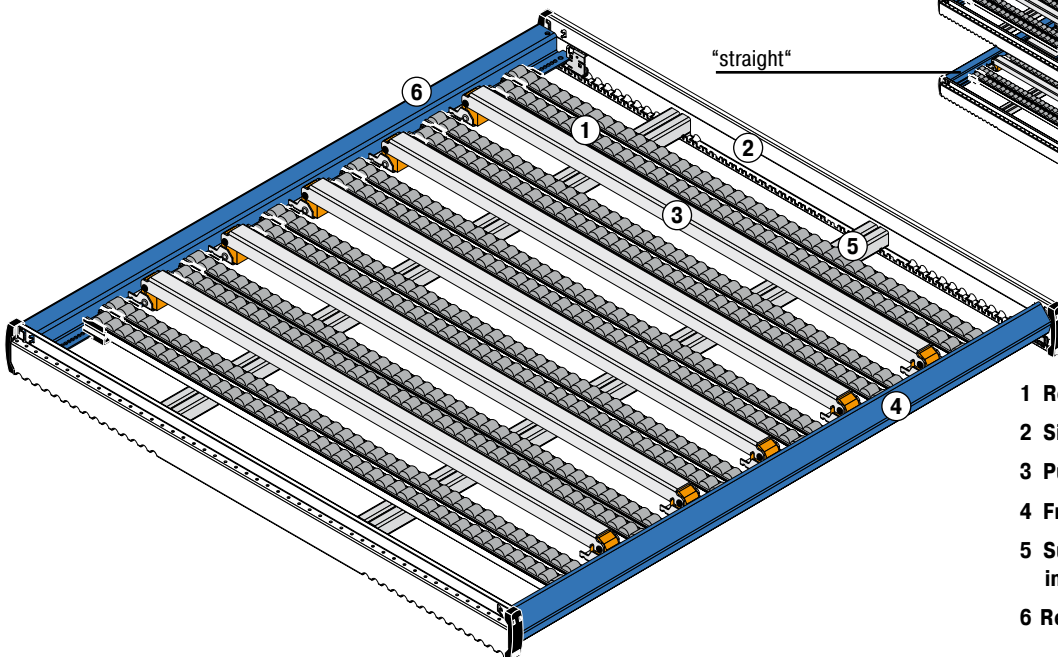
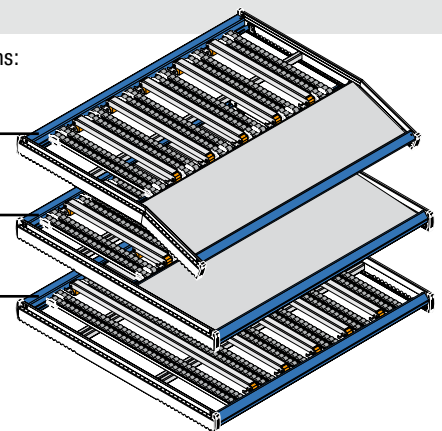
BITO flow shelves are assembled without bolts. This allows convenient reconfiguration, if other load capacities or different storage units have to be stocked. Another benefit is that most of the components can be used again.

Three flow shelf variations:

“cranked”

“straight with inclined picking tray”

“straight”



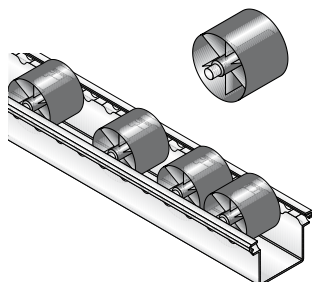
- 1 Roller track
- 2 Side section
- 3 Push-flat guide rail
- 4 Front section
- 5 Support section inside the flow shelf
- 6 Rear section

① Roller track

Torsion-resistant steel section equipped with smoothly operating cylindrical rollers mounted on a steel axle. The rollers are highly friction resistant, wear and tear resistant, form stable and have a long service life.

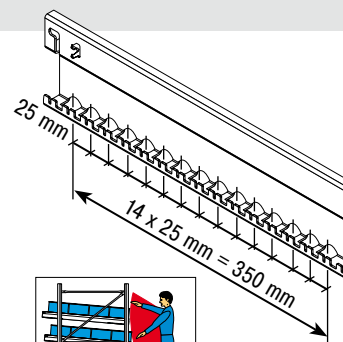
- good travel characteristics
- ideally suited for all types of storage units
- load capacity 8 kg per roller

Rollers on a steel axle

**② Side section**

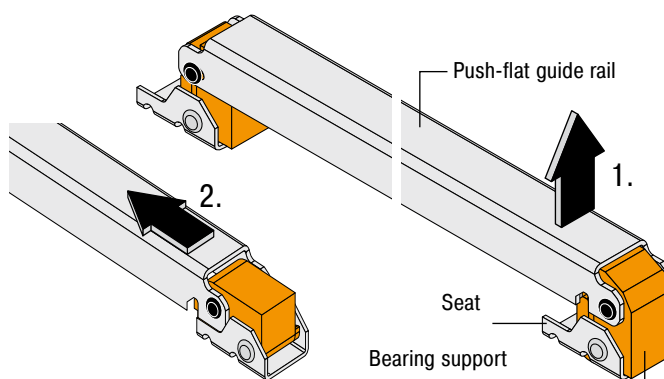
Over a length of 350 mm, flow shelf side sections have adjustment notches for accommodating support clips. Setting off the flow shelves in depth allows to make an ergonomic picking curve.

- picking face configuration according to ergonomic requirements

**③ Push-flat guide rail – flexible and cost efficient**

Whether large or small containers are fed in and whether they are handled long or short side facing – the lane subdivision will always fit. It is not necessary to reposition the dividers. By simply pushing down the guide rail, it is possible to feed containers with a flat as well as with a castellated base onto the same flow level without having to “unload” the flow shelf first.

- different container types can be fed in during normal operation without losing time for flow shelf reconfiguration
- the system accommodates different container sizes without the need for a new lane subdivision
- containers with different base types (mixed operation) can be fed onto the same flow level

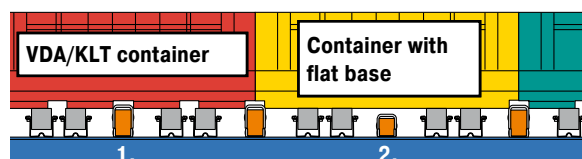
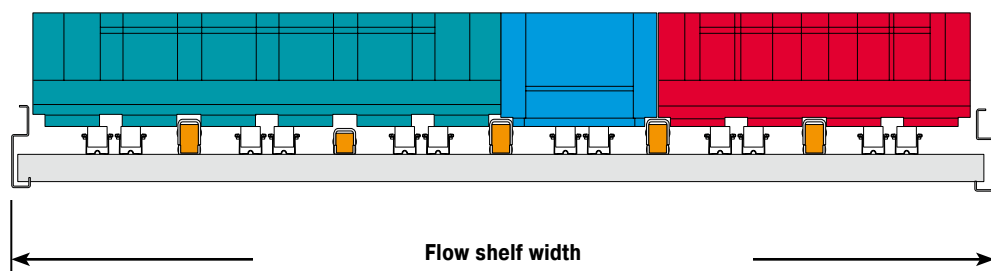
**Applications of the push-flat guide rail**

Fixed guide rails mounted in the same pitch as the container base castellation allow long side and short side handling of all container sizes.

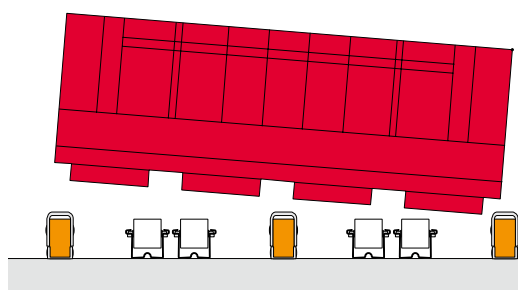
600 x 400 mm
long side facing

300 x 200 mm
short side facing

400 x 300 mm
long side facing



Push-flat guide rails have the additional advantage that they can be pushed down so that containers with a flat base can be fed onto the same flow level.

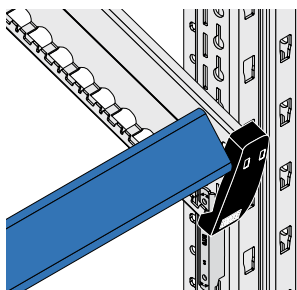


The robust guide rails protect the roller tracks by absorbing the dynamic force occurring when a container is placed onto the flow shelf.

Racking units

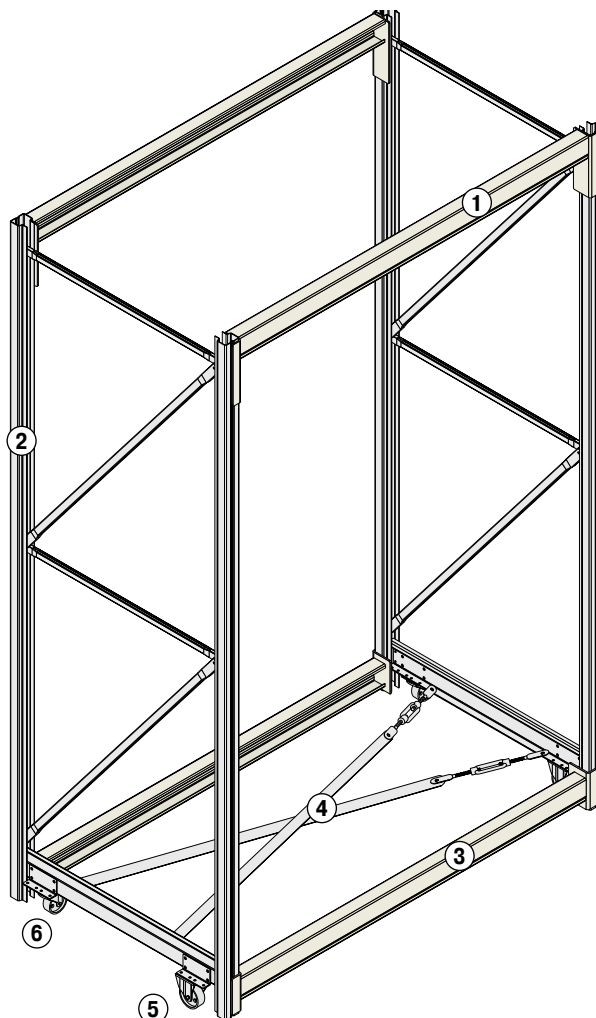
In order to ensure continuous supply of parts and components at workstations, the racking modules have been specifically designed to provide items in direct access at the picking face as well as to hold a sufficient quantity of items on stock in the lanes. Racking units are available as static or mobile version.

The flow shelves are height adjustable in 12.5 mm increments.

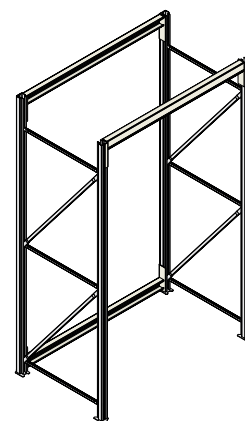


BITO provides several types of ready-made racking units – all designed to suit practical considerations.

Contact us!



- 1 Stiffening beam (top)
- 2 Upright with Z-type strutting
- 3 Stiffening beam (floor level height) – with half-height hook connectors
- 4 Cross bracing with tension jacks
- 5 Fixed castor
- 6 Swivel castor with brake
- 7 Worktop (see below)

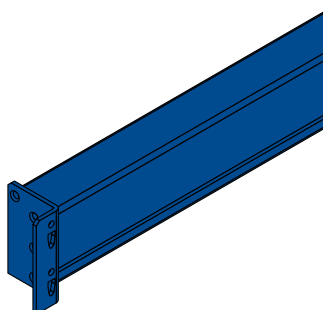


Starter bay – static version

③ Stiffening beam with half-height connectors

Together with the cross bracing and the frame connectors, the stiffening beams make the racking construction very stable for hazard free relocation of the unit.

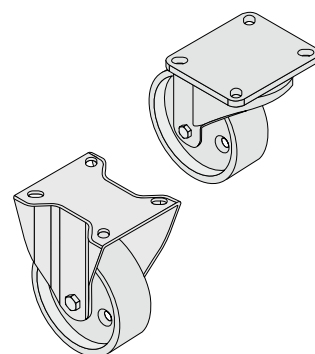
- minimum loss of height as the half-height hook connectors allow to position the first level flow shelf immediately above the beam



⑤ ⑥ Castors

2 swivel and 2 fixed castors make sure that the racking unit can be moved without effort. For safe positioning of the racking unit, the swivel castors are equipped with brakes.

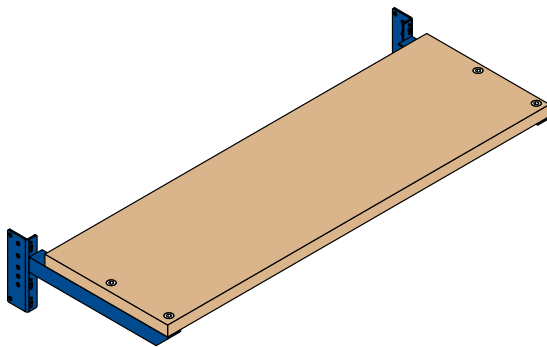
- firm positioning of the racking unit with braked castors
- easy relocation of racking unit



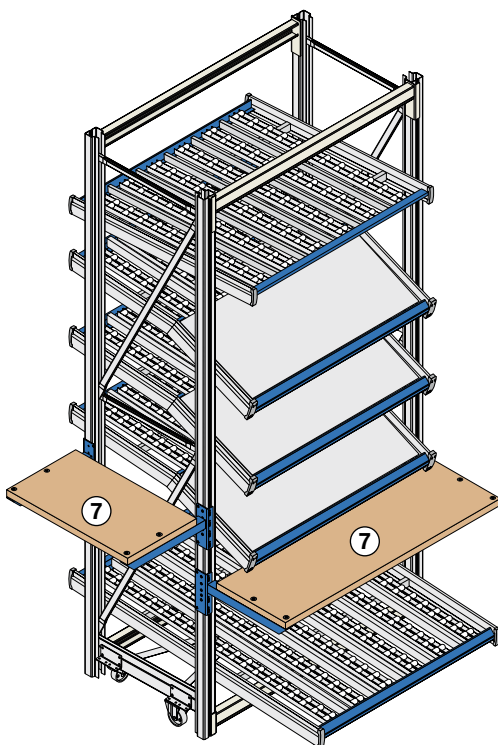
⑦ Worktop

Picked parts can now be assembled directly at the racking unit. Fast adjustment without bolts of the solid beechwood worktop on a 50 mm pitch.

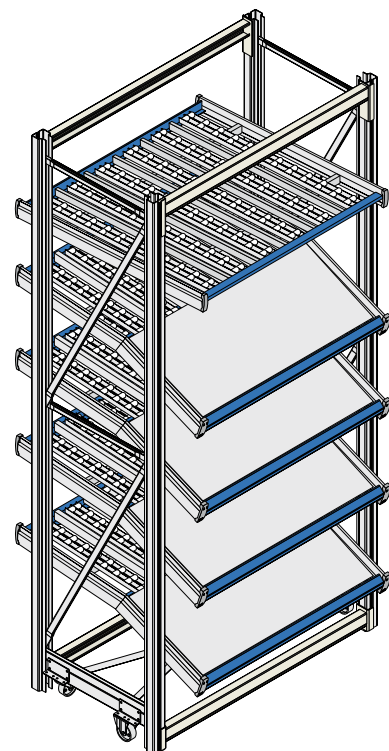
- fast re-adjustment work height
- robust components
- worktops can also be mounted to the short sides of a racking unit



Racking unit with worktop



Racking unit without worktop



BITO supply racking shelving for light duty applications

Particularly suited for the supply of parts and components in plastic bins and containers or cardboard boxes, this system is a low cost alternative to the live storage system. Based on the BITO boltless shelving system, this light construction supply racking can be assembled fast and easily. Racking runs can easily be formed by adding extension bays. The system ensures that order pickers do not run out of stock: all items can be directly accessed at the picking face and there is enough stock of each product line in the lanes.

There are 2 racking options available.

Dimensions: L x D x H

Starter bay: 1 358 x 1 250 x 2 000 (mm)

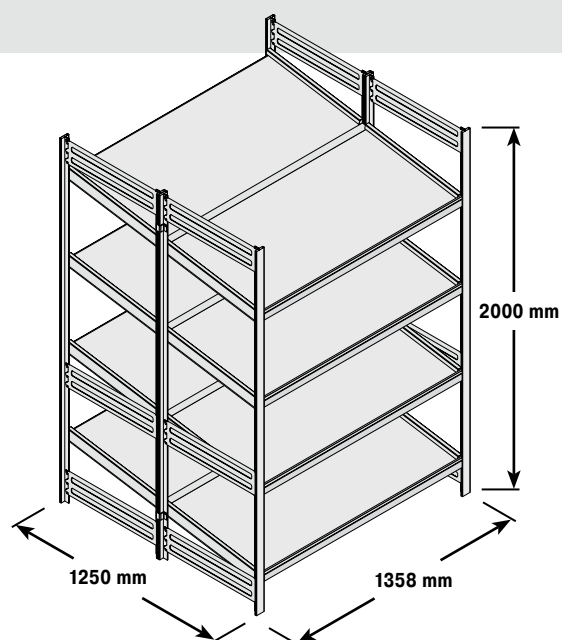
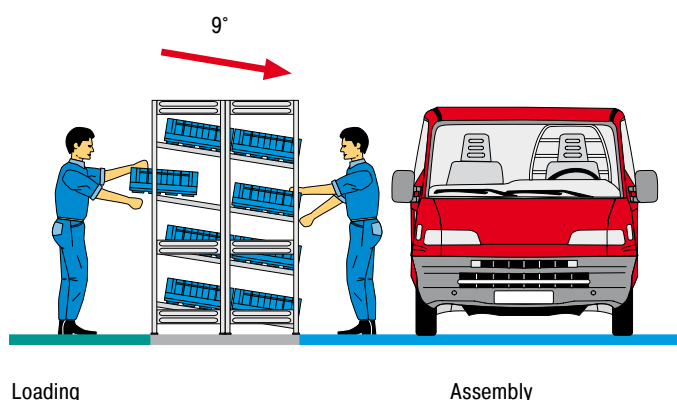
Extension bay: 1 308 x 1 250 x 2 000 (mm)

Advantages of the boltless shelving system

- fast and easy assembly
- bay load capacity = 2 x 800 kg
- starter and extension bays make racking rows of any require length
- gap covers for a closed and smooth surface
- side lips prevent that storage units jam at the uprights or fall out sideways

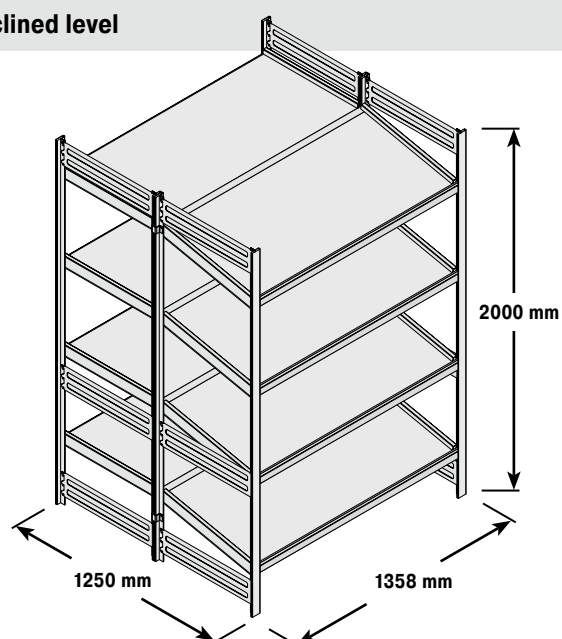
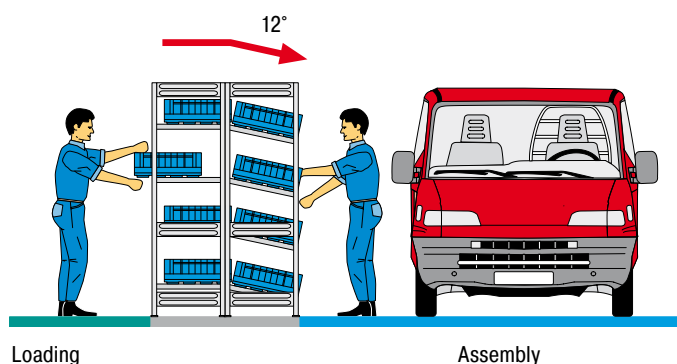
Supply racking type »BSS«

combines 2 inclined levels



Supply racking type »BGS«

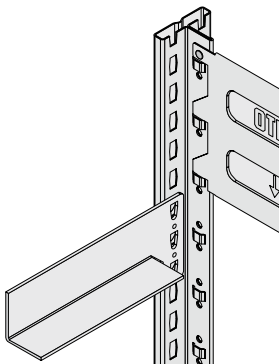
combines 1 straight and 1 inclined level



① Beam

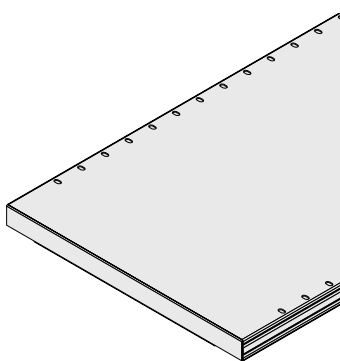
Accommodates shelves and at the same time increases shelving rigidity.

- **easy hook-in fitting**
- **safety pin to prevent accidental dislodgement**
- **height adjustable in 25 mm increments**

**② Shelf**

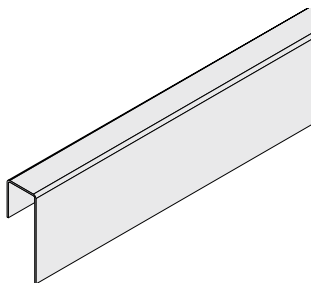
The shelves are simply placed onto the beams or onto the shelf clips.

- **shelf load capacity 100 kg**

**③ Side lip**

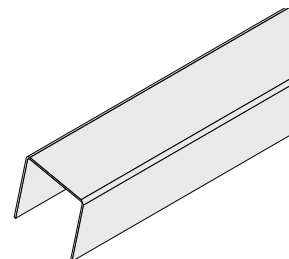
These robust sections are fitted to the shelf edges along the entire shelving depth.

- **prevents that storage units jam at the uprights**
- **front-to-back lips on either side prevent storage units from falling out sideways**
- **easy boltless assembly**

**④ Gap cover**

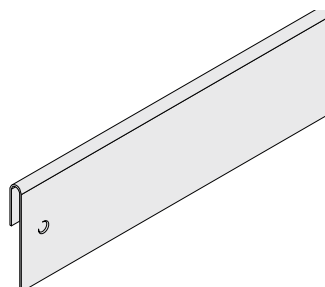
The gap cover is simply inserted into the gap between two shelves.

- **provides an even surface**

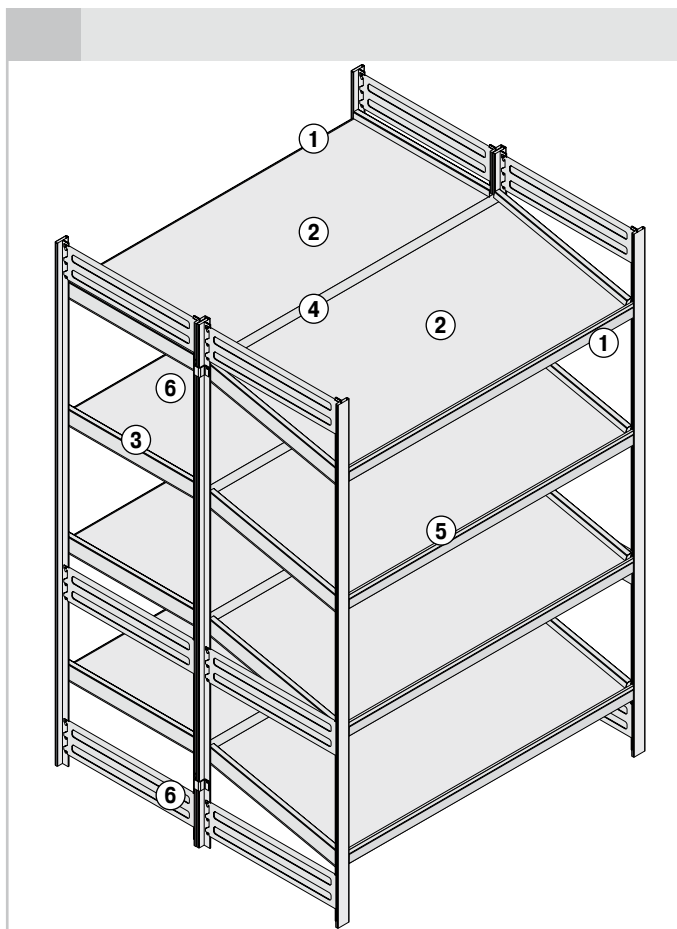
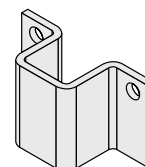
**⑤ Front lip**

The front lip extends over the full width of a bay and prevents storage units from falling out at the picking face.

- **easy to mount between shelf and front beam**
- **high enough to prevent storage goods from falling**

**⑥ Connector clamp**

- **connects two frames to form a robust unit**





BITO ERGO

Innovative modular system to suit the most diverse of applications

The BITO ERGO system has been developed to support the Japanese KAIZEN process in your company and allows to realise easily and rapidly shelving units, trolley stands and general purpose racks for your specific storage, supply and assembly needs.

With just a few components, a large number of configurations can be realised.

The BITO ERGO system offers a high degree of flexibility, improves operational efficiency and provides many possibilities to save time. Live storage units, material supply shelving and customer specific racks can be set up rapidly and at a competitive price.

A 3-D configurator which is included in the delivery at no extra charge allows you to plan and to visualise your individual configuration while providing an overview of all required parts and components.

BITO

www.bito.com



Product information

Frequent application

- racks in storage, supply, assembly and workstation environments

Service options

- manual replenishment and order picking

Storage options

- goods can be stored long or short side facing

Storage units

- bins and cartons



Advantages of the system

- numerous configuration options with just a few components
- all components meet our high BITO quality standards
- solid tubes, connectors and accessories in line with industry standards
- system provides highest levels of safety
- 3-D configurator included in the delivery at no charge – the ideal planning tool for your individual ERGO structure
- reduces waiting, in-house transport, order processing and manufacturing times
- allows a 100% utilisation of warehouse volume (f. ex. by integrating pillars)
- ergonomic handling
- safe way to store and handle goods
- easy reconfiguration
- supply of small parts for assembly
- all components are easy to mount; existing structures can be conveniently retro-fitted
- ESD versions available for handling electronic parts
- all tubes have the same diameter
- robust make
- environmentally compatible powder coating

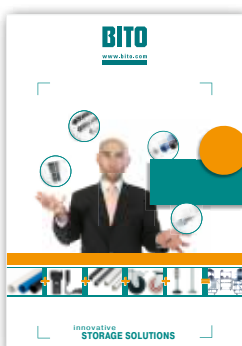


Information material

For more information on this product, please contact us on

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

Please also ask for a free copy of our BITO ERGO brochure!





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

page 59



Roller conveyor stand

page 57



Step-up rail

page 57



Storage units

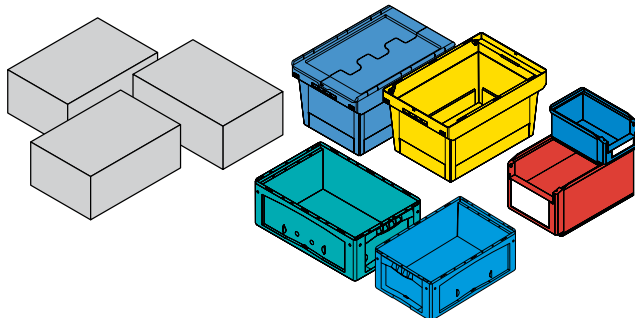
Smaller sized storage units such as plastic bins and containers, cartons or individual items

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

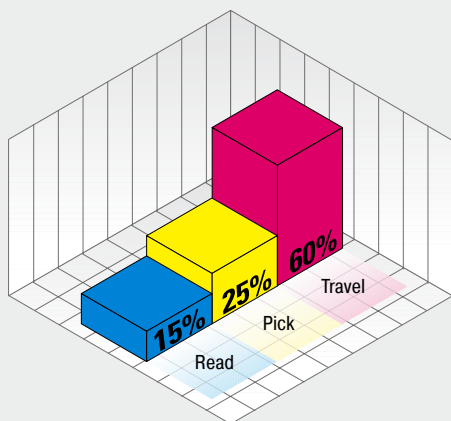
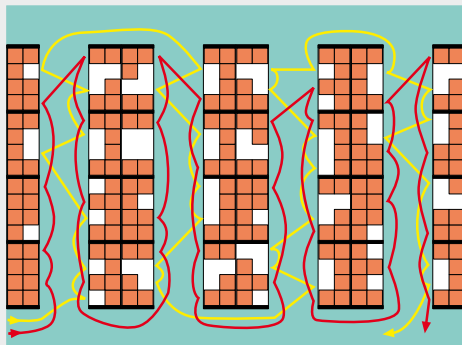
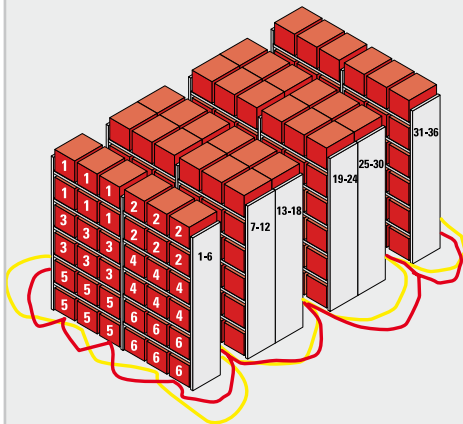
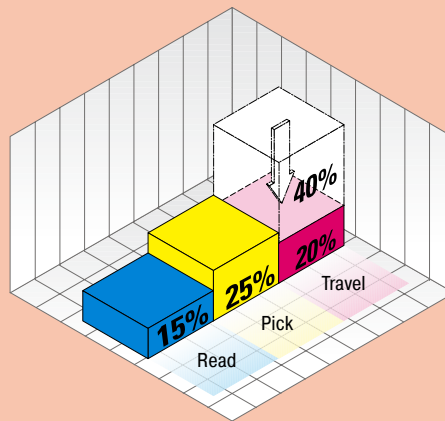
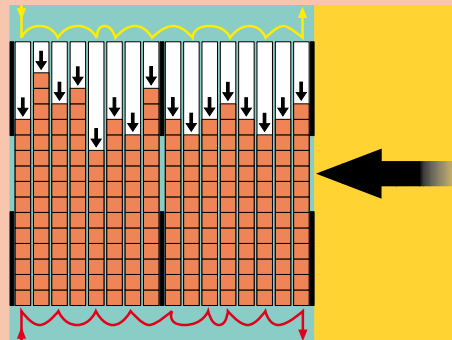
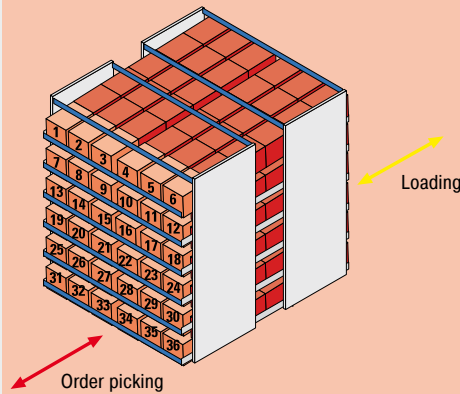
"Dynamic storage"

Our **PRODUCT CATALOGUE** provides detailed information on our entire delivery programme.

Ask for your free copy!



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.

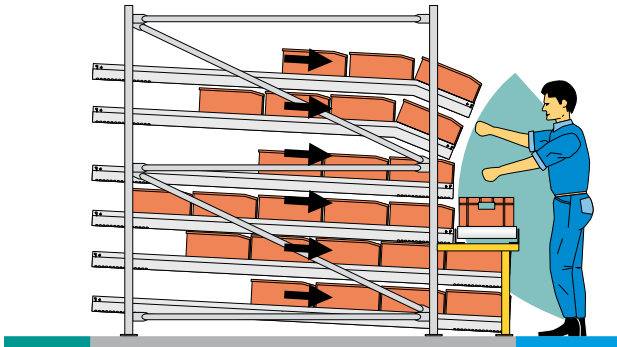


Specific advantages of BITO carton live storage

- **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.

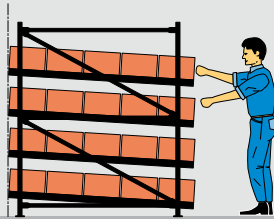
In the first instance, the layout is determined by the type and the size of the storage units or the picking items.

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.

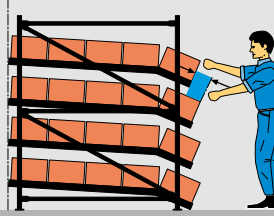
This includes for example the installation of conveyors at the correct working height or a step-up rail to facilitate access to the working levels above the natural reach height.

1 Layout options for picking faces without conveyors



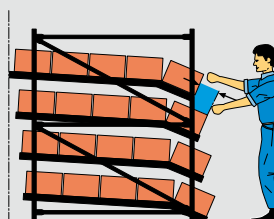
The configuration with flow levels forming a flush picking face is appropriate for picking complete storage units. **Small items** can be picked through the front opening of bins or containers.

- 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.

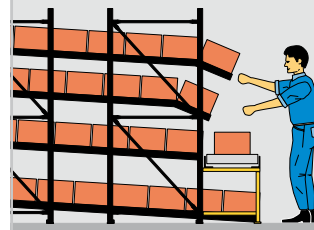
- optimum visibility and fast access to goods
- easy order picking even of bulky goods

2 Layout options for picking faces with conveyors



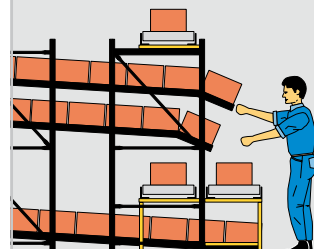
The pick-to-belt configuration is a typical solution of a **product-oriented picking strategy**.

- 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

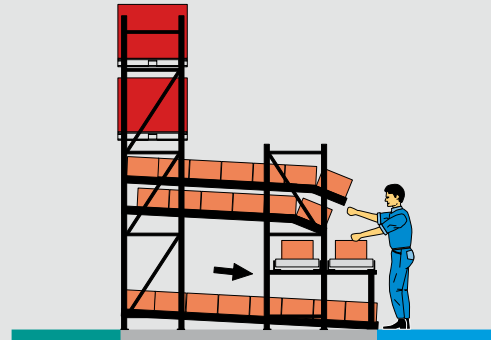
1 Integrated conveyors

- 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



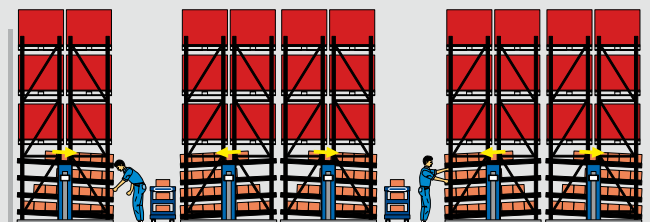
4 Mobile installation

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

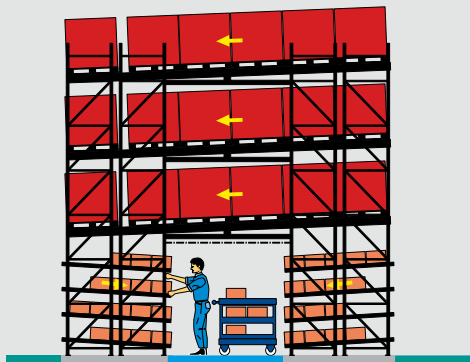
Service aisles can be opened as needed which eliminates the necessity of having several „fixed“ service aisles as is required in static installations. This allows to make maximum use of floor space.

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



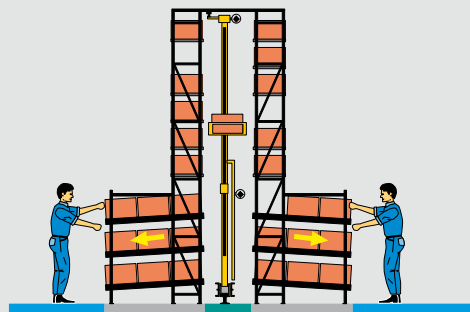
- with pallet live storage buffer stock

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



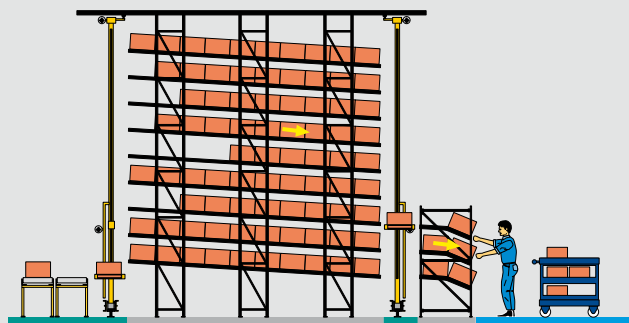
- the bins can either be stored in an automated bin storage installation or in highbay shelving serviced by an automatic stacker crane

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



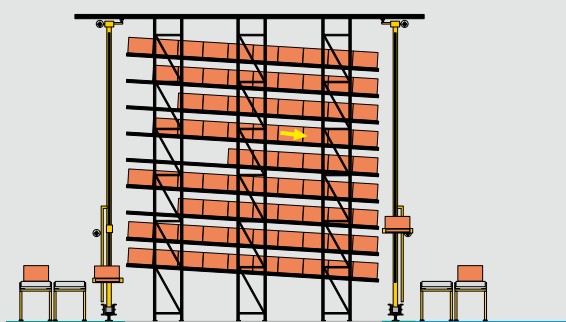
- manual order picking from a carton live storage installation - a fully automated carton live storage buffer constantly feeds the order picking installation

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

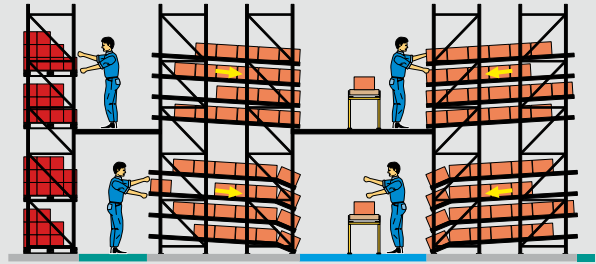
9 Multi-tier order picking

- 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



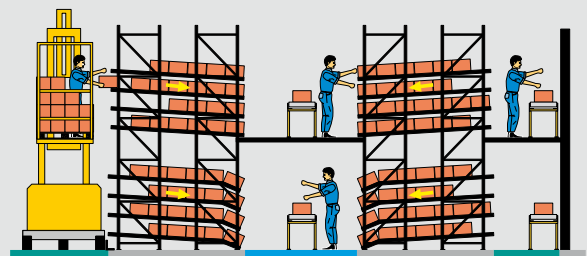
10 Multi-tier order picking

- 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



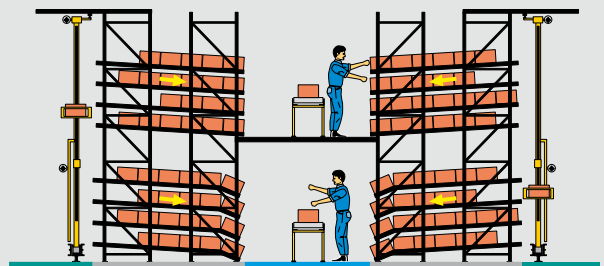
11 Multi-tier order picking

- 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



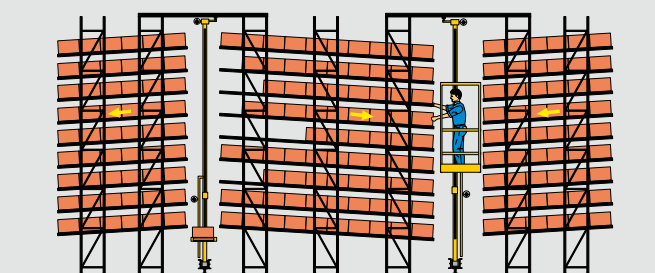
12 Highbay installation

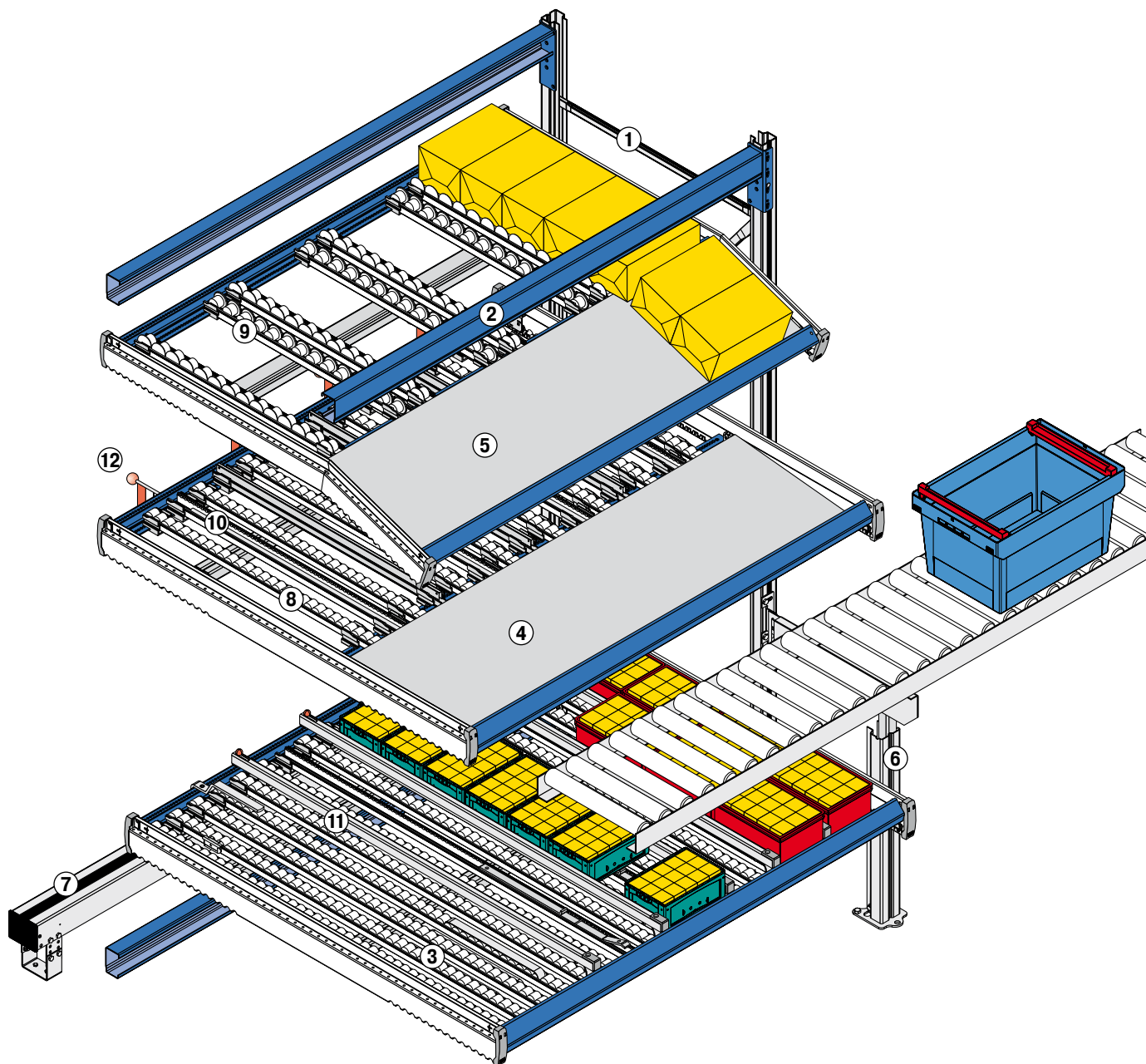
- carton live storage highbay installation
- order picking with man-operated stacker crane
- re-stocking by automatic stacker-crane

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

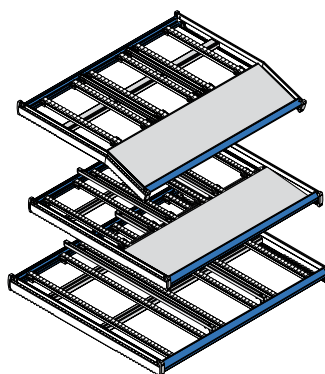




- 1 Frame**
suited for high load capacities
- 2 Beam**
easy boltless assembly
- 3 Straight flow shelf**
- 4 Straight flow shelf with inclined picking tray**
- 5 Cranked flow shelf**
- 6 Roller conveyor stand**
available in different height and depth options
- 7 Step-up rail**
for convenient working

- 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

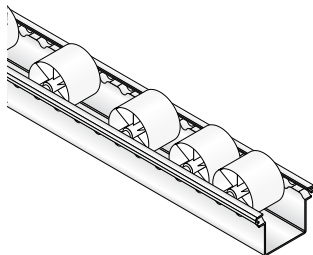
Available in three different variations for an ergonomic picking face design. All flow shelves are assembled without bolts. This allows easy and fast flow shelf adaptation to other load capacities or storage units while using the same components again.

- boltless assembly
- easy adaptation to other load capacities

8 Roller track with cylindrical rollers on a plastic axle

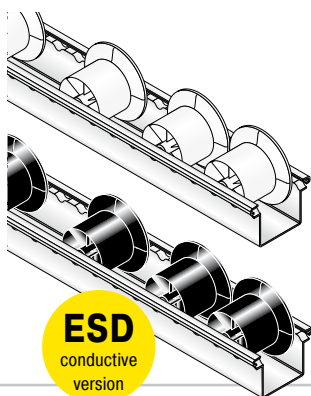
The robust, smoothly operating rollers from high quality plastic allow an optimum adaptation to all kinds of storage units. The smallest roller pitch is 28 mm.

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

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

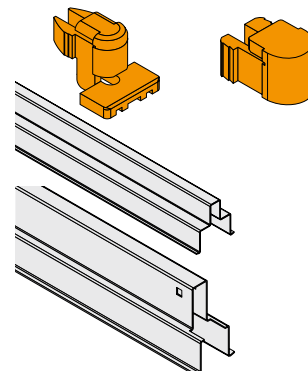
Flanged rollers are mainly used for storage units with stable pre-formed edges. The smallest roller pitch is 42 mm.

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

**10 Standard divider**

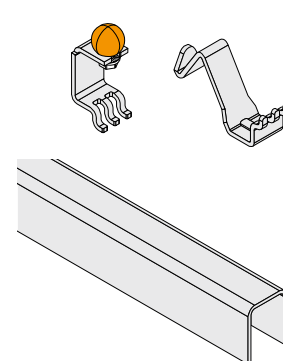
Dividers subdivide a flow level into lanes and prevent interference of storage units travelling on adjoining lanes. Available in two heights.

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

**11 Universal divider**

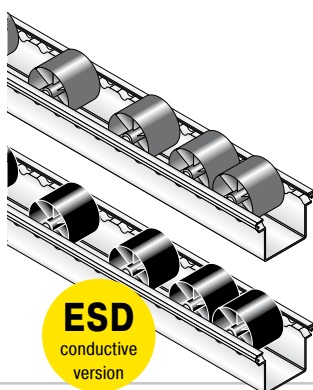
The universal divider allows even faster re-adjustment of the lane width without having to remove the roller tracks. Very appropriate for roller beds and when changes in the product range require frequent adaptation of the lane width.

- **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**

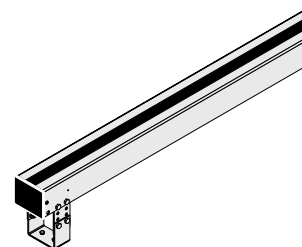
These cylindrical rollers operate on a galvanised steel axle. The smallest roller pitch is 28 mm.

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

**7 Step-up rail**

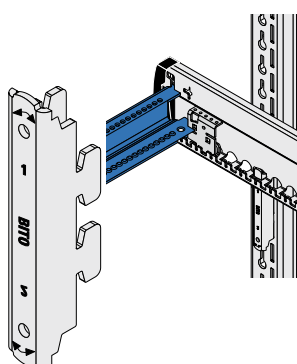
Adjustable in 3 heights for convenient and safe access to the upper storage levels.

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

**Support clip**

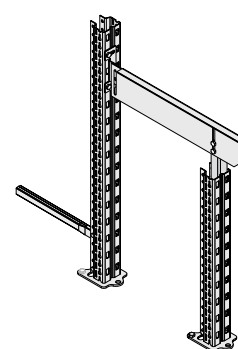
The support clip is hooked into the side perforations of the uprights and provides a safe seat for flow shelves. A simple turn through 180° allows to fix flow shelves on a 12.5 mm pitch.

- **easy boltless assembly**

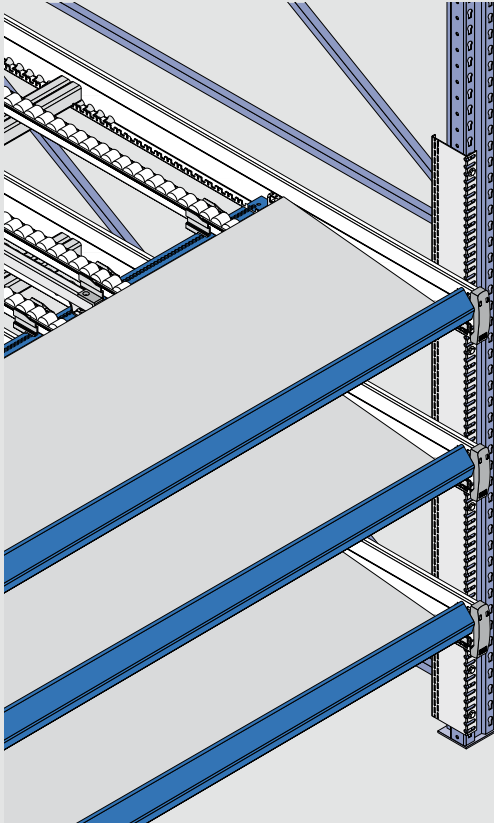
**6 Roller conveyor stand**

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



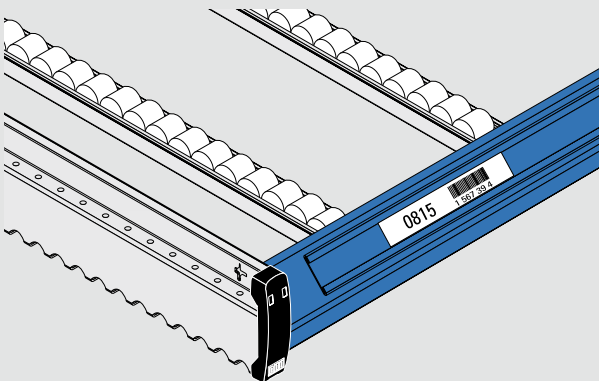
Retro-fit your existing pallet racking with flow shelves and benefit from a combined pallet/carton live storage racking!

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.

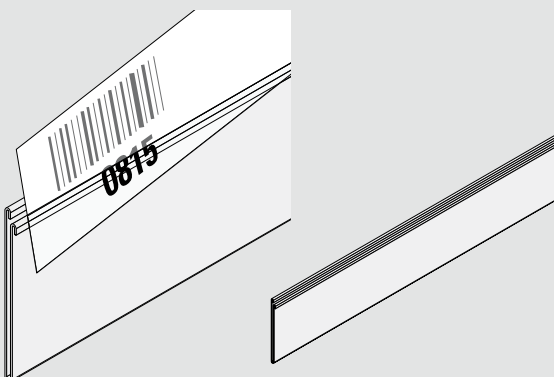
Metal label holder



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!

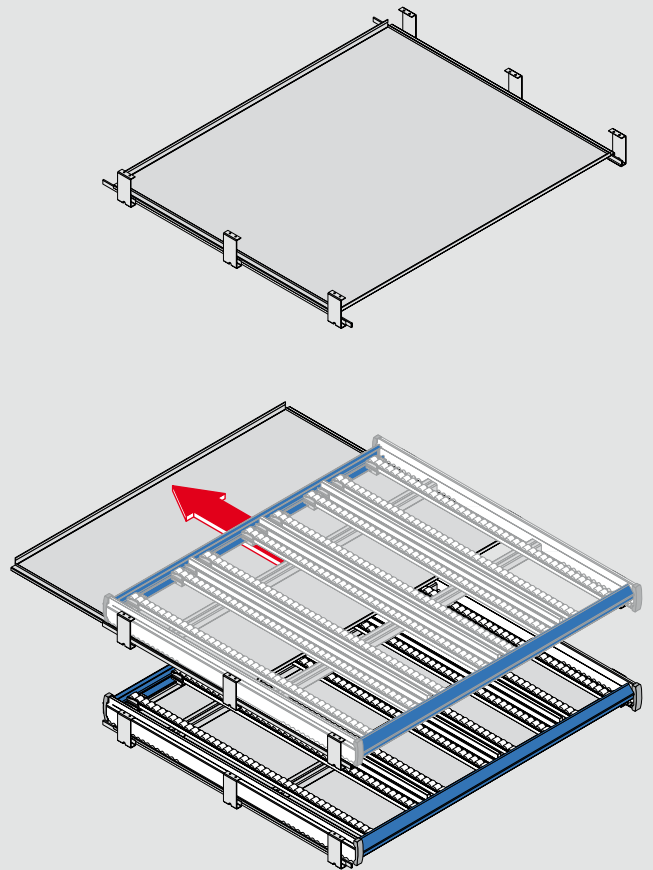
Dust protection sheet

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

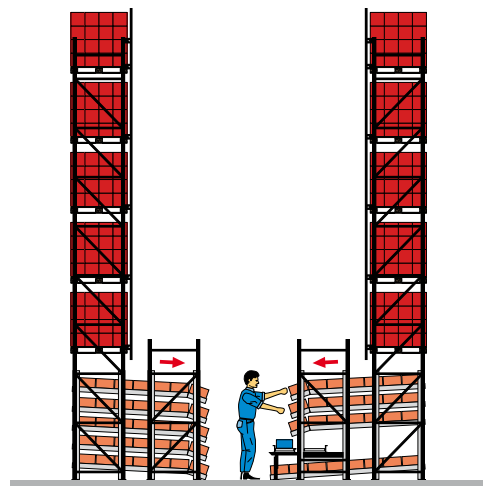
SK Pharma Logistics GmbH in Herford is a logistic services provider of pharmaceuticals. Their warehouse now features a carton live storage system. The 664 live storage lanes are grouped into four picking areas which are again subdivided into several zones stocking different reference item groups.

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

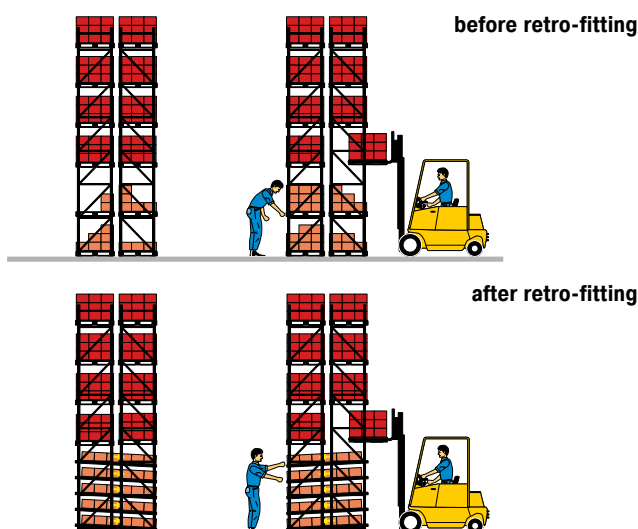
- pallet racking retro-fitted with flow shelves at floor level height
- static pallet buffer on top

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.

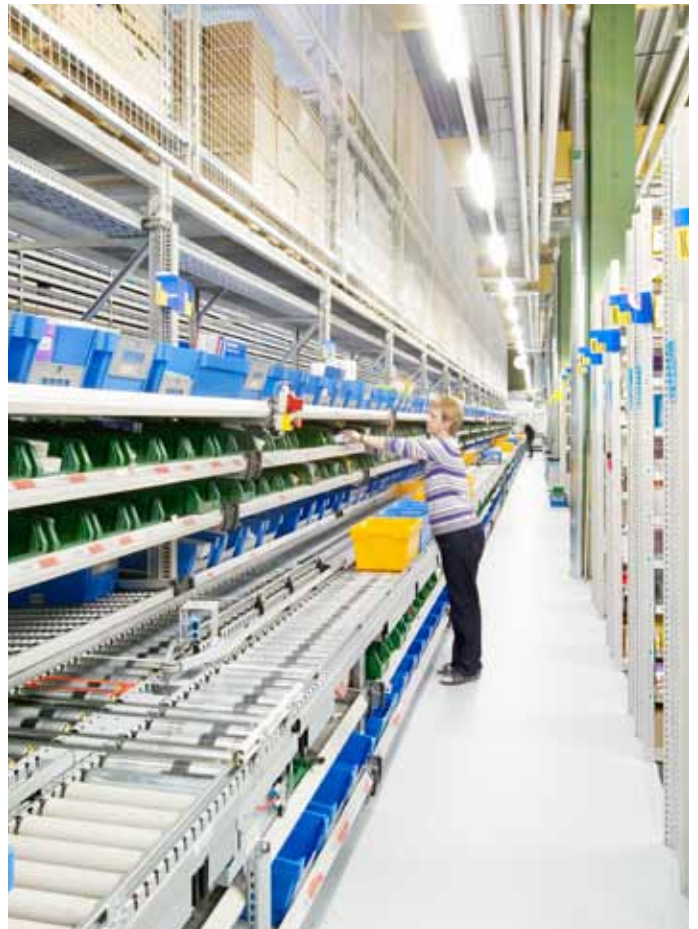
The Tegut pallet racking facilities now combine easy access live storage lanes at floor level height and a huge product reserve in the static pallet buffer on top.



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

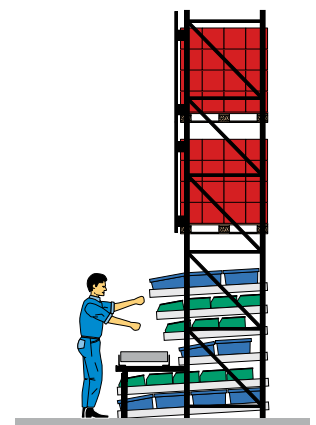
Headquartered in Frankfurt on the Main, Andreae-Noris Zahn AG (ANZAG) is one of the largest pharmaceutical wholesalers in Germany. With 25 branch establishments, the company can boast the densest delivery network of the sector.

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

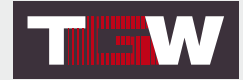




Zwilling J.A. Henkels AG
Manufacturer of cutlery



Project realised in
cooperation with



TGW, Wels (A)



Features

- paperless order picking
- integrated conveyors

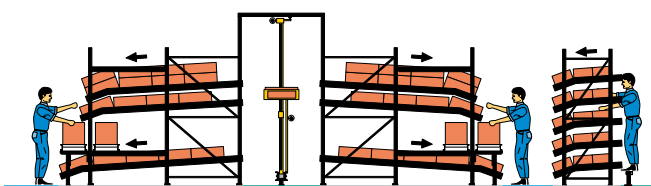
Function

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

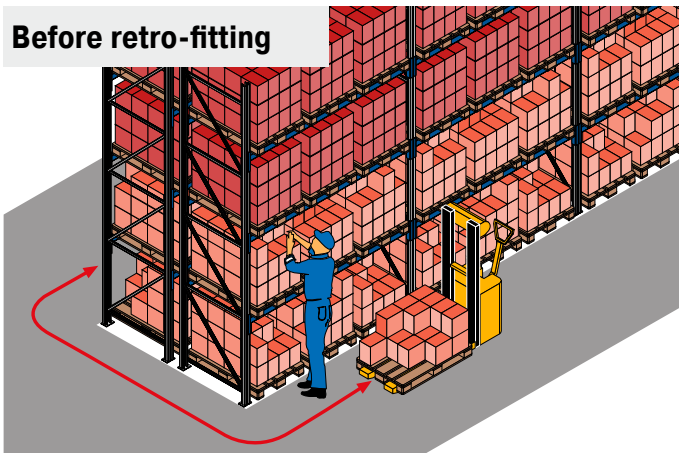
- accommodate cartons and bins in lanes with a pre-defined width
- ideal for storage units with difficult travel characteristics
- for heavy-weight goods of up to 30 kg
- galvanised rollers, \varnothing 25 mm, roller pitch 84 mm

Levels equipped with roller tracks

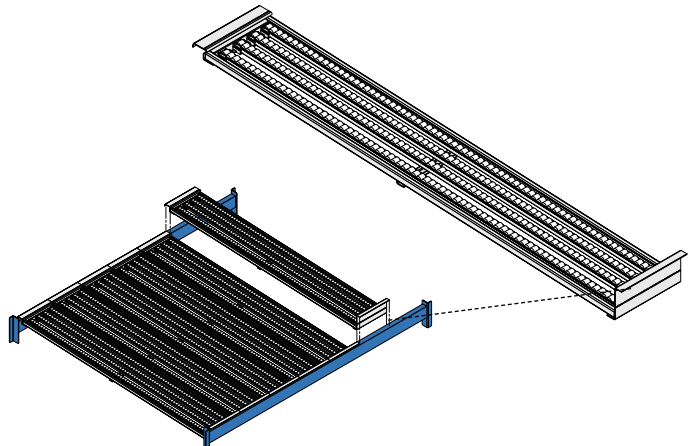
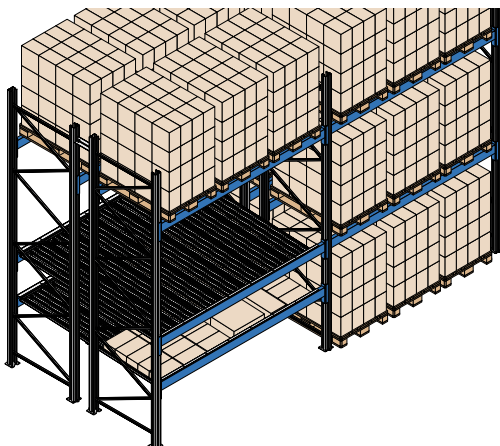
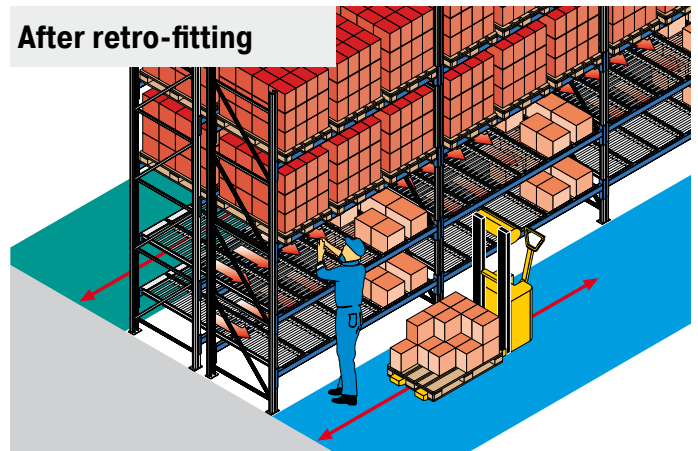
- suited for cartons and bins of any size
- roller tracks are mounted with a spacing of approximately 100 mm and can be adjusted in 8.5 mm increments
- cylindrical plastic rollers, \varnothing 26 mm, roller pitch 28 mm
- even track spacing turns a level into a roller bed without pre-defined lanes



Before retro-fitting



After retro-fitting



**DACHSER**

Dachser
International forwarder

TUNING

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



Automated carton live storage

In logistic solutions, fully or partially automated systems are always a good alternative to manual solutions if, without impairing flexibility, they lead to improved working conditions, to a reduction in order throughput times and picking errors, to permanent availability of goods and to a better utilisation of warehouse volume and floor space. Computer-monitored servicing is an additional benefit and allows permanent stock control.

The economic benefit due to savings in time is particularly apparent in the case of carton and pallet live storage systems and pallet racking.

A closed system improves security by preventing unauthorised access to goods.

Our close cooperation with renowned service vehicle and software manufacturers ensures that our automated installations run with optimum functionality and operational safety.

BITO

www.bito.com



Features

- individual items are picked from integrated live storage lanes
- direct order picking from automated tray storage zone on top
- orders can be picked on two tiers
- automated replenishment
- manual picking
- products are picked with the help of a pick-by-light system
- integrated conveyors

Function

With more than 2400 retailers in eleven countries, the drugstore chain dm-drogerie markt is one of the leading suppliers in this sector. The company stocks many product lines in plastic bins and on plastic trays. Their 36 lane storage facility is serviced with fully automated stacker cranes that provide immediate replenishment to the supply zone and feed products into the flow lanes at operator picking height. Orders are picked directly into order-related bins that are transported on integrated conveyors.

Benefits

- short order throughput times
- increased picking performance
- ergonomic layout of operator workplaces
- fully automated facility servicing
- floor space occupation has been reduced by as much as 30%





Fully automate carton live storage CLS-A

Full utilisation of the available warehouse height and a very high storage density are only some of the advantages provided by automated carton live storage.

The racking installation can conveniently be serviced over the entire height at any time.

Fast access times and short travel routes result in an enormous increase in productivity. Computer-monitored warehouse management systems allow error-free order picking and permanent stock control.

A further advantage of BITO automated carton live storage is that all shelving and racking installations perfectly meet the requirements of loading and order picking trucks – a result of the close cooperation over many years between BITO and manufacturers of service vehicles.

BITO

www.bito.com



Product information

Frequent application

- supply and order picking store

Service options

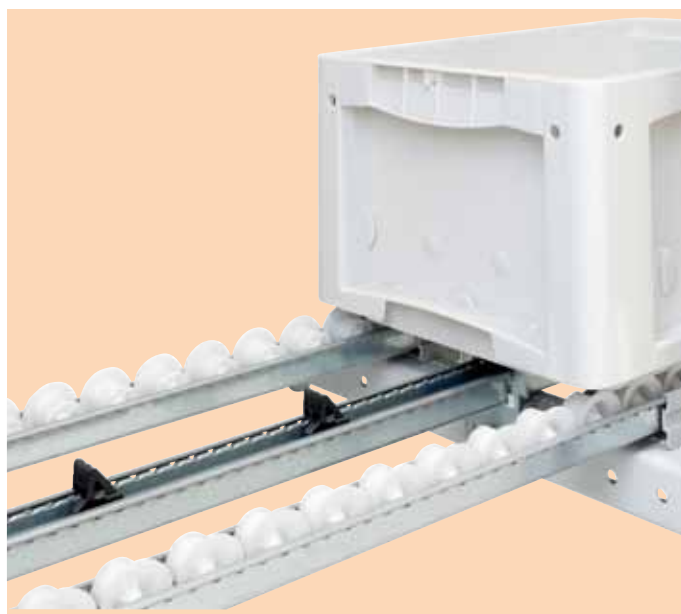
- fully automated replenishment and order picking

Storage options

- storage units, either short or long side facing

Surface/volume utilisation

- floor space occupation reduces by 20% and more
- optimum utilisation of the available warehouse height



Storage units

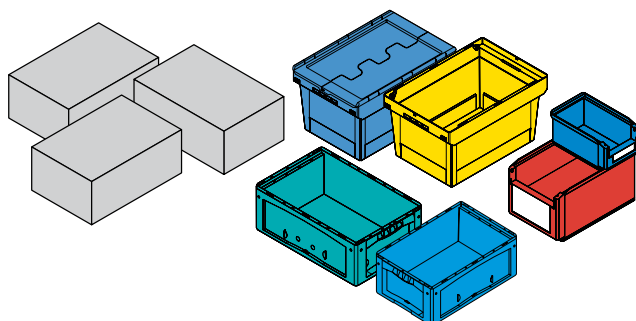
Plastic bins and containers as well as cardboard boxes up to a weight of 35 kg maximum each

Stock rotation frequency

- high stock turnover, short shelf life

Stock characteristics

- A-items (fast movers)



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



BITO partners

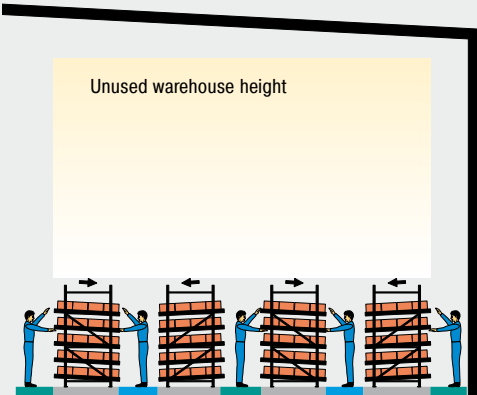
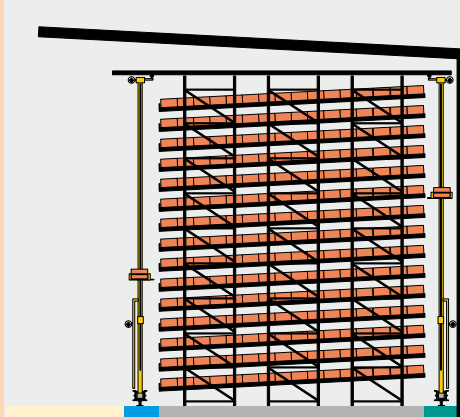
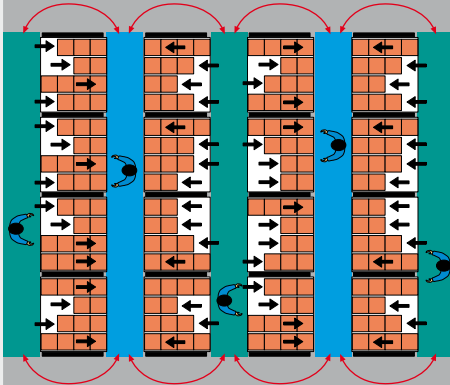
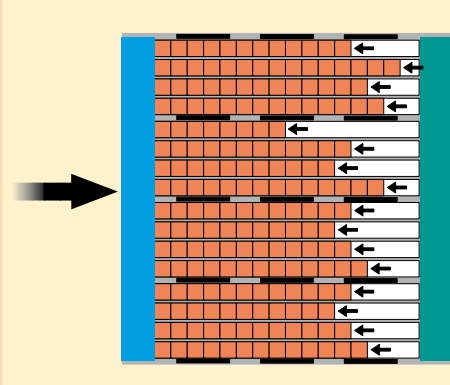
BITO shelving and racking systems are built for low tolerance applications as is required in automated environments. Our close cooperation over many years with service vehicle and software manufacturers guarantees our customers optimum functionality and operational safety.

Advantages of the system

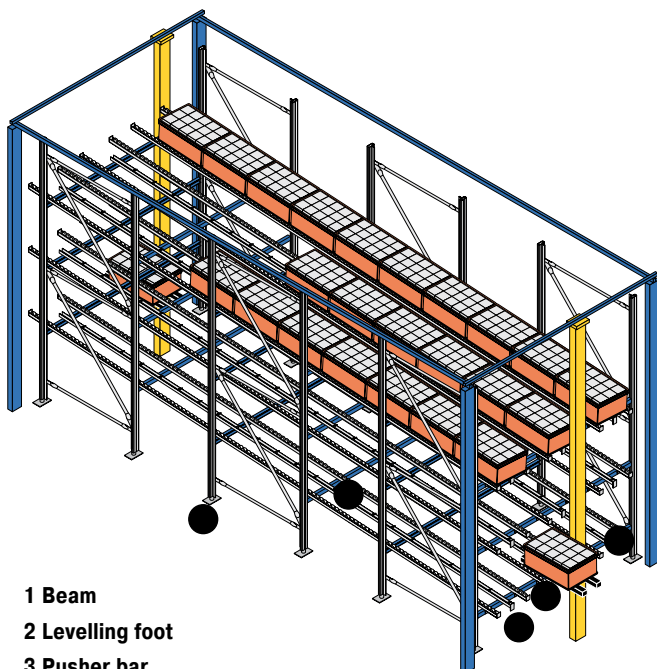
Advantages of automated carton live storage

- maximum utilisation of the available warehouse height with highbay racking constructions
- optimum floor space utilisation due to compact storage
- streamlined and automated operations
- fast and transparent procedures
- improved productivity due to fully automated, computer-monitored operations
- strict adherence to the FIFO principle (first-in – first out)
- link-up to warehouse management systems allows permanent stock control
- very efficient pusher bar system guarantees that all storage units move to the picking face
 - also those with poor travel characteristics

Economic evaluation

Conventional carton live storage	Automated carton live storage	Comparison
 <p>Unused warehouse height</p>		<p>The example on the left-hand side features a conventional carton live storage installation. Replenishment and order picking are done manually over a reach height of up to 2 metres.</p> <p>Our example on the right-hand side shows an automated carton live storage installation serviced by stacker cranes. The available warehouse height can be used to the optimum. Access and travel times are drastically reduced which increases productivity.</p>
		<p>The highbay construction allows to make full use of the warehouse height. Moreover, considerably less floor space is occupied due to the elimination of several replenishment and order picking aisles.</p>

Roller track with cylindrical rollers on a plastic axle

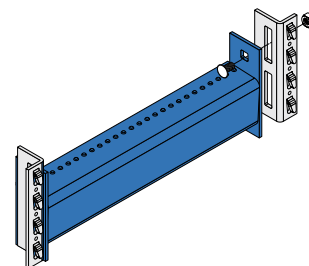


- 1 Beam
- 2 Levelling foot
- 3 Pusher bar
- 4 Track protector
- 5 End plate with clamping saddle

1 Beam

The beams can be adjusted at any height thus providing the optimum flow level in-c-line for your storage units. The ideal lane width can be obtained by clipping the roller tracks and dividers in 8.5 mm increments onto the indentations along the beam.

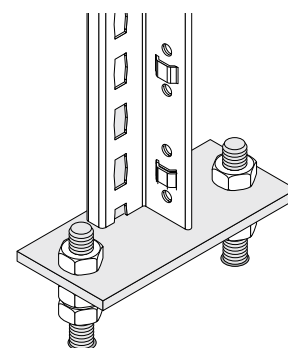
- continuous height adjustment



2 Levelling foot

Allows precise levelling to compensate floor unevenness. Essential for complying with narrow stacker crane tolerances.

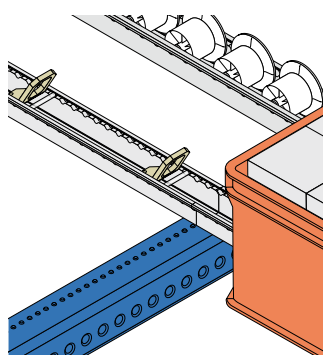
- compensates floor unevenness



5 Pusher bar

Storage units which get stuck in the middle of a lane cause disruptions in the workflow and often enough, it is difficult and time consuming to remove blocked units. The pusher bar ensures that all storage units are available at the picking face.

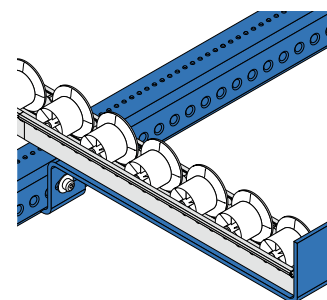
- mechanical device which pushes blocked storage units to the front without manual assistance



4 Track protector

This robust Z-shaped protector section with an integral end stop protects the protruding roller tracks from being damaged by the stacker crane which moves between the roller tracks.

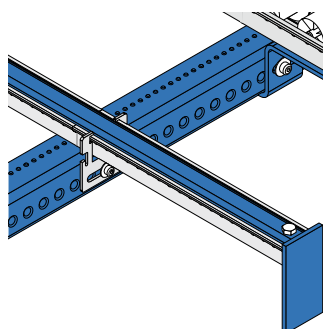
- provides protection for roller tracks
- serves as end stop for unit loads



5 End plate

The end plate is part of the pusher bar. It is pushed back by the stacker crane when a storage unit is collected. Strong spring pressure and suitably spaced protruding pawls return the bar to its original position and thereby push the goods forward even in installations with a very slight incline.

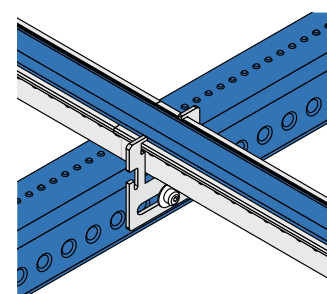
- easy operation of the pusher bar



6 Clamping saddle

The clamping saddle holds the pusher bar in its correct position. The saddle is provided with a plastic lining to reduce noise and friction.

- accommodates the pusher bar
- reduces noise



WÄSCHEGUT Industrial laundry



Features

- paperless order picking
- integrated conveyors
- fully automated loading and retrieval

Function

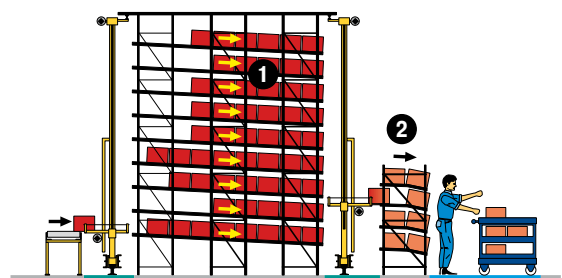
Single reference storage containers are transported on conveyors from the production area to the buffer store (1). This block only provides entire storage units which are loaded and retrieved by automatic stacker cranes. The stacker cranes are controlled by a central warehouse computer that also allocates the storage locations for the bins.

For order picking, the containers are relocated into the live storage block in front (2). The order picker picks the goods customer-based directly into the »MB« multi-purpose containers, registers the contents and identifies the container with a barcode label.



Benefits

- substantial cost savings due to programmed operations
- transparent and accelerated material flow





CARLO COLUCCI
High-end textiles



Project realised in
cooperation with



PSB, Pirmasens



Features

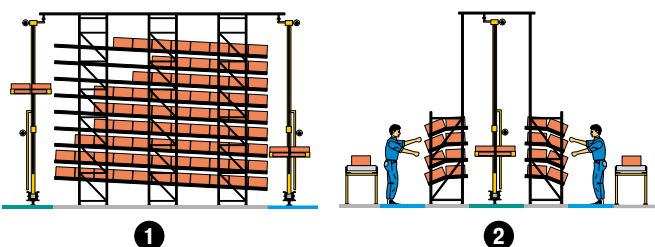
- paperless order picking
- integrated conveyors
- buffer stock with automated loading and retrieval
- order picking installation with automated loading and manual order picking

Function

The automated carton live storage installation (1) which serves as intermediate buffer stock is fed by an automated stacker crane with the cartons coming from the goods-in department. The cartons move unassisted on roller tracks to the picking face where they are automatically fed out upon demand by the second stacker crane and supplied for manual order picking (2).

Benefits

- highbay construction allows maximum utilisation of storage space
- increased productivity due to automated, computer-controlled stacker cranes
- strict adherence to the FIFO principle (first in – first out)





Automated bin and tray storage

Order picking installations based on the goods-to-operator principle are increasingly integrated into total logistic systems. The most common system is automated bin and tray storage (BITO type »AKL«) with individual positions for bins or for trays which are either loaded with several bins or equipped with dividers.

These installations are serviced by picking trucks which by their light weight construction and up-to-date control systems achieve a high performance ratio. This ensures continuous supply to work stations with goods to be picked and the uninterrupted return of bins to their storage location.

Automated bin storage systems are most frequently used in warehouses stocking many small size items of which only a limited quantity is picked at any one time.

BITO

www.bito.com



Product information

Frequent application

- small parts storage, order picking stores, buffer stores, production and supply stores, spare parts and tool storage

Service options

- fully automated loading and retrieval

Storage options

- single position storage with 1 or 2 positions in depth
- multi-position storage

Surface/volume utilisation

- very high



Bay with two storage positions in depth
(back-to-back storage)



Storage units

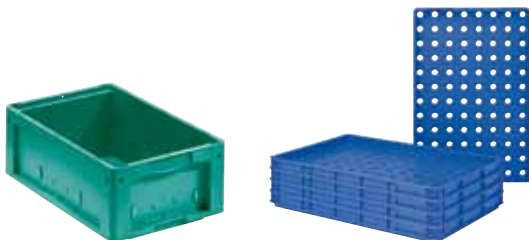
- plastic containers
- cardboard boxes
- plastic trays
- steel trays

Stock rotation frequency

- very high (A-items = fast movers) to medium (B-items)

Stock characteristics

- sorted into bins and containers or loose storage on trays



Customer specific solution



BITO partners

We realise our automated bin storage projects together with strong partners specialising in computer-controlled warehouse management/ automated steering as well as with logistics planners and general contractors. Our close cooperation over many years with these partners guarantees our customers optimum functionality and operational safety.



Extractable storage positions



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"

Our **PRODUCT CATALOGUE** provides detailed information on our entire delivery programme.

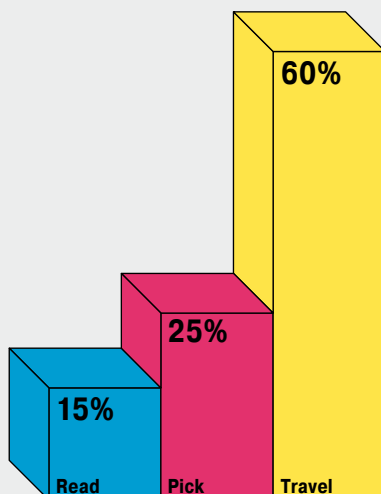
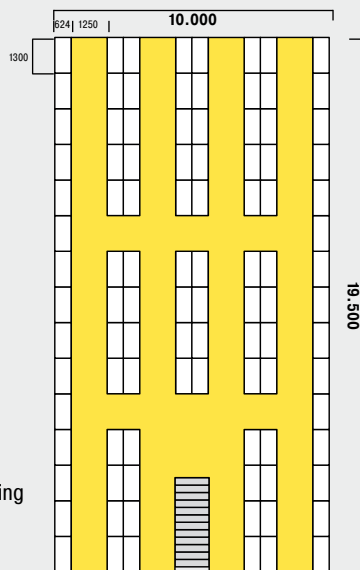
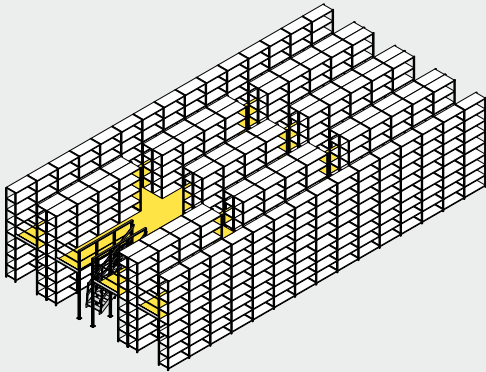
Ask for your free copy!



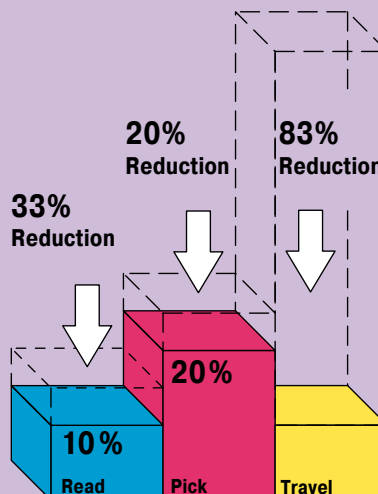
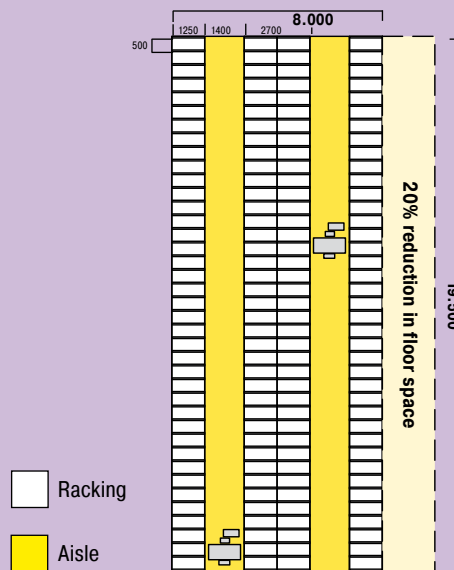
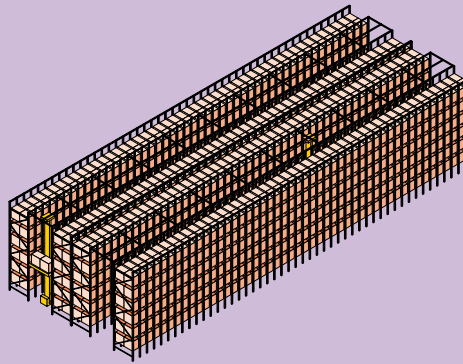
Outfeeder lanes transport goods to sorting/dispatch areas

Economic evaluation

**Conventional
two-tier shelving installation**



**Automated bin storage installation
BITO type »AKL«**



Comparison

For the sake of comparison, both installations are equipped with standard containers sized 600 x 400 x 220 mm.

Both installations have a storage capacity of some 3700 containers handled long side on. In the automated bin storage installation containers are stocked double deep.

In our example, the automated bin storage installation occupies 20% less floor space than the shelving installation.

The optimum ergonomic layout of the picking area in front of the automated bin storage installation cuts information and picking times. Almost no walking required for order pickers which reduces travel times considerably.

Advantages of the system

General advantages of automated bin storage

- goods-to-operator principle reduces access times; no walking, lifting, putting down etc.
- optimum utilisation of the available warehouse height with high bay racking constructions; high storage density = high storage capacity in a minimum of space
- modern warehouse management systems along with generally applied organisational procedures guarantee a very good availability of all product lines; permanent stock control
- every reference is directly accessible; high picking performance
- automated in- and outfeeding allows convenient handling even of heavy-weight storage units
- closed system prevents unauthorised access to goods

Specific advantages of BITO automated bin storage type »AKL«

- uprights can be supplied 30 mm, 50 mm, 60 mm and 80 mm wide for an optimum adaptation to different bay load requirements and building constraints
- beams can be adjusted in 6.25 mm increments which allows maximum utilisation of the building height
- maximum operational safety due to strict adherence to tolerances set up for production and assembly
- integration of sophisticated live storage technology into automated bin storage systems allows direct order picking from BITO »AKL« installations
- single source purchasing of racking + bins & containers + trays: we produce high quality plastic bins and containers as well as plastic and steel trays in our own plants!
- short-term delivery together with professional project implementation



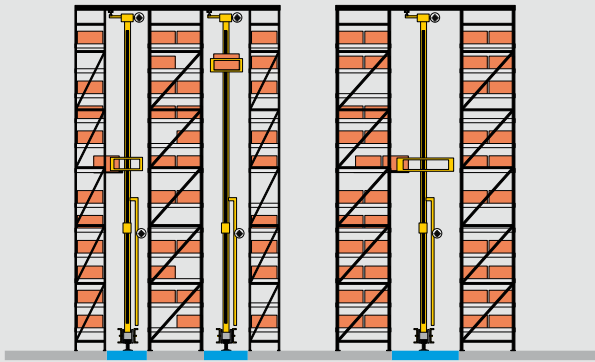
Bay with two storage positions in depth (back-to-back storage)

Customer specific solution

Extractable storage positions

Outfeeder takes transport goods to sorting/dispatch areas

1 Single position storage



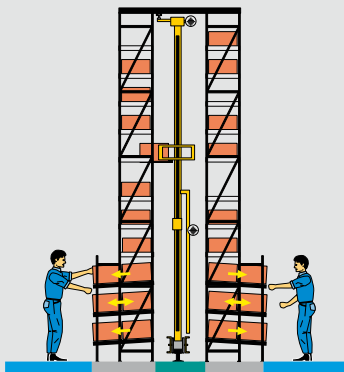
- stacker cranes take bins to central picking locations
- loading of the installation and bin return is done by automatic stacker cranes

The most common solution is single position storage. Reduced picking times and short travel routes combined with permanent stock control make this solution very efficient.

Your advantages:

- very good utilisation of the available storage volume
- continuous work flow

2 Integrated buffer stock



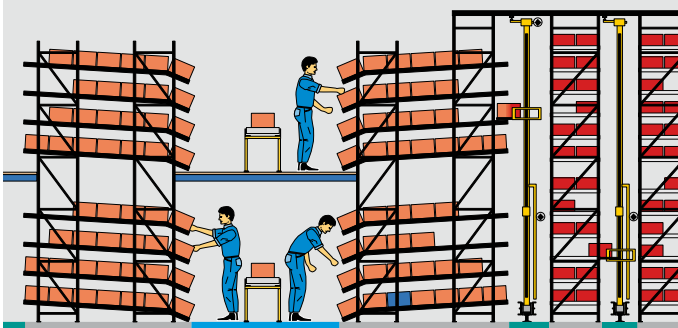
- installation integrates static buffer levels on top and live storage lanes at floor level height for direct order picking

The carton live storage lanes in reach height are fed by the bin buffer stock on top. This ensures that the order pickers are constantly supplied with goods.

Your advantages:

- short travel routes
- good utilisation of headroom
- suits computer-controlled warehouse management systems
- bins which are not empty are returned to their storage location
- order picking without paperwork (f. ex. with pick-by-light systems)

3 Separate buffer stock



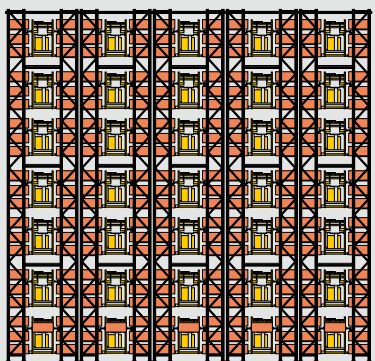
- a separate automated bin storage buffer supplies the carton live storage installation used for order picking
- both installations are serviced by automatic stacker cranes
- the installations are linked to a warehouse conveyor system

The automated bin storage installation is used as buffer stock from which the required product lines are automatically fed out into the carton live storage installation for order picking.

Your advantages:

- replenishment quantities and frequency depend on the stock taken out in the CLS order picking area
- maximum utilisation of headroom
- picking stations on all tiers are replenished simultaneously

4 AS/RS installation



- this facility is ideal for order picking, distribution and order consolidation
- in- and outfeeding with several stacker cranes per aisle

With several lifts and shuttles operating simultaneously, this highly dynamic system is ideal for achieving extremely short lead times.

Your advantages:

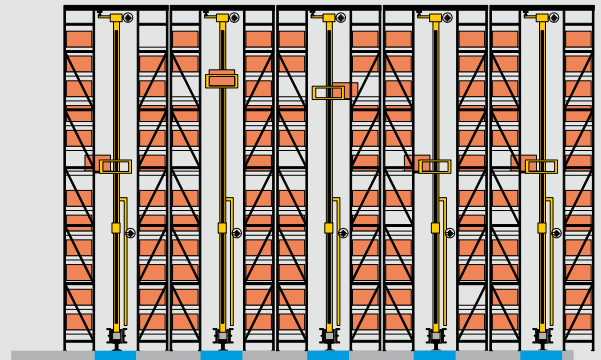
- high-capacity facility with up to 1000 bin/box lot movements per hour
- modular built which allows to expand the facility at any time
- several lifts and shuttles operating at the same time provide substantial gains in picking performance

5 Single position system

– single deep storage

Your advantages:

- stocks heavy-weight storage units
- short access times
- can be integrated into computer-controlled warehouse management systems
- maximum utilisation of headroom

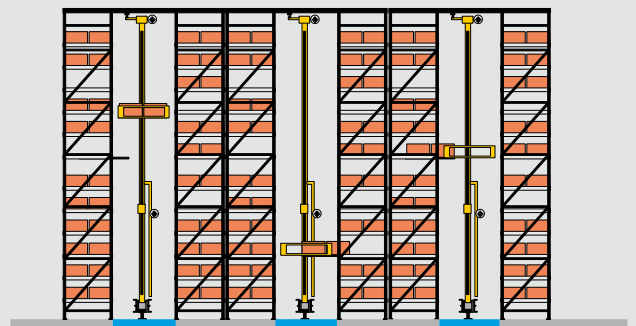


6 Single position system

– double deep storage

Your advantages:

- stocks medium to heavy-weight storage units
- optimum utilisation of available storage volume
- very economic due to double deep storage
- full use of stacker crane service capability

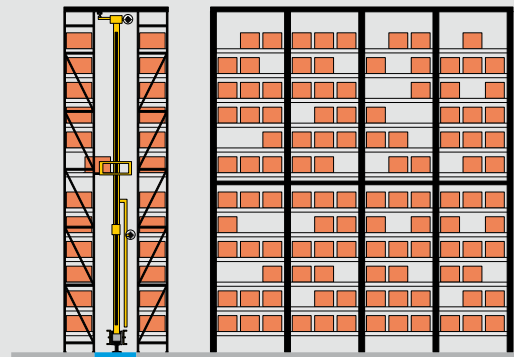


7 Multi-position system

- several containers next to each other in the same bay
- single or double deep storage

Your advantages:

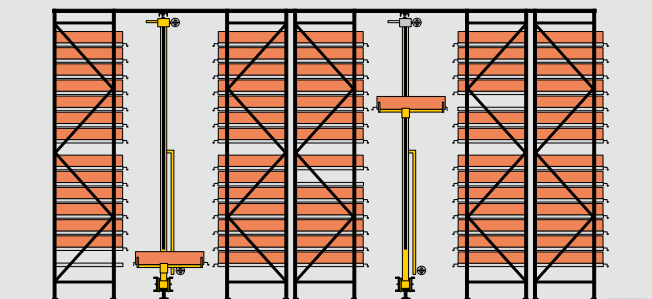
- stocks medium-weight storage units
- shelving construction allows full base support of containers and cartons

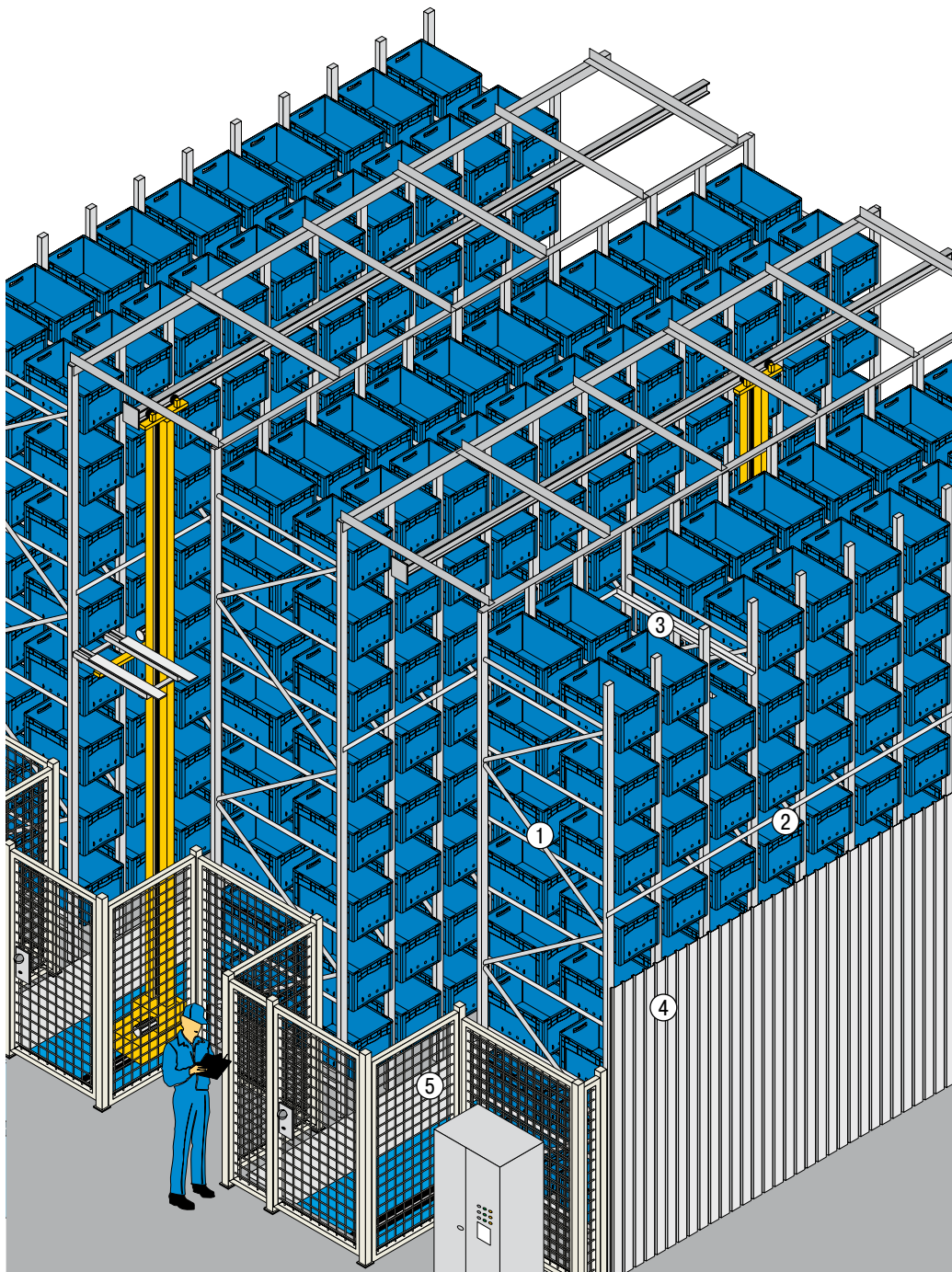


8 Shuttle-serviced system

Your advantages:

- stocks heavy-weight storage units
- push and pull technique allows high storage density
- several references can be stocked in the same storage location
- ideal for stocking a huge number of references





Additional equipment

As a rule, our automated bin storage installations are supplied with

- upper guide rails for stacker crane
- protective cladding around and access doors to stacker crane operation areas
- wire-mesh steel, corrugated steel sheet or plexiglass cladding
- sprinkler tube fixings

Load carriers

BITO plastic bins and containers are frequently used as storage units. In particular, the series

- **small parts containers »KLT«**
- **Euro stacking containers »XL«**

are ideally suited for this system on account of their design and especially adapted features. Equally suited are

- **multi-purpose containers »MB«**
- **stacking containers »BN«**
- **storage bins »SK«**

Apart from plastic bins and containers, trays are increasingly used.

BITO supplies plastic as well as steel trays made in their own plants.

For more information on load carriers refer to pages 84 to 89.

- 1 Frame
- 2 Longitudinal bracing
- 3 Support bar (for double deep storage)
- 4 Closed cladding
- 5 Wire-mesh cladding



Installation with double sided access



Integrated outfeeder tracks



Protective cladding

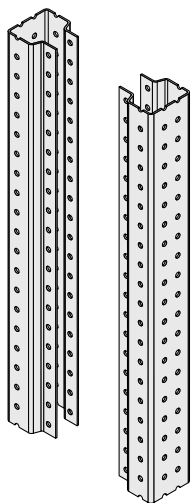


Automatic stacker crane

① Frames

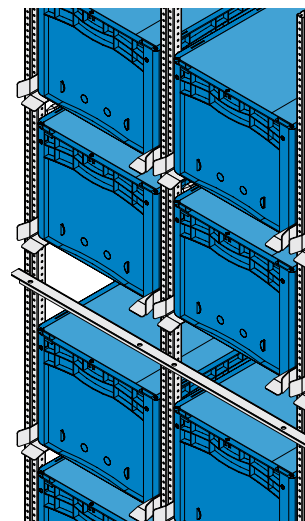
The system allows for frame heights of up to 15000 mm. All frame components are riveted. Depending on the intended frame load capacity, the uprights are 30, 45 or 60 mm wide. As a result, the inherent "waste" of storage space required by the installation itself is minimised.

- **high rigidity**

**② Bracing**

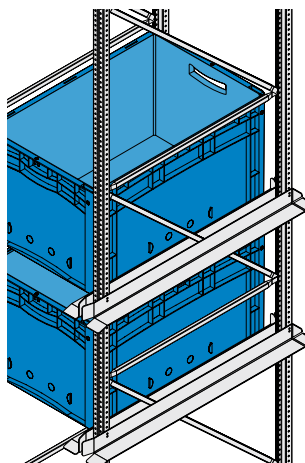
Sufficient bracing with horizontal and diagonal struts is required for the precise functioning of the bin storage installation. For this purpose, flat straps and galvanised sections are used.

- **high racking rigidity**

**Angled runners**

Bin or tray seats are 75 mm wide. The runners can be fitted in 6.25 mm increments and are supplied with integrated end stop at the rear. Material thickness depends on the intended load capacity. If required, the runners are supplied with flared entry guides.

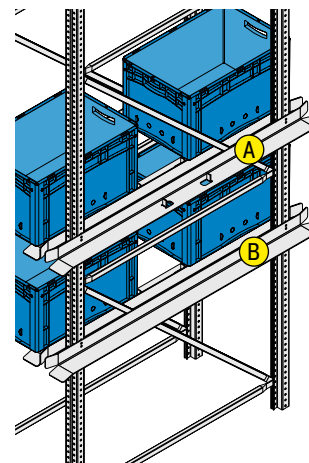
- **safe seating for bins and trays**
- **available for single and double deep storage**

**③ Double deep storage and access on both sides**

Depending on the intended load capacity, back-to-back racking may be equipped with just one - double deep - frame while the runners extend over the entire lane depth.

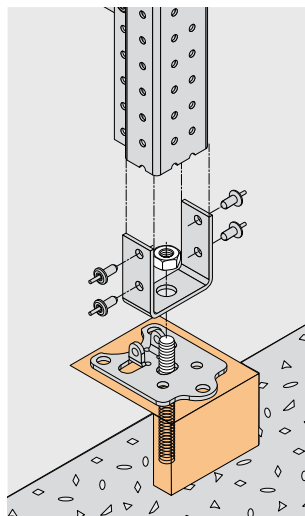
- **safe seating for bins and trays**

- A** - runners for double sided access come with a centre stop
- B** - runners for double deep storage are without centre stop

**Base plate**

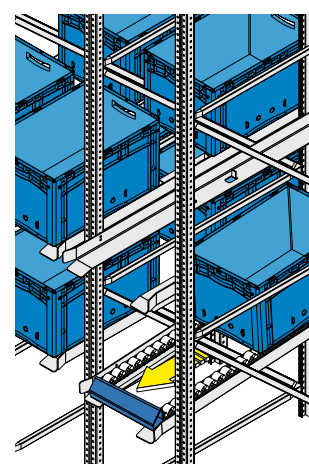
Base plates are ideally suited for installation levelling. They are fixed with chemical floor anchors and, preferably, undercast with shrink-free compound mortar.

- **easy levelling**
- **solid fixing with chemical floor anchors**

**Outfeeder tracks**

If an automated bin storage installation is also used for order picking, it is very convenient to have outfeeder tracks at various positions along the shelving front. For this purpose, appropriate lengths of roller tracks are fixed onto the angle runners.

- **easy re-stocking of bins and trays after order picking**





Thermote & Vanhalst
Spare parts for lift trucks



Project realised in
cooperation with



VanDerLande Industries

BEEWEN

Beewen (RGB)



Features

- installation used as despatch buffer
- multi-position storage
- integrated carton live storage installation
- order memory

Function

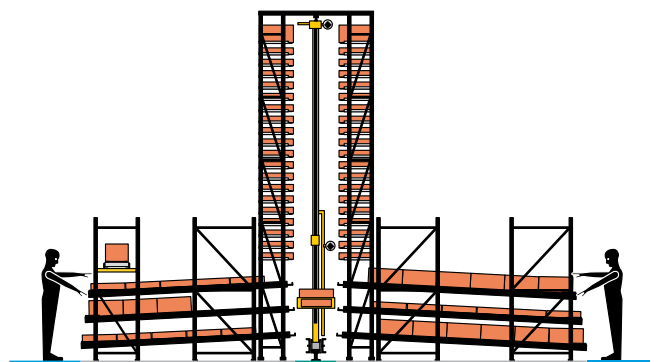
The installation combines a spare parts buffer stock and a carton live storage area for order picking. All references pertaining to a customer order are picked automatically from the upper static part and are fed out into the customer dedicated live storage lanes at floor level height.

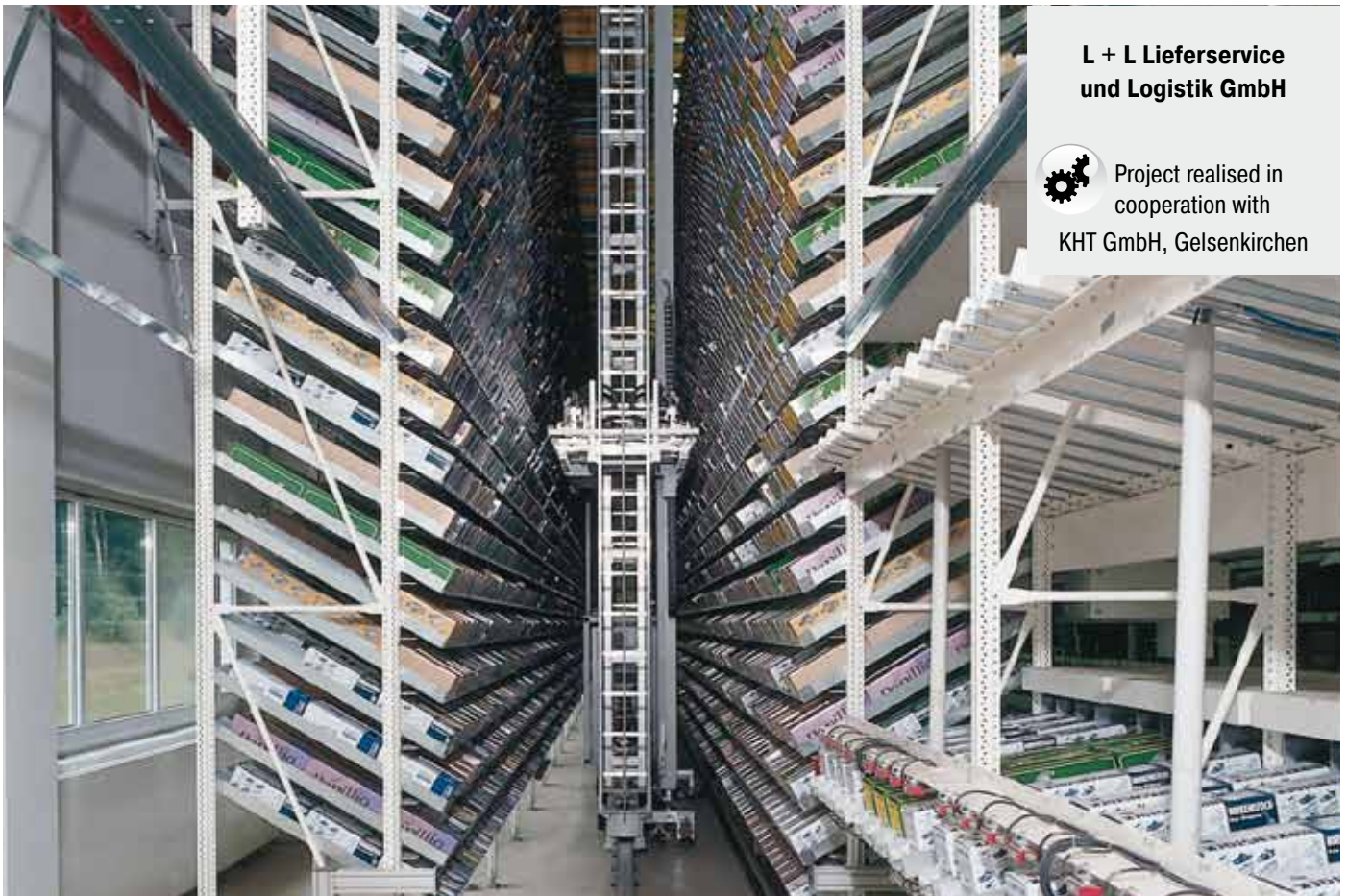
After an order is complete, the goods are retrieved from the lanes, packed and prepared for dispatch.



Benefits

- extremely short lead times due to order memory system
- the system works without expensive conveyor and sorter technology





**L + L Lieferservice
und Logistik GmbH**



Project realised in
cooperation with
KHT GmbH, Gelsenkirchen

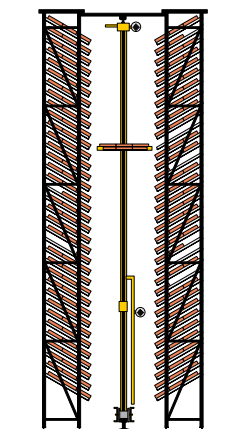


Installation features

- multi-position storage
- buffer store which at the same time serves as order picking store via integrated conveyors

Function

The 35600 lanes are serviced according to the push-back principle. A special stacker crane is able to feed in or out 3 cartons in depth. Due to the lane incline, the cartons move automatically into the picking position.



Benefits

- the fully automated installation replaces several conventional order picking areas
- increased storage capacity
- improved picking performance

Berker GmbH & Co. KG
Manufacturer of electronic switches and systems



Project realised in cooperation with



TGW GmbH, Wels



Installation features

- central store which is linked to picking locations with conveyors
- double deep storage
- storage in BITO »KLT« small parts containers
- BITO steel trays

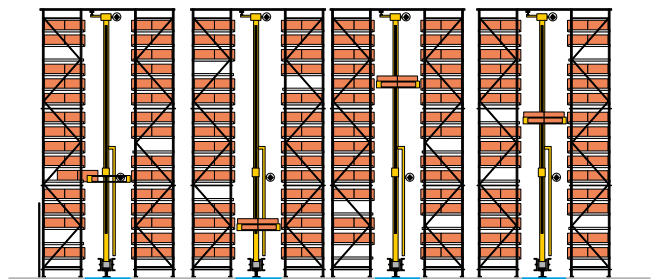
Function

Different order volumes and intervals and the enlarged product range made it necessary to set up an automated bin storage installation in order to cope with the increasing demand. Each stacker crane is able to handle 4 orders simultaneously. With every stacker crane run, two containers or two trays are transported to the picking locations. In total, the stacker cranes operating in the four aisles of the installation have a capacity of 530 double picks per hour. This allows to process more orders within a shorter period of time.



Benefits

- fast and on-time delivery to all customers
- more orders from a widened product range can now be handled





Schrauben Jäger

Wholesaler of screws, bolts
and accessories



Project realised in
cooperation with



psb GmbH, Pirmasens

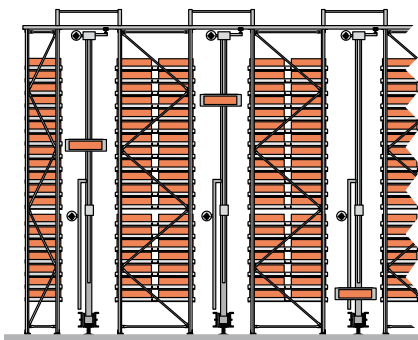


Installation features

- storage on trays
- used as buffer and order picking store
- conveyors at the short side of the installation link buffer store to order picking locations

Function

The trays accommodate cartons filled with bolts and fixing elements. In- and outfeeding is done with automatic stacker cranes.



Benefits

- high storage capacity in a very limited space
- immediate product availability
- substantially increased picking performance
- short order throughput times, paperless order picking
- computer-controlled batch monitoring



Stacking containers in Euro-footprint, series »XL«

ESD
conductive version
upon request

5
year
warranty



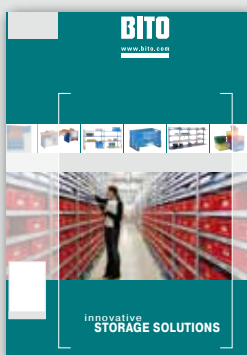
Storage in Euro-sized BITO »XL« containers is the most cost efficient load carrier option for automated bin storage installations. With its extra large volume, the ergonomically designed open handgrips and a minimum base deflection of the ribbed base and double base variations, this container is a reliable solution for applications inside warehouses as well as outside.



red**dot**



More information...



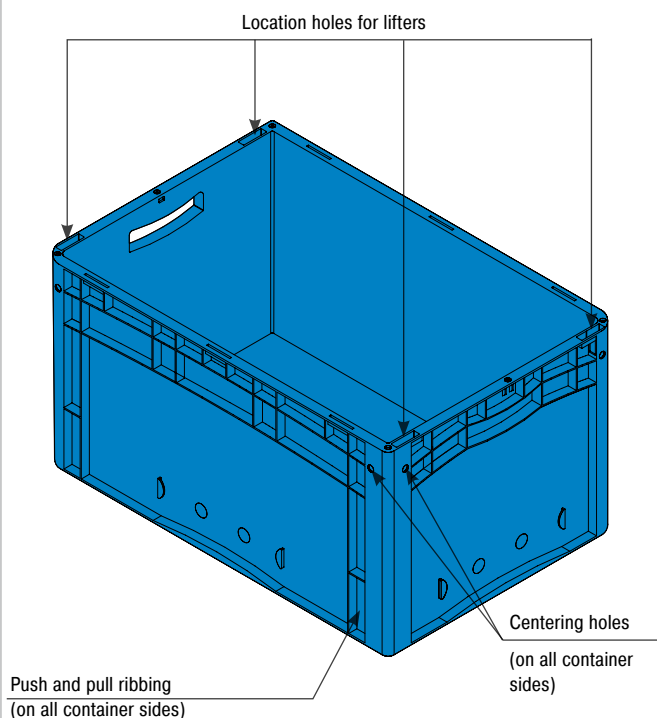
For more information on BITO stacking containers »XL« as well as on our entire range of products refer to our PRODUCT CATALOGUE.

Just contact us on +49-(0) 67 53 / 1 22-1 64 !

Euro-sized stacking containers XL

also refer to page 198

Constructive features for use in automated bin storage



Advantages

- numerous container variations and sizes
- broad range of accessories
- container subdivision with insertable bins or with longitudinal/cross dividers
- barcode label areas on the short sides
- high rigidity due to reinforcing ribs
- security tags provide access control



Volume

The XL container features a particularly large internal volume due to its optimised side wall construction.

- large volume due to its optimised side wall construction



Ribbed base

The ribbed base variation carries up to 50 kg with a base deflection of not more than 5 mm.

- very robust make
- load capacity of up to 50 kg*
- maximum base deflection 5 mm*



Euro-sized dimensions

All container dimensions are adapted to the size of Euro pallets. This allows regrouping of deliveries and further transport without the need for re-packing the goods.

Stacking loads:

400 x 300 mm = 250 kg

600 x 400 mm = 300 kg

- adapted to the size of Euro pallets
- no repacking of goods



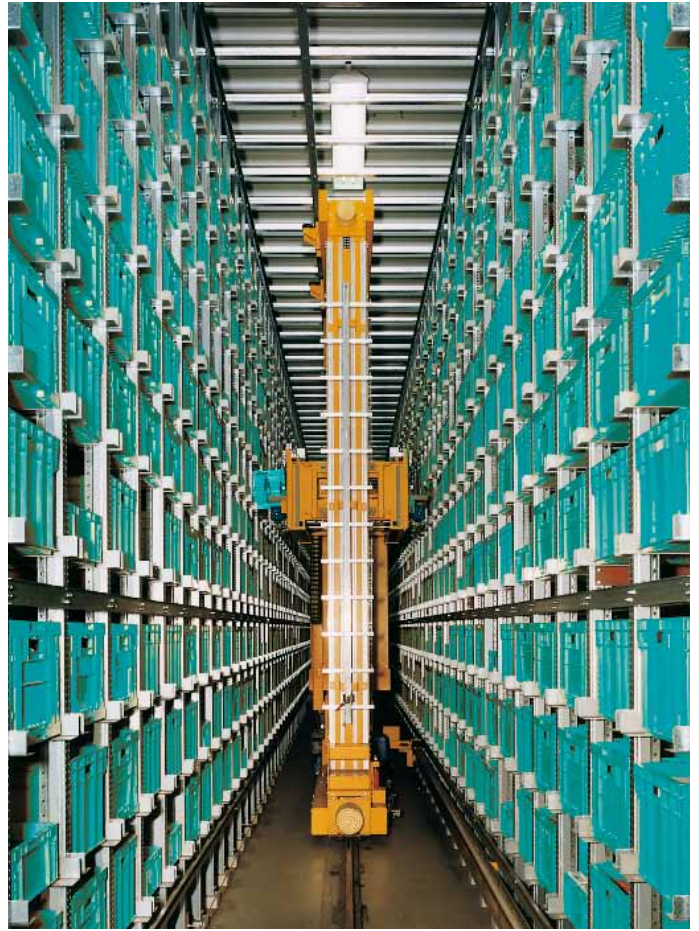
Double base

The double base variation has a load capacity of up to 50 kg along with a minimal base deflection of not more than 2 mm. The smooth base finish makes for particularly good travel characteristics on conveyors.

- very robust make
- load capacity of up to 50 kg*
- maximum base deflection 2 mm*



* All load capacities indicated refer to UDL, storage in length direction and an ambient temperature of 23 °C.



BITO Small parts containers »KLT«

ESD
conductive version
upon request

5
year
warranty

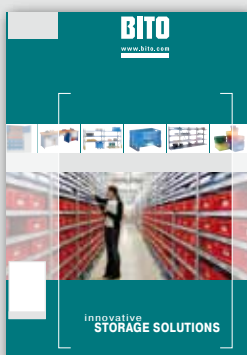


The BITO »KLT« container meets the requirements of a modern warehouse environment in an ideal way. With its reinforced corner construction and the three different base versions, the container can take high load capacities. The very rigid ribbed and double base variations allow narrow tolerance handling as is required for automated bin storage installations and for troublefree and space saving servicing with all types of automatic stacker cranes.

Sophisticated constructive features allow automatic and accurate pulling, lifting, lowering and centering. For identifying the container or its contents, the container can be barcode labelled or equipped with data transmission devices in the corner areas or in the ribbed base.



More information...



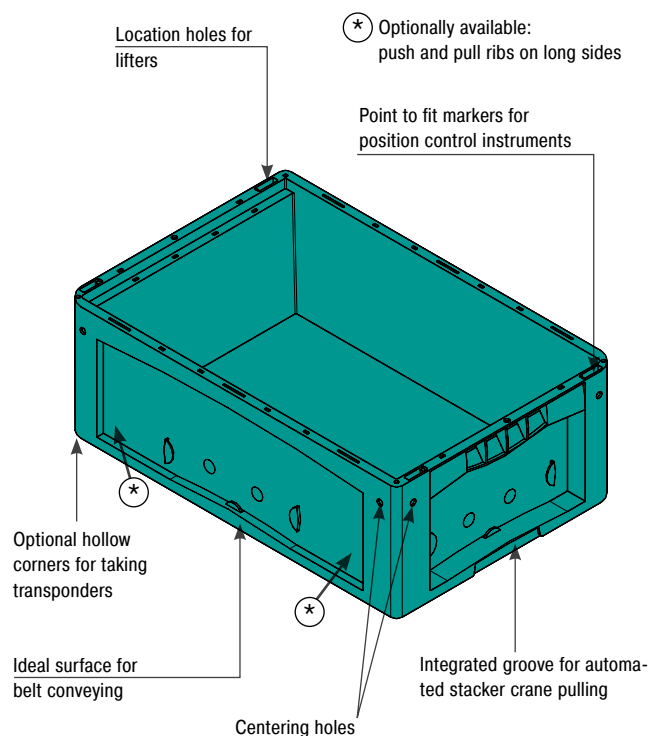
For more information on BITO small parts containers »KLT« as well as on our entire range of products refer to our PRODUCT CATALOGUE.

Just contact us on +49-(0) 67 53 / 1 22-1 64 !

Small parts containers KLT

also refer to page 200

Constructive features for use in automated bin storage



Advantages

- many container sizes
- broad range of accessories
- container subdivision with insertable containers, longitudinal/cross dividers and divider strips
- tamper evident security tags
- company logos can be applied by screen/tampon print, injection moulding or hot stamping



Standard base

Depending on the container dimensions, load capacities range from 25 kg to 50 kg.

The smooth base finish makes the container ideal for transport on conveyors.

- **load capacity 25 - 50 kg*** depending on container dimensions



Conveyor technology

Troublefree operation on all conveyor systems. Outstanding travel characteristics on roller tracks, roller conveyors, on belt and chain conveyors, transfer lines, etc.

- **optimum travel characteristics**
- **low noise travelling**



Ribbed base

Containers with ribbed base have a load capacity of up to 50 kg with a base deflection of less than 1 mm.

- **load capacity of up to 50 kg***
- **base deflection = < 1 mm***



Transport

The container dimensions are perfectly adapted to the pallet sizes available on the market. This allows an optimum use of lorry freight space. High stacking loads of up to 500 kg – with and without lid.

- **very good stacking stability**
- **high stacking loads**
- **adapted to the size of Euro pallets**



Double base

Containers with a double base have a load capacity of up to 75 kg with a base deflection of less than 1 mm.

The smooth base finish makes the container ideal for transport on conveyors.

- **load capacity of up to 75 kg***
- **base deflection = < 1 mm***



* All load capacities indicated refer to UDL, storage in length direction and an ambient temperature of 23 °C.

BITO Plastic trays



On account of their versatility, trays are becoming increasingly used in automated bin storage installations. As trays can accommodate bins as well as cardboard boxes, they are suited for a wide range of products.

All plastic trays are manufactured by BITO.



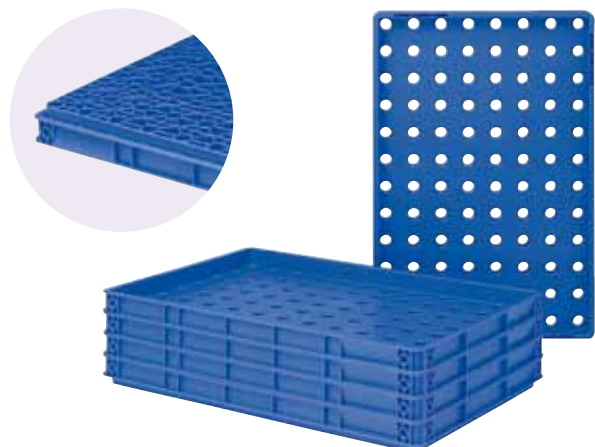
Advantages

- tray serves as “adapter“ for storage units and unit loads sized 670 x 410 mm, 640 x 426 mm, 600 x 400 mm and 400 x 300 mm which by their characteristics would not be suited for stacker crane/conveyor handling or automated bin storage
- easy in-feeding of cartons – even if damaged
- safe storage of bins which have not been designed for automated storage
- suited for use with all types of stacker cranes
- conveyor-friendly smooth base finish ensures low noise travelling; special ribbing makes sure that there is no base deflection even when the tray is fully loaded
- double base (sandwich base) upon request



Tray subdivision with Euro-sized bins

for trays sized 640 x 426 mm



BITO Steel trays

Steel trays are used for heavy-weight loads. Bended push and pull rails ensure optimum handling. Moreover, recessed areas on the long sides for barcode labels and punched bridges for inserting a collar make this tray an allrounder for automated bin storage.

Useful accessories such as insertable bins for tray subdivision as well as collars for added height widen the range of applications.

The steel trays together with their accessories are manufactured by BITO.



Advantages

- tray serves as “adapter” for loads which by their characteristics would not be suited for conveyors and automated bin storage
- easy in-feeding of cartons – even if damaged
- safe storage of plastic bins and containers
- suited for all types of stacker cranes
- easy subdivision by insertable bins and collars with longitudinal and cross dividers
- collars increase a tray’s standard height from 38 mm to as much as 400 mm
- very low base deflection
- load capacities range from 50 kg to 300 kg
- pressure-joined corners



Tray subdivision with EURO-sized bins

with insertable bins and collars with longitudinal and cross dividers





PRO Pallet racking

Despite modern technologies which are increasingly adopted in warehousing and order picking, the “classic” pallet racking is most commonly used in this field.

The pallet racking system allows convenient access to every pallet. Moreover, the racking configuration can be easily modified and extended. Relatively low investment costs and flexibility have made this system essential for storage and order picking.

The most common configuration is multi-position storage with 2 - 4 pallets per bay. If pallets are buffered or if complete pallet loads are to be handled, pallets are stored short side facing. For order picking, however, pallets are generally stored long side facing in order to facilitate access.

With useful and practice-proven accessories, the BITO pallet racking system allows optimum storage of all kinds of palletised loads.

BITO**www.bito.com**



Product information

Frequent application

- buffer and order picking stores

Service options

- manual order picking at floor level height
- hand pallet trucks, electric lift trucks, reach trucks
- all current forklift truck types available on the market
- automated servicing

Storage options

- long/short side facing
- vertical storage
- one or two pallet deep storage

Surface/volume utilisation

- can be increased considerably by highbay storage



Highbay pallet racking



Storage units

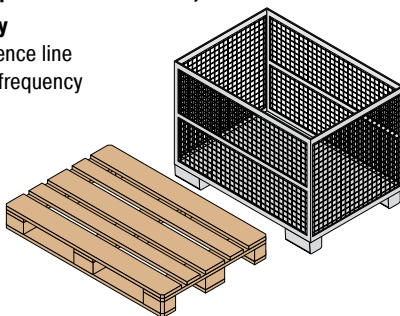
All currently used pallet types, wire-mesh box pallets, special size pallets, customer specific load carriers, etc.

Stock rotation frequency

- large quantities per reference line
- medium to high turnover frequency

Stock characteristics

- bulky storage units
- heavy-weight loads



Extractable first pallet position

Safety



The German quality mark **RAL-RG 614/2** guarantees the highest levels of quality for structural safety, load capacity and sufficient rigidity both lengthwise and front to back.



All components fully comply with the latest safety regulations.



Automated pallet racking with single position storage



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"

Our **PRODUCT CATALOGUE** provides detailed information on our entire delivery programme.

Ask for your free copy!

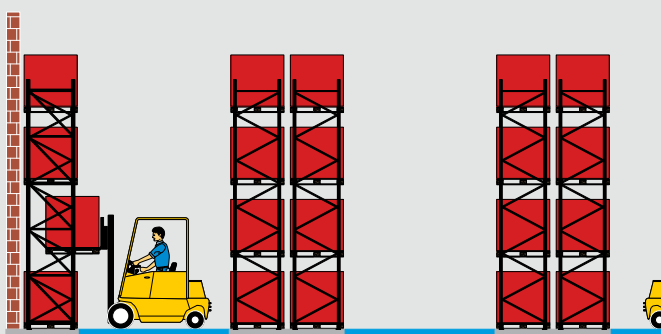


Identification and safety equipment

System specific advantages of BITO pallet racking systems

- assembled frames = faster overall assembly, or, depending on the project, unassembled frames to save on freight costs
- bolted frames = lower repair costs if damaged by a lift truck
- fast and boltless assembly of basic components
- high corrosion resistance by galvanising or epoxy coating
- long and short side pallet handling as well as multi- and single position storage
- broad range of accessories and safety equipment
- all racking components comply with the latest safety regulations
- level decking can be ordered in many variations
- particularly hard-wearing components for a long service life

1 Broad aisle installation



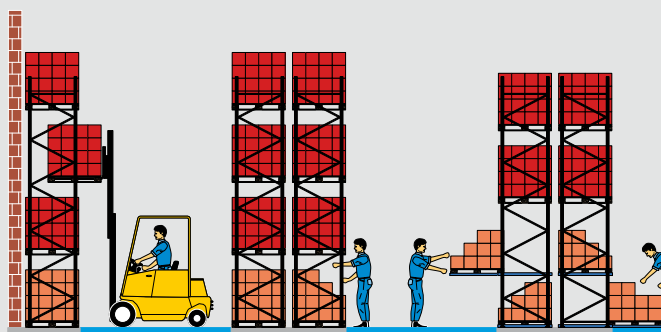
- buffer store
- low to medium turnover frequency
- low cost pallet position

The standard solution for pallet racking is a configuration with **broad aisles**. Servicing is generally done with front stackers, reach trucks or man-up stacker cranes. The floor level can be conveniently serviced with a hand pallet truck or an electric lift truck.

Your advantages:

- low cost storage
- easy servicing with front stackers
- manual order picking at floor level height

2 Extractable first pallet position



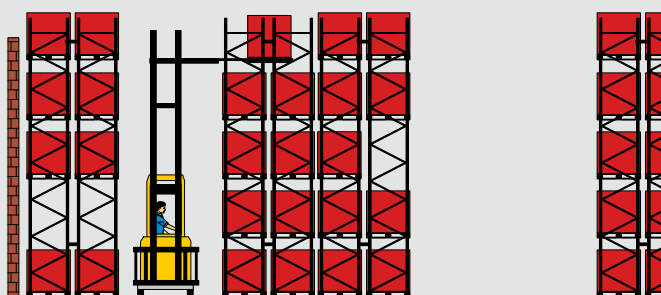
- ergonomically favourable order picking from 3 sides
- very good access, even if pallets are stored short side facing
- can be retro-fitted into existing pallet racking installations

As a rule, smaller unit loads are directly picked off the pallet. Manual order picking is done on the floor level and sometimes also on the level above, depending on the reach height. Extractable first pallet positions facilitate order picking as pallets can be accessed from 3 sides.

Your advantages:

- ideal, strain-free order picking from 3 sides
- prevents injuries – no head bumping on the beam of the level on top

3 Double deep storage



- good alternative to narrow aisle storage with rail-guided service vehicles

Double deep storage requires a service vehicle with telescopic forks. As a rule, the truck is equipped with a camera at the forks and a control monitor in the operator cabin to give view onto the second pallet in the lane.

Your advantage:

- less floor space required

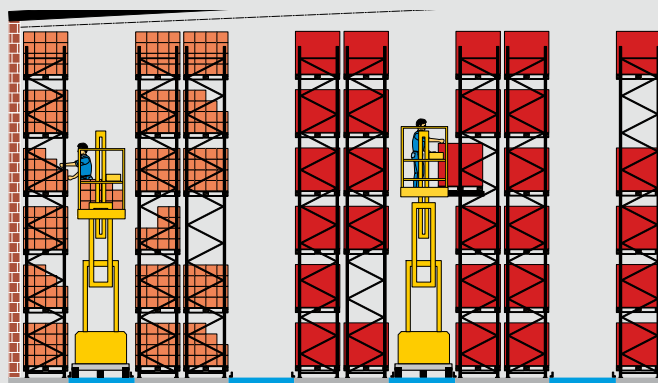
4 Narrow aisle installation

- highbay construction with narrow aisles and order picking trucks
- individual unit loads can be picked from all levels

Narrow aisle installations allow a very good floor space utilisation. Man-operated stacker cranes or order picking trucks lift the operator into the ideal picking position to allow manual picking on all levels. Guide rails or inductive steering ensures that service vehicles always keep the ideal distance to the installation.

Your advantages:

- very good utilisation of available floor space and headroom
- ideal for stock items in huge quantities with a medium to high turnover
- no relocation of picking stock required
- safe working environment, as there are no persons in the aisles

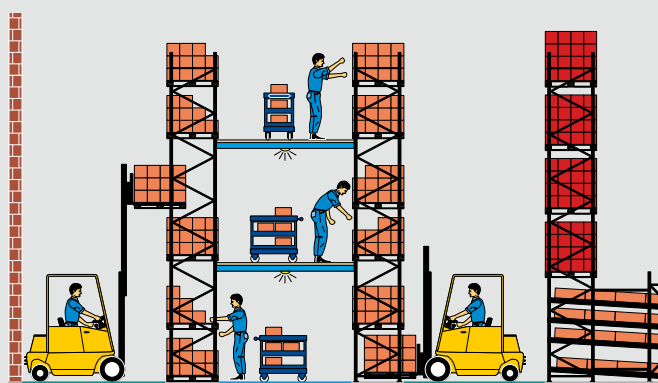


5 Multi-tier installation

In multi-tier installations, items can be picked simultaneously by several order pickers. This means that a higher number of orders can be picked. The BITO pallet racking system can **ideally be combined with other shelving and racking systems**, such as live storage, to the benefit of warehouse workflow.

Your advantages:

- fast order processing due to simultaneous order picking
- good utilisation of available headroom
- random storage ensures that all storage locations are addressed as often as possible
- immediate replenishment from the buffer on top
- suited for pallet long and short side handling

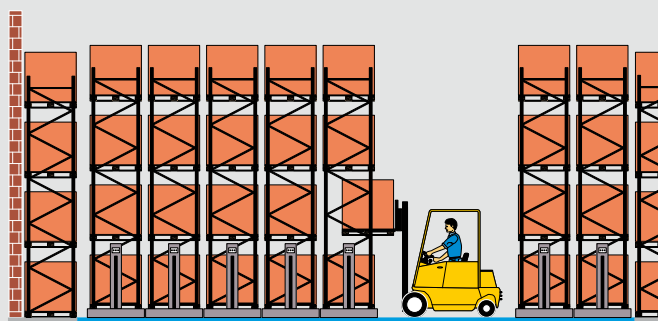


6 Mobile pallet racking

The elimination of several aisles leads to an optimum utilisation of floor surface. The gain in space is substantial and can amount to 100 %. As aisles can be opened where required, all pallets can always be directly accessed.

Your advantages:

- optimum utilisation of storage volume results in a very high storage density
- instead of one broad aisle wide enough for truck circulation, it is also possible to open several smaller aisles

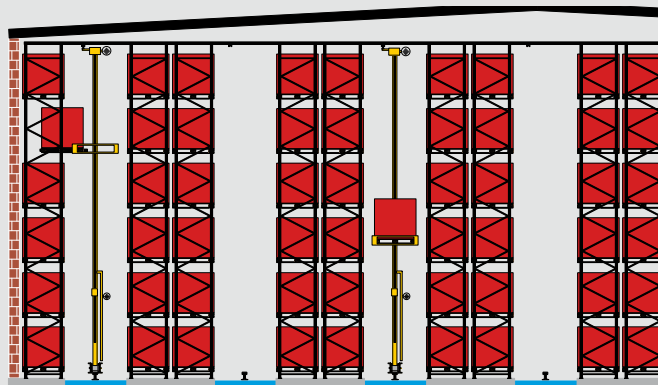


7 Automated installation

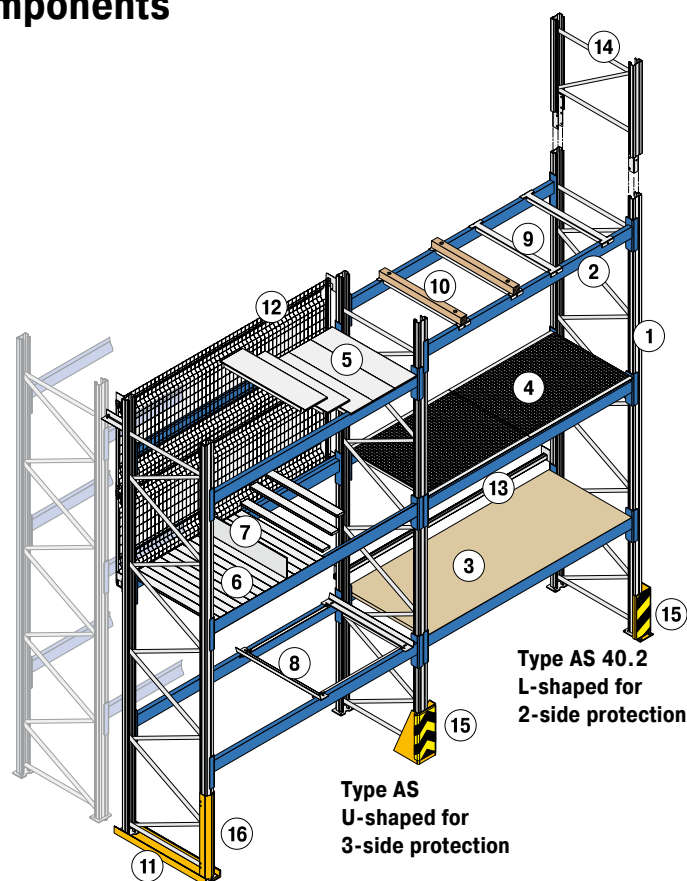
Although "classic" pallet handling with lift trucks is widely spread, automated installations are on the rise. Higher investment costs are quickly overcompensated by shorter order picking times which in turn reduces lead times.

Your advantages:

- closed system provides safe working environment
- optimised travel routes improve efficiency
- short order throughput and delivery times
- very good availability of goods
- computer-controlled warehouse administration
- continuous work flow

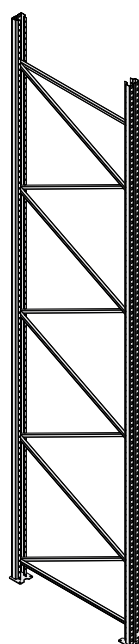


Components



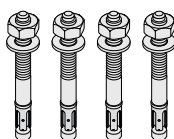
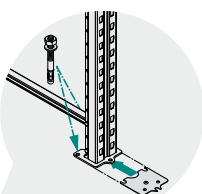
- 1 Frame
- 2 Beam
- 3 Chipboard shelf decking
- 4 Wire-mesh shelf decking
- 5 Drop-on steel panels for box-type beams
- 6 Drop-in steel panels for stepped beams
- 7 Dividers for steel panel levels
- 8 Support tray
- 9 Pallet support bar
- 10 Pallet support bar with squared timber block
- 11 Load spreader
- 12 Wire-mesh back cladding
- 13 Back stop
- 14 Frame extension
prevents goods from falling sideways, can be retro-fitted
- 15 Column guard
- 16 Upright protector

Frames

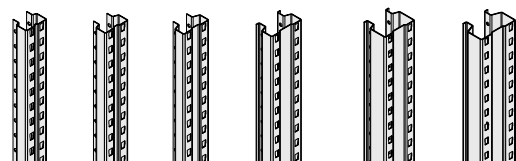


Frames are delivered unassembled. All parts are galvanised to prevent corrosion. Sturdy bolt anchors provide excellent stability. The bolt-together construction allows to easily exchange damaged components.

High-quality bolt anchors provide excellent stability.



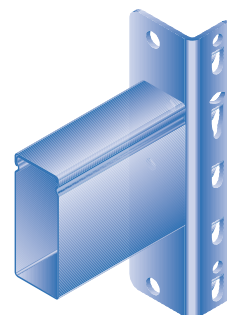
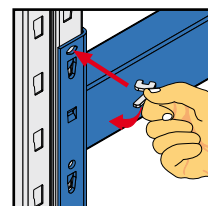
Profiles are available in various width, depth and material thickness options.



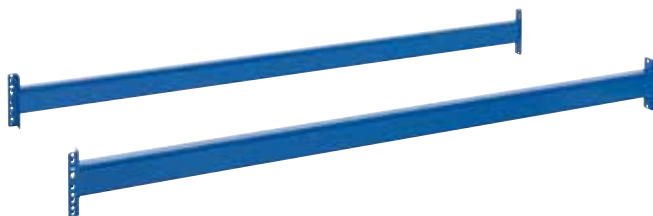
Beams

The easy-to-handle boltless system allows **fast and cost-effective assembly**. **Solid safety hooks** which are secured against loss by a 90° turn prevent accidental lifting of the beams to avoid work accidents.

- high load capacity
- excellent lengthwise rigidity of the racking construction



Profiles are available in various height and material thickness options.



Components - Safety equipment

Column guard

Available in two types for 2-side or for 3-side protection of uprights in corner areas and passageways. This particularly robust component is floor-anchored directly in front of an upright. Height 400 mm (100 mm more than stipulated by most safety regulations).

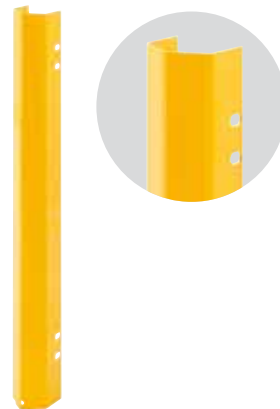
Type AS 40.2
L-shaped for
2-side protection



Type AS, U-shaped
for 3-side protection

Upright protector

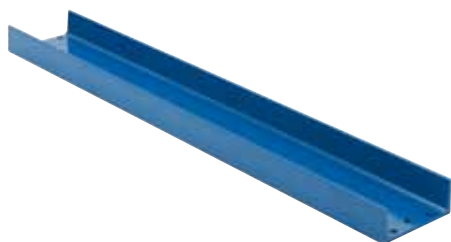
Protects uprights over a length of 700 mm. It is bolted to the upright and can be mounted at any racking level.



Load spreader

Distributes loads from the uprights on a larger surface of low quality flooring.

Hot-rolled U-shaped profile.



Fencing

Provides short side protection for racking rows. A steel sheet plank is bolted to robust corner protection elements which are floor-anchored in front of the short side of a racking row.

A second steel sheet plank can be added to fill the room between floor and upper plank.



Wire-mesh back cladding

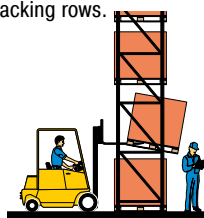
Protection of trafficways and work areas located behind single sided racking installations. A robust frame with a wire-mesh infill of 50 x 100 mm and additional stiffening corrugation prevents goods from falling.



Back stop

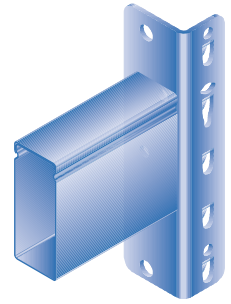
Prevents that pallets are pushed too far back or that palletised storage units fall onto passageways and work areas which are located behind single sided racking rows.

It can be equally used to maintain the required safety distance between pallets stored in double sided racking rows.



Components - Drop-on level decking

- drop-on fitting on beam type PT
- easy retro-fitting of an open-type level into a decked level
- later-on adjustment possible at any time



Chipboard decking fitted on support bars

Drop-over support bars increase the load capacity of chipboard shelves. The support bar dimensions have been adapted to the panel height in order to ensure that the shelves sit flush with the upper edge of the box-type beams.

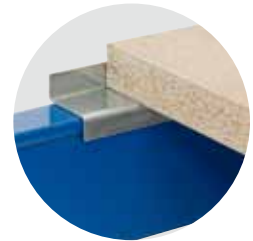


- chipboard panel quality V20 E1
- easy retro-fitting of an open-type level into a decked level



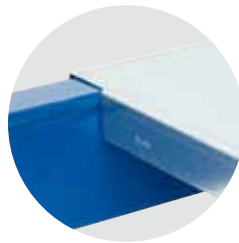
Chipboard decking fitted with 4 positioning angles

On box-type beams, level decking is held by 4 Z-shaped drop-on positioning angles which keep the decking segments in place.

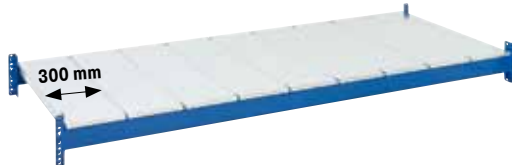


Steel panel decking

The 300 mm wide, galvanised drop-on steel panels are simply placed next to each other onto the beams. This makes a flat surface which does not add to the beam height.

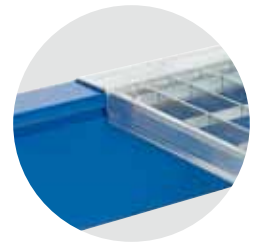


- very robust panels
- high load capacity



Wire-mesh segments

With their angled sides, the wire-mesh segments sit safely on the box-type beams. Suited for high load capacities – surface loads as well as point loads. Water permeability makes the segments ideal for warehouses with a sprinkler system. Moreover, it is easy to view from beneath whether a storage location is occupied or not.

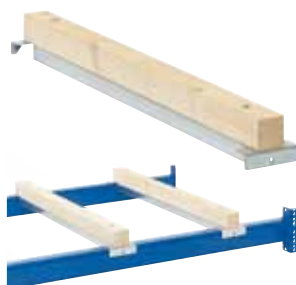


Loads stored on pallet support bars

Pallet support bars provide additional front-to-back support to any load carrier, in particular to storage units handled long side facing.



Pallet support bars

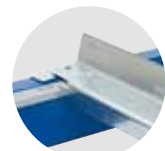


Pallet support bar w/ squared timber

Loads stored on support trays

Bolted construction, optionally with back stop. The angular sides allow safe in-feeding and out-feeding of wire-mesh box pallets and flat pallets.

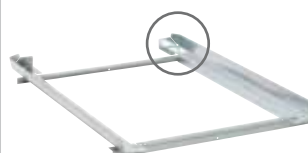
Options:



without back stop

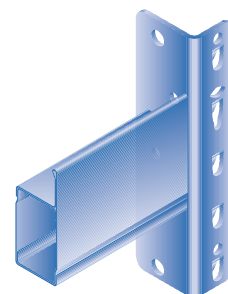


with back stop



Components - Drop-in level decking

- drop-in fitting on beam type PS
- easy retro-fitting of an open-type level into a decked level
- 2 step heights: 23 mm and 38 mm



Chipboard decking fitted into stepped beams

The robust upstand of the stepped beams protect the cut edges of the **chipboard panels** from potential damage during loading and retrieval. Chipboard panel quality **V20 E1**.

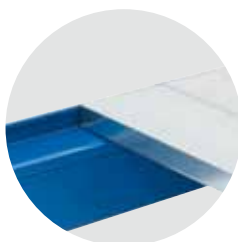
- **continuous, flat storage surface**
- **high-quality chipboard shelf**



Drop-in steel panel decking

The low-weight steel panels are simply placed next to each other and form a flat and smooth storage surface which is easy to clean.

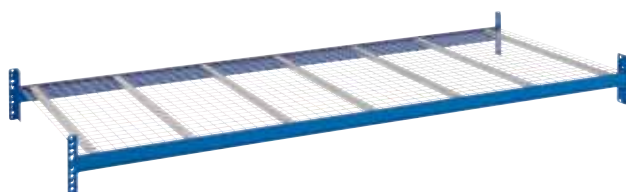
The panels sit flush with the upper edge of the beam step so that optimum protection from damage is ensured during loading and retrieval.



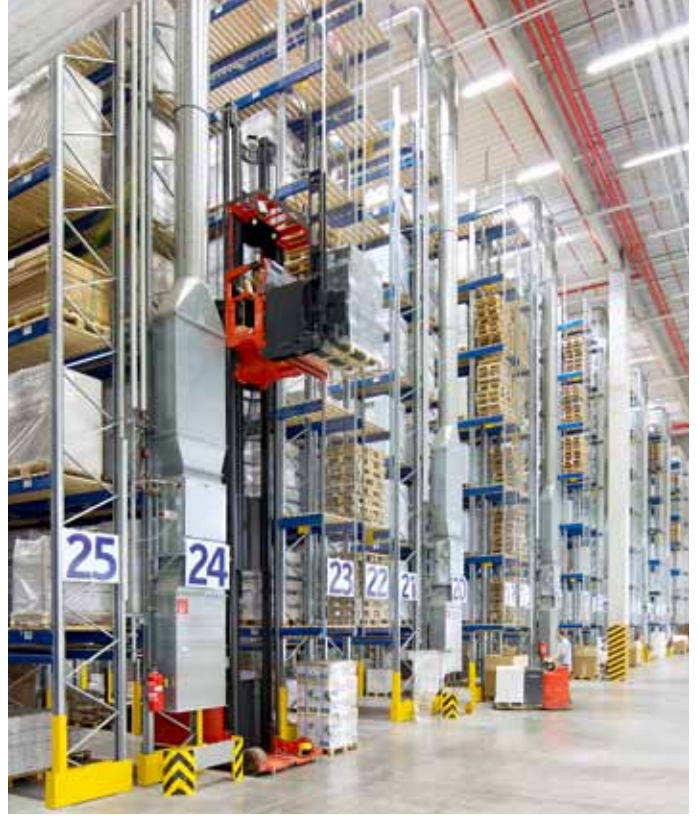
Wire-mesh decking

The wire-mesh infill has two benefits: it is easy to see from beneath whether a storage position is occupied or not. Water permeability helps you meet fire protection requirements, i.e. wire-mesh segments are ideal for warehouses with a sprinkler system.

- **light-transmissive**
- **water permeable for fire protection**



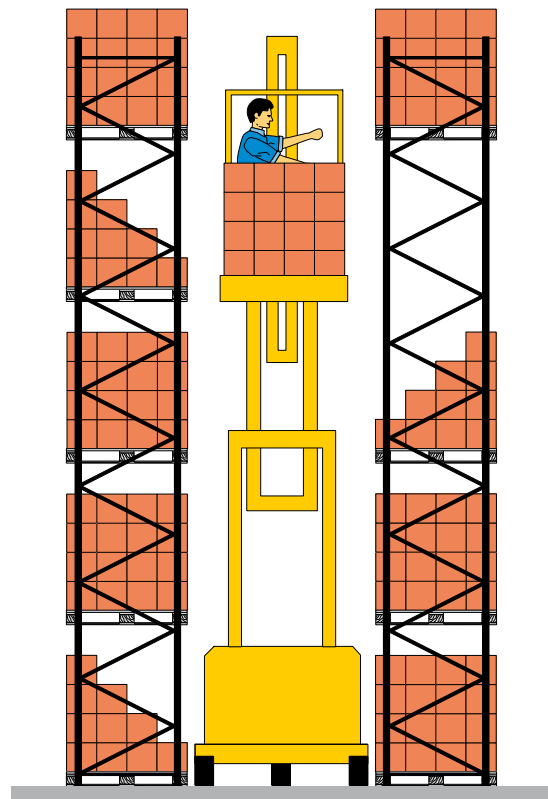
Narrow aisle racking



Storage in narrow aisle installations

Narrow aisle highbay storage allows a very good surface utilisation. As a rule, these facilities are serviced with man-operated stacker cranes or order picking trucks. This allows picking of smaller unit loads from all racking levels. Guide rails and inductive steering ensure that service vehicles always keep the ideal distance to the installation.

Narrow aisle facilities also allow to make optimum use of the available headroom, even if a broad product range with a medium to high picking frequency has to be stocked. With stacker crane servicing, there is no need to relocate fast movers to lower levels. On top of this, the warehouse operator benefits from a safe working environment, as there are no persons in the aisles.





 **IGEPA**group

IGEPA
Paper wholesaler



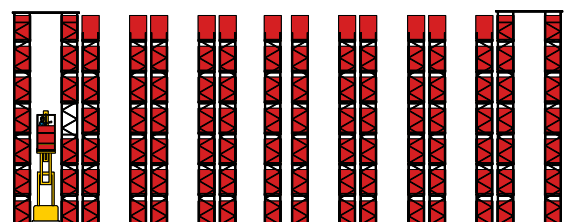
Features

- pallet store with man-up narrow aisle trucks
- floor level order picking with buffer stock on top
- special pallets for cut paper
- fitted with special-size, drop-on wooden grating conforming to the latest fire prevention regulations

Function

The Igepa Group is one of the leading paper wholesalers in Europe with more than 40000 customers. Their distribution warehouse in Hemmingen accommodates pallet storage facilities serviced by man-up narrow aisle trucks with inductive steering. All pallets are fed in as fully loaded pallets. For major orders, full pallet loads are retrieved and dispatched from all levels. In most cases, however, order picking vehicles take out goods from the floor level or the first beam level.

With guard railing at the short sides, floor-anchored U-shaped column guards posted in front of every upright and walk-through barriers within back-to-back installations, the Igepa facilities comply with the strictest safety standards.



Benefits

- many pallet positions in a limited warehouse space
- safe working environment despite free range narrow aisle trucks
- levels decked with high-load capacity wooden grating allow to feed in different size pallets

Order picking from the floor level

Pallet extraction units

Pallet extraction units allow to pull out individual pallets from a static pallet racking installation into the aisle. Goods can then be picked conveniently and without straining the back from three sides. This special equipment item is particularly useful when relatively heavy or bulky goods are to be picked.

Another advantage of pallet extraction units is that pallets can always be stored short side facing due to the improved access provided by the system. This also has a positive effect on the required length of picking aisles.

For system-related reasons, only some of the storage positions on each level can be equipped with an extraction unit.

Depending on the pallet height or the optimum picking height, floor level and first level picking positions can be realised as extractable unit.



Pallet extraction unit on the floor level



Floor mounted and beam mounted extraction units





Retro-fitting static racking into live storage racking / Floor level order picking aided by various solutions

Order collation of palletised goods is often done on the floor level, i.e. underneath the first beam level of a pallet racking. This is particularly common in warehouses which stock a small range of reference lines in huge quantities with a medium picking frequency. As a rule, the picking pallet is placed on the floor level for easy access by the picking staff.

Depending on the type of goods to be picked, a pallet racking facility can be combined with push-back or flow shelves for bins or cartons on the floor level – with the pallet buffer levels on top. With the help of upright adapters, the floor level of pallet racking can be equipped at low cost with flow shelves or with BITO Adapta-Flow modules, thus transforming a static racking level into a highly flexible live storage level.

If goods with difficult travel characteristics are to be stored, roller tracks are the ideal solution. In the case of short access routes and for compact storage, classic shelving is appropriate. The levels on top are suited as supply buffer for the stock items below. As the buffer stock is kept close to the picking places, relocation of stock to the floor level is fast and easy.

RIEGER

Willkommen daheim.

Möbel Rieger
Furniture retailer



Features

- narrow aisle storage facility serviced by stacker cranes with inductive steering for roll pallets and containers of various sizes
- high-rise construction
- frames are in part supplied with X-strutting
- furniture depots with dispatch terminal
- tunneled stacker crane transfer aisles

Function

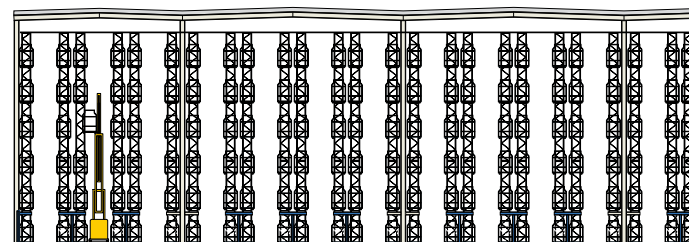
The third generation, family owned furniture retailer Möbel Rieger GmbH & Co. KG is headquartered in Göppingen and has several branch stores in Germany.

The newly constructed distribution warehouse accommodates roll pallets and containers of different dimensions. The goods-out department collates 70% of their merchandise into ready-to-dispatch orders on roll pallets which can be pushed conveniently and safely into freight vehicles. This makes loading particularly efficient.



Benefits

- safe transport of goods
- fast lorry loading
- space-saving storage





Soennecken
Office supplies, stationery



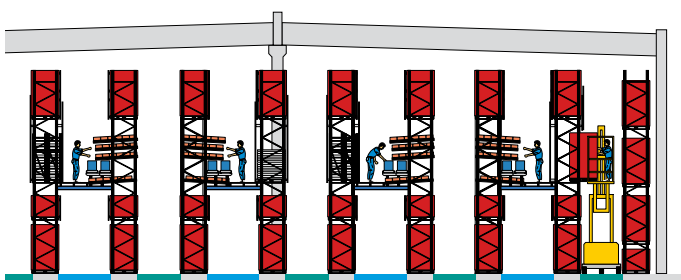
Features

- highbay store
- 6000 pallet positions on levels with three different beam spacing options
- 3 fully automated aisles
- order picking from 24000 storage positions in total: on pallets, in live storage lanes and in shelving installations

Function

Soennecken eG is the leading cooperation for medium-sized office supply traders and related industries. In their central depot in Overath, narrow aisle service trucks transport office supplies from the highbay store to the order picking area where the goods are stocked in static shelving, on flow shelves or as complete pallet loads.

In order to save time, smaller unit loads are fed out onto pallet sized trays which allows to transport several reference lines at the same time. Mesh-clad hatches between the narrow aisle and the order picking areas ensure operator safety. Products are classified into A-, B-, C- and D-items.



Benefits

- no accumulation of dirt between narrow aisle and order picking area
- time efficient relocation of smaller sized units onto modular pallets
- pick-by-voice: hands free, improved concentration, low error rate

Broad aisle racking

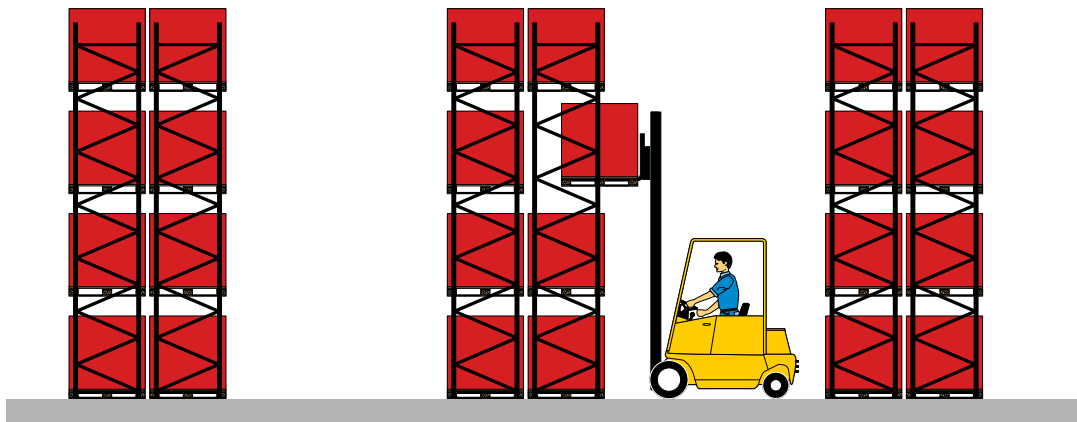


Broad aisle racking

Broad aisle racking is a standard solution for pallet racking facilities. Servicing is effected by front stackers, reach trucks and order picking trucks.

Aisle width depends on the dimensions of the service vehicle. The advantages of this solution are bottom-of-the-line technology and cost-efficient storage. The service vehicles can be used for replenishment as well as for order picking.

The floor level and the first level can be conveniently serviced with hand pallet trucks or electric stackers. Compared to narrow aisle stores, the disadvantage of this solution is that it occupies more floor space.





VAN EUPEN
IHR LOGISTIK-DIENSTLEISTER

Van Eupen
Full service logistics provider



Features

- pallet racking facility as supply and buffer stock
- three-tier shelving installation to supply small parts
- manual order picking

Function

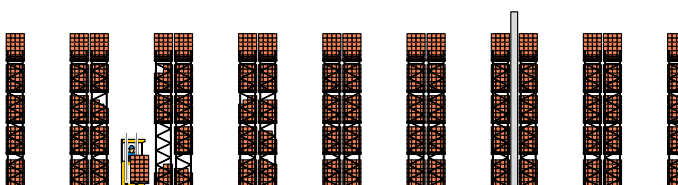
At 17 sites in Germany, Van Eupen provides 100000 m² of storage surface in total, offering state-of-the-art equipment for the full array of logistics services.

In their hub in Unna, reach trucks stock complete pallet loads into pallet racking and relocate pallets into the order picking area as required. In this area, unit loads are picked manually from pallets stocked on the floor level whereas loads from pallets stocked on higher levels are retrieved with mid-level order pickers.

Small parts are stocked in a three-tier shelving installation and picked manually.

Benefits

- all reference lines are directly accessible
- high flexibility in case of product range modifications
- fast order processing as staff levels can be adapted to actual needs
- many storage positions on a small surface
- optimum utilisation of headroom



Single position storage



i

Single position storage systems

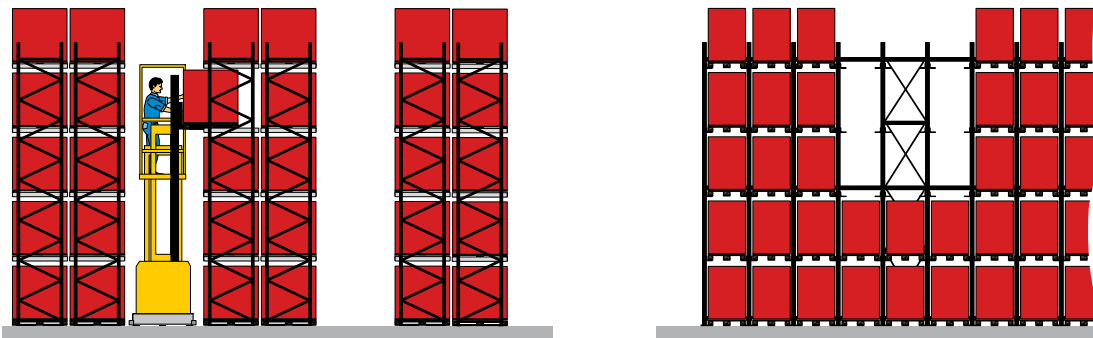
Single position storage systems combine features of pallet racking and of automated bin or tray storage (BITO-type AKL). Their configuration is similar to automated bin or tray storage systems.

The installations accommodate f. ex. compact wire-mesh pallet boxes with Euro-norm deck dimensions, however not on beams, but on angled profiles such as used in automated bin storage.

As a rule, single storage position systems consist of a racking facility with one or several

aisles, one rail-guided service vehicle per aisle, order picking stations, conveyors, a goods-in area and a bus system connected to the warehouse management system.

Single position storage systems can also be serviced manually with reach trucks. Operators receive all necessary information by radio data transmission or from order picking lists.





AMAZONEN WERKE
Manufacturer of
agricultural machinery



Features

- pallet racking facility used for order picking
- servicing with rail-guided narrow aisle trucks
- single position storage

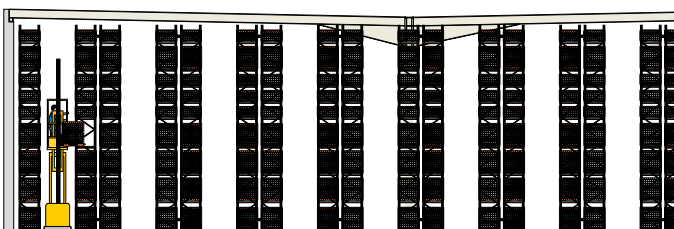
Function

The Amazonen-Werke in Hasbergen supply equipment and machinery for use in agriculture, landscaping as well as snow clearing and gritting. In order to ensure fast delivery of all products, all local depots have been merged into one central depot.

This central depot provides the supplies for the production plant and speeds up order picking to allow faster customer supply. 90% of the supplies are stocked in wire-mesh box pallets and 10% on standard size Euro-pallets.

Benefits

- shorter response times to customer orders (a must in this industry)
- shorter in-house travel routes and order throughput times
- the use of angled profiles in single position storage leaves more space in height between the box pallet levels, thus facilitating product access
- narrow aisle construction allows to accommodate a higher number of storage positions on the same surface





Drive-in racking

Drive-in racking allows to store several pallets in depth. Similar to block storage, this possibility provides an optimum utilisation of floor space and storage volume. However, loading and retrieval should be subject to a certain storage cycle.

This type of storage is chosen for pressure sensitive goods or unstable storage units which are stored in big quantities. The range of items stored in drive-in racking is small to medium-sized and has a low picking frequency. This storage solution is ideal for a small pallet turnover and favours an employment as seasonal store.

BITO

www.bito.com



Product information

Frequent application

- buffer store, seasonal store

Service options

- front stacker with a mast width of 950 mm maximum

Storage options

- pallets handled long side facing
- several pallets in depth

Surface/volume utilisation

- high volume utilisation
- medium gain in floor space



Storage units

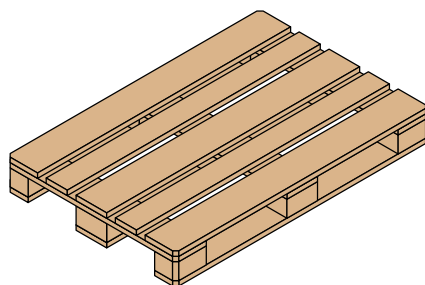
Palletised goods

Stock rotation frequency

- huge storage quantities per reference line
- small to medium sized range of products
- low turnover frequency

Stock characteristics

- sensitive goods
- unstable storage units



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"

Our **PRODUCT CATALOGUE**
provides detailed information on
our entire delivery programme.

Ask for your free copy!



Economic evaluation

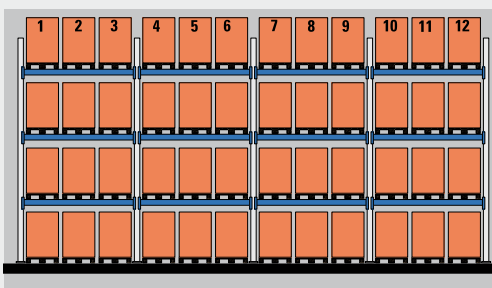
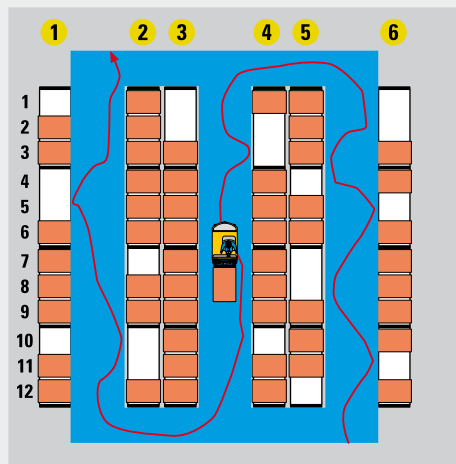
In comparison to conventional pallet racking, drive-in pallet racking allows very cost-efficient and compact storage. The floor space gained can be used for increasing storage capacity or for a different purpose.

It is recommended to dedicate a racking level to a specific reference line, as there is no permanent access to all pallets in store.

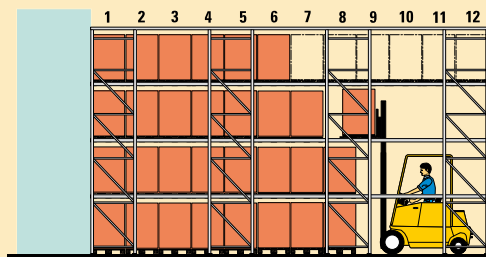
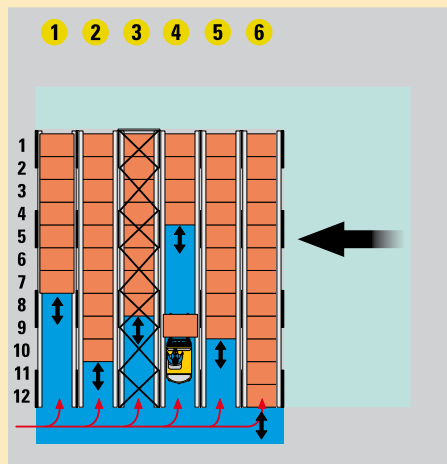
- very economic pallet storage
- savings on expensive storage surface



Conventional pallet racking



Drive-in pallet racking



Comparison

Our example is based on a pallet racking installation with 6 racking runs, each providing 12 pallet positions per storage level. There are 4 storage levels in total, including the floor level.

The layout plan alone already shows that the gain in storage surface is considerable.

Apart from the fact that drive-in pallet storage requires less storage surface, the upright projection demonstrates a further gain in storage volume.

Advantages of the system

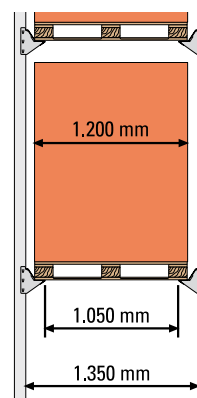
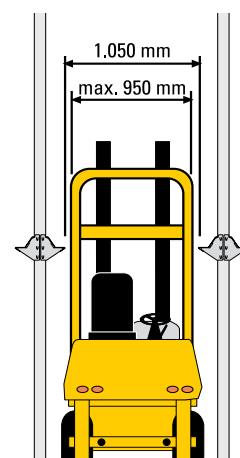
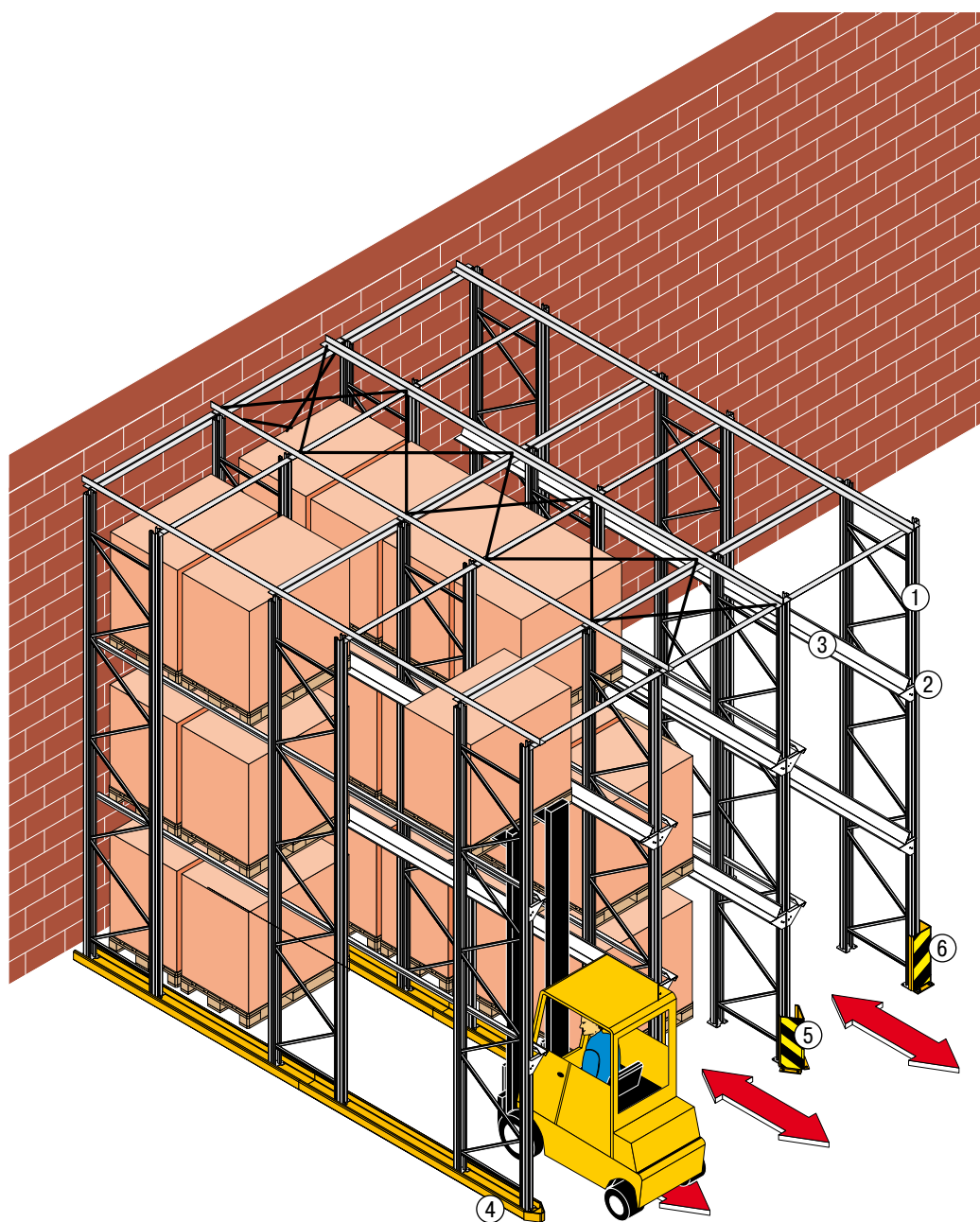
General advantages of drive-in racking

- compact storage
- no pressure damage
- safe storage of pallets with unstable loads
- high volume utilisation due to compact storage

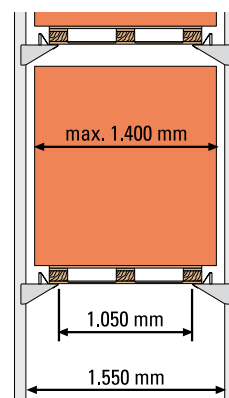
Specific advantages of BITO drive-in racking

- frames are the same as those used for the well established BITO pallet racking system
- brackets for the robust angled pallet seats can be adjusted in 75 mm increments
- hook-in mounting of brackets allows fast and easy assembly without bolts (suited for pallets without overhanging loads)
- pallets are safely guided by the sloping sides of the angled seats
- diagonal bracing provides for high racking rigidity
- all parts have a high quality galvanised surface





Pallet without overhanging loads
– hook-in bracket



Pallet with overhanging loads
– hook-in bracket

- 1 Frame
- 2 Bracket
- 3 Angled pallet seat
- 4 Vehicle guide rail / load spreader with entry guide
- 5 Column guard type EF
- 6 Corner column guard type AS 40.2

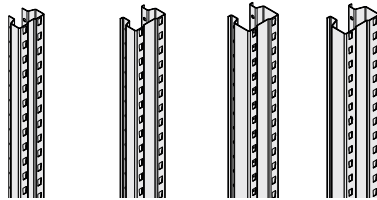
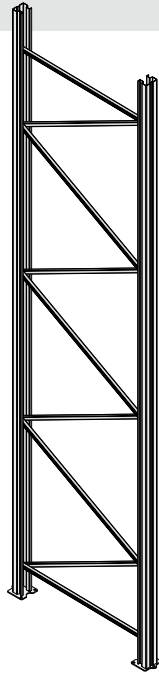


Loading and retrieval of drive-in racking is done with a front stacker with a maximum mast width of 950 mm to allow entrance of the service vehicle into the lanes.

1 Frame

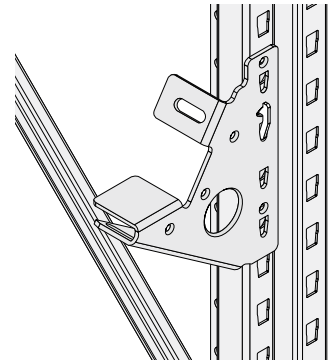
The frame is an all-bolted component of our well established pallet racking system and is particularly suited for high load capacities. At their top, the frames are connected to each other with struts – in lengthwise direction as well as front to back. Additionally, the uprights of a frame are linked to each other by horizontal and diagonal struts to ensure that all parts of the frame are solidly connected and that the installation benefits from a high rigidity.

- **robust component**
- **high load capacity**

**2 Hook-in bracket**

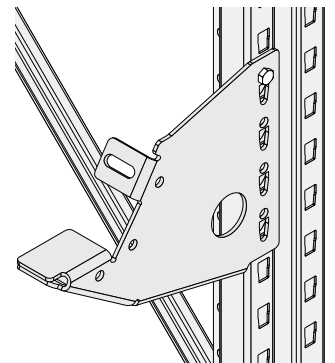
The 4 hooks of the bracket perfectly slot into the upright perforations. Unintentional lifting is prevented by a safety pin which is secured against dropping out by a 90° turn.

- **fast adjustment without bolts**
- **height adjustable on a 75 mm pitch**
- **high load capacity**



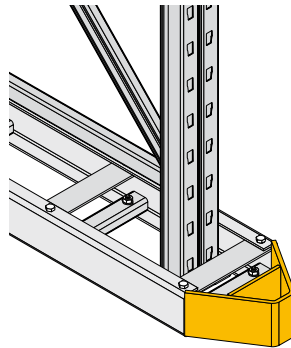
For pallets with overhanging loads, a larger hook-in bracket is used which is additionally secured by a bolt in the uppermost slot.

- **for pallets with overhanging loads**

**4 Load spreader with fork entry guide**

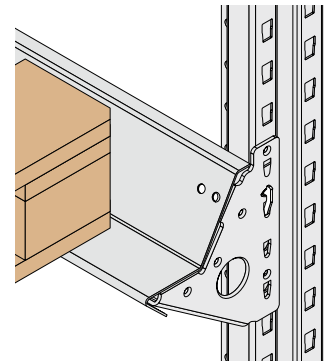
Optionally, the drive-in lanes can be equipped with vehicle guide rails to keep service vehicles in track. In the case of poor flooring quality, this component spreads load pressure over a wider area.

- **load spreader**
- **rail-guidance for vehicles**
- **entry guide**

**3 Angled pallet seat**

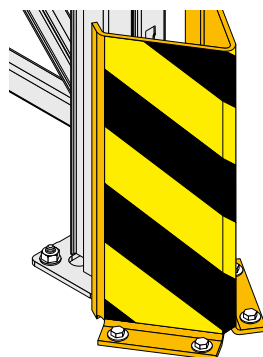
Bolted to the bracket. The broad seat surface and the sloping sides ensure safe pallet positioning.

- **safe pallet positioning**
- **strong component**

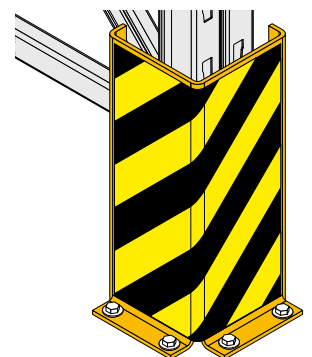
**5 Column guard type EF**

Protects uprights located between the outer frames at the right/left hand corner against collision damage from service vehicles. This 400 mm high, robust component is epoxy-coated in RAL 1003 and has additional yellow/black signal striping.

- **protection of uprights**
- **height 400 mm**
- **yellow/black signal striping shows need for increased attention**

**6 Column guard type AS 40.2**

Safety regulations stipulate that frame uprights in corner areas must be protected against collision damage. The column guard AS 40.2 is 400 mm high – thus exceeding the required minimum height by 100 mm.



Service provider / Forwarder



Features

- drive-in racking as supply and buffer store for big bags on Euro pallets
- pallet heights between 1.250 and 1.650 mm
- maximum pallet weight 750 kg
- 12 pallet positions per level, 11 pallet positions per lane
- 396 pallet positions per block

Function

The forwarder uses this drive-in pallet racking facility as a supply and buffer store for bagged products such as artificial sweetener. Before, the bags had been stored on the warehouse floor. As the service provider ran out of floor space and as the construction of a new hall was no option, a drive-in racking was identified as the ideal solution to make better use of the available floor space.

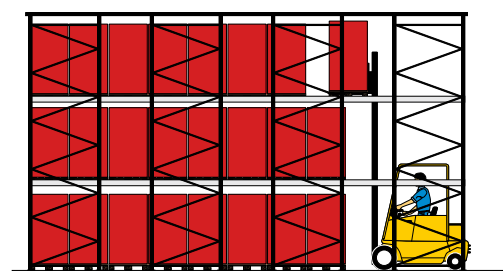
The new facility accommodates a limited range of products supplied in easily deformable, unstable units for intermediate storage. Before delivery to the customer, large batches of palletised products are grouped together according to their despatch route.

In-feeding and out-feeding are very convenient: it is just as easy to load the big bags from a freight vehicle into the lanes as to feed the bags back into a freight vehicle. The facility is serviced with front stackers.



Benefits

- good utilisation of warehouse space
- hall is now subdivided into clearly structured storage areas
- lanes can be dedicated to a specific stock line
- risk of product damage is much lower than with floor level block storage





KRAGE & GERLOFF
Logistik GmbH
Freight forwarder

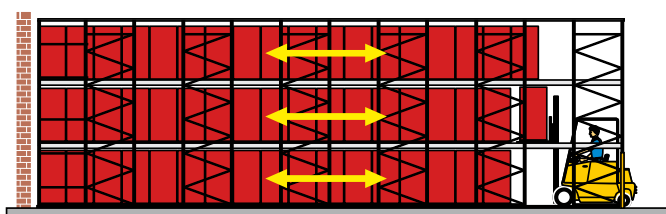


Features

- drive-in racking used as supply and buffer store
- three storage levels
- no aisles required between lanes
- computer-assisted goods-in and goods-out monitoring
- no pressure damage
- maximum storage capacity in a very limited space
- reduced floor space occupation

Function

The owner-managed service provider Krage & Gerloff Logistik GmbH has specialised in storage and transport logistics. At their location in Schwanenbeck, all kinds of manufactured products are stocked in drive-in pallet racking. In comparison to classic pallet storage, a drive-in racking facility provides an even increased storage capacity at a very attractive price. In addition to this, reduced floor space occupation cuts down on operational costs. Apart from the fact that this solution allows maximum utilisation of the warehouse volume, it also allows safe storage of pressure sensitive goods. All goods are loaded and retrieved with front stackers.



Benefits

- maximum utilisation of headroom
- space utilisation is substantially improved
- clearly defined storage areas allow to immediately locate any stock line
- no damage to products
- very compact storage


BITO
www.bito.com

BITO PROMotion shuttle system

Providing a very high degree of storage density, the deep lane storage and retrieval system BITO PROMotion is an interesting alternative to drive-in, push-back and pallet live storage systems. The system is serviced by battery powered, remote-controlled shuttles to move pallets to the back and to the front of a lane. For this purpose, each lane is equipped with carrier rails on which the shuttles move at a speed of up to one metre per second. They can be placed into a lane and relocated into another lane with a standard fork lift truck which will also assume pallet infeeding and outfeeding.

The PROMotion shuttle system can work according to the FIFO principle (First In First Out) as well as the LIFO principle (Last In First Out).

To ensure that the PROMotion shuttle system meets highest safety standards, BITO closely cooperated with an expert committee for handling and storage issues (Fachausschuss Förder- und Lagertechnik) lead-managed by the BGHW Mannheim (Institute for statutory accident insurance and prevention in distributive trades). As a result, BITO is able to provide the PROMotion shuttle system with an unrivalled safety package.



Product information

Frequent application

- seasonal store
- buffer store
- order-based preparation of despatch routes
- deepfreeze and cold store environments

Service options

- fork lift truck
- driverless transport system (FTS)

Storage options

- pallets handled long side facing, several pallets in depth

Surface/volume utilisation

- very good use of available floor space
- high degree of volume utilisation

Stock rotation frequency

low to medium



Safety

All safety features of the BITO PROMotion shuttle system have been developed with the support and guidance of the expert committee for storage and handling issues of the BGWH Mannheim, the relevant institute for accident insurance and prevention in distributive trades. Basis of all considerations and a valuable source of information was the committee's publication „Kanalläger mit Satellitenfahrzeugen - Handlungshilfe zur Risiko- und Gefährdungsbeurteilung“ (Guidelines for risk and injury hazard assessment in lanes serviced by satellite vehicles), worked out in close cooperation with manufacturers, the occupational health and safety inspectorate as well as accident prevention and insurance associations.



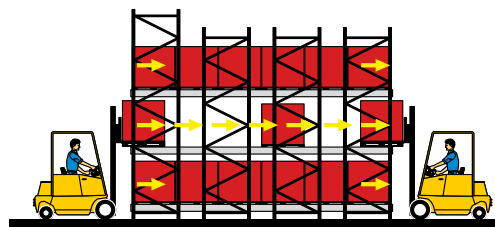
During the consultations, all safety relevant aspects were closely examined in order to establish solutions on how to prevent potentially hazardous situations. The BITO safety concept includes a comprehensive package of measures:

- laser scanners to detect persons and objects in the lane, either in front or behind the shuttle
- emergency button for immediate shuttle switch-off
- every shuttle start-up is announced with an acoustic signal
- an access & maintenance platform helps to eliminate the cause of disruptions or to remove the shuttle from the lane by safely transporting the operator to the point of trouble
- proper instruction at racking installations (warning, prohibition and requirement signs)
- protective cladding at the racking block sides along trafficways
- switch-key to use battery voltage for operational starts or after battery exchange
- mechanical end stops and sensor technology keep the shuttle in its lane

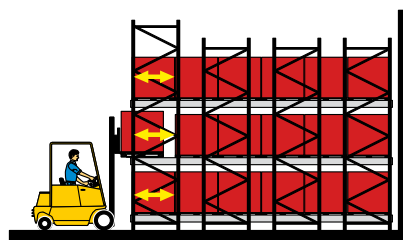
The BGWH expert committee on storage and handling issues concluded that the safety features of the BITO PROMotion shuttle system comply in every respect with the safety requirements listed in their above-mentioned safety publication.



Storage options



FIFO principle (First In First Out)



LIFO principle (Last In First Out)



Information material

For more information on this product, please contact us on

Tel.: 0 67 53 / 1 22-1 64

or refer to our brochure

"The intelligent storage assistant!"

Ask for your free copy!



Advantages of shuttle operated storage systems

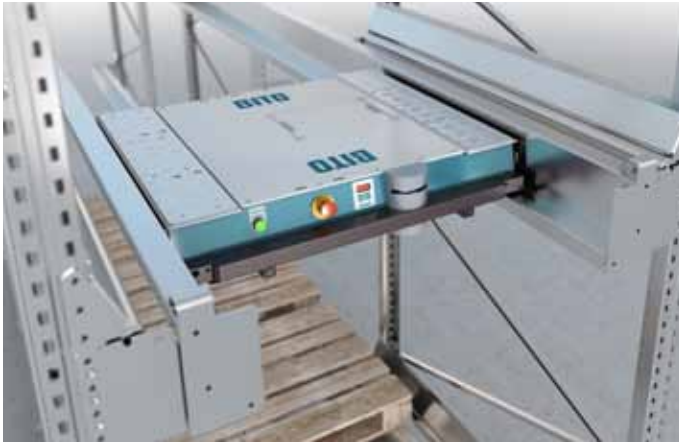
General advantages

- high storage density
- good use of warehouse volume, as the lanes do not need an incline
- high degree of floor space utilisation due to deep lanes
- FIFO and LIFO principle applicable
- damage-free storage of pressure-sensitive goods
- each lane can be individually accessed
- cost efficient storage of a limited number of bulk stored product lines

System specific advantages of the BITO PROmotion shuttle

- system also accommodates low-quality pallets
- frames come from our well-proven PRO pallet racking system
- pallets weighing up to 1.500 kg can be handled
- various carrier rail types can be selected according to pallet weight, ensuring optimum travel characteristics and safe storage
- low-weight lithium-ion battery with a long service life
- robust remote control monitors up to four shuttles
- technically mature and seamless safety concept developed in cooperation with BGHW Mannheim (Institute for statutory accident insurance and prevention in distributive trades)
- no wiring of the racking system necessary
- also ideally suited for deep-freeze environments

PROmotion - Racking components and features



Further information on frames, beams, column guards and upright protections on page 96-97.

Frames

- from the well established BITO PRO pallet racking system
- high-quality bolt anchors ensure excellent structural safety
- high load capacities
- lanes can be adjusted in height on a 50 mm pitch

Stiffening profiles

- double C-profiles increase construction rigidity without adding to height

Carrier rails

- developed to meet highest demands
- accommodate pallets weighing as much as 1.500 kg
- various profile thickness options ensure safe and economic storage
- long service life - designed for up to 50.000 shuttle rides

In-feed guide (optional)

- allows easy and convenient pallet in-feeding and centering

Column guard

- mandatory in the corner areas of a racking block to protect uprights from collision damage

Upright protection (optional)

- bolted directly to uprights
- heavy-duty make to protect against collision impact
- prevents damage to racking structure

Protective cladding

- fitted to the long side of a racking block to protect operators from moving shuttles
- integral feature of the BITO PROmotion safety concept
- prevents unauthorised access

Lane depth

- thorough structural calculations and an optimised component design allow lane depths of up to 80 metres

PROmotion - Functions

Standard functions

Pallet infeeding

In a first step, the shuttle is placed on the carrier rails with a front stacker. After this, the truck driver will deposit the pallet on the angled pallet seat profiles and activate the shuttle programme. The shuttle will then lift the pallet, transport it to the end of the lane, deposit the pallet on the carrier rails and return to its position at the front of the lane.

Pallet outfeeding

The truck driver will place the shuttle into the lane and press the outfeeder button on his remote control. The shuttle will move down the lane, underide the first pallet, lift it, transport it to the lane front and set the pallet down on the angled pallet seat profiles.

Continuous infeeding

The same steps are followed as for one-time infeeding, however the infeeder button only needs to be pressed once. Provided that pallets are continuously fed into the lane by the truck operator, the shuttle will keep on transporting pallet after pallet from the front to the rear of the lane.

Continuous outfeeding

The same steps are followed as for one-time outfeeding, however the outfeeder button only needs to be pressed once. Provided that pallets are continuously retrieved by the truck operator, the shuttle will keep on transporting pallet after pallet from the rear to the front of the lane.

Manual mode

For operation in manual mode, each action of the shuttle must be actuated individually by remote control, such as pallet lifting, moving the pallet to the front or the back of the lane, shuttle stopping and pallet depositing.

Diagnosis software

If an error occurs during infeeding or outfeeding, the type of error will be specified on the remote control display.

Additional functions

Continuous out-feeding PLUS

Speeds up outfeeding. Just as in the continuous outfeeding mode, the shuttle will transport a pallet to the front. However, instead of waiting under the pallet until it has been retrieved by the truck operator, the shuttle will move back immediately to the rear of the lane and take the next pallet to the front. Waiting under the second pallet until the first pallet at the picking face has been retrieved, the shuttle will then deposit the second pallet on the first pallet position and bring the next pallet from the rear of the lane. This means that there are always two pallets ready for outfeeding at the front of a lane.

Improving storage density

The system software ensures that the shuttle assumes lane organisation without operator intervention by automatically relocating pallets from front to rear and rear to front.

Stock control

While moving pallets up and down the lane, the sensors are counting the number of pallets stored in this lane and send this information to the remote control unit. This feature is particularly useful for installations with very deep lanes.

Programmable distance control between the pallets

The shuttle software allows to preset the clear distance between pallets. The system is set at 50 mm as standard, however pallets with overhanging loads can be positioned with a clear distance of up to 120 mm.

Anti-collision protection

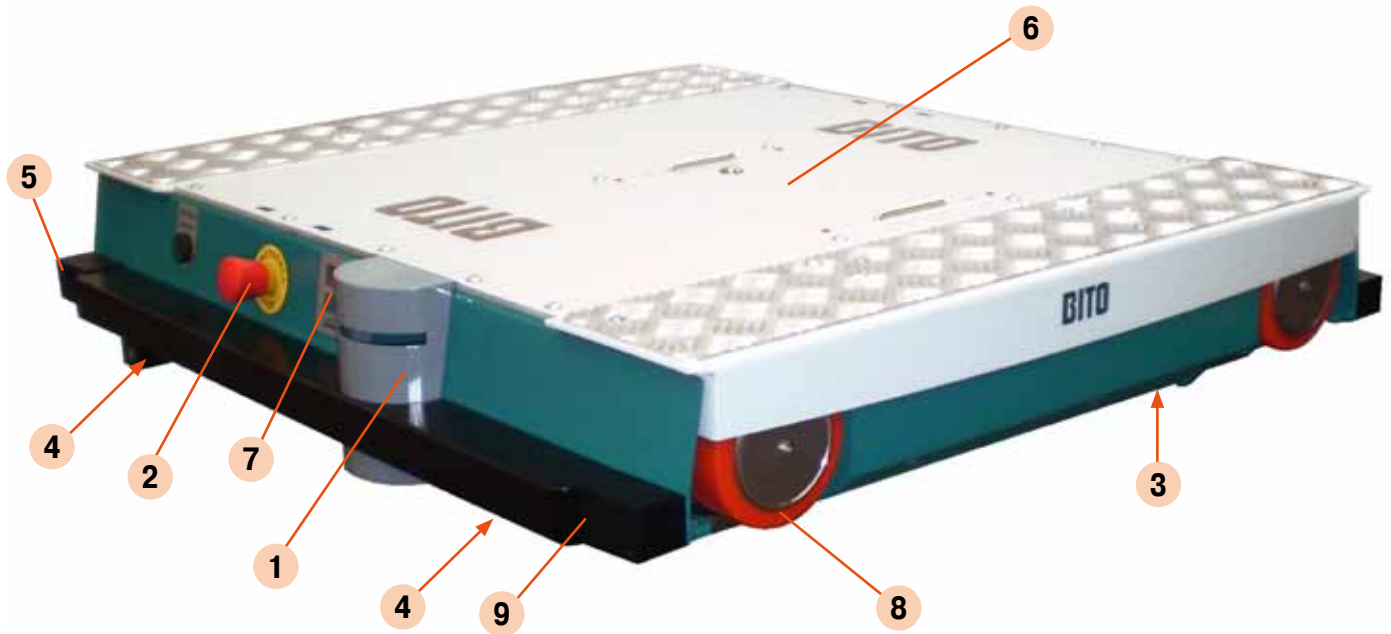
If several shuttles operate in the same lane, it is mandatory to control shuttle traffic. Shuttle-integrated sensors recognise each other and make sure that shuttles do not collide. This function is required for FIFO handling and for racking blocks serviced from both sides with a shuttle.

Handling of various pallet types

This option increases storage flexibility by allowing different size pallets in the same lane such as 1.200 and 800 mm deep pallets. For this application, a shuttle for 1.200 mm deep pallets is required. It picks up the 800 mm deep pallet and moves it a bit forward into the envisaged direction. The shuttle will then put the pallet back on the pallet seat profiles, readjust its position and pick up the pallet again to move it to the proper position at the beginning of the lane.

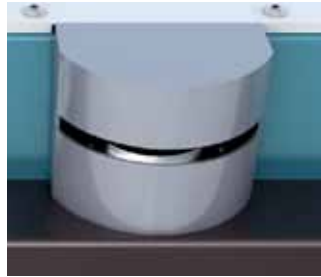


PROMotion - Safety features



1 Laser scanner to detect persons

- 2 scanners per shuttle
- detects objects and persons up to a distance of 2 metres from the shuttle
- braking command is released well in advance



Remote control

- easy handling
- tough design for everyday use
- manages up to 4 shuttles



2 Emergency stop button

- hazard prevention
- located at both end faces of the shuttle



3 Rail detection sensor

- prevents derailling



4 Guide rails with anti-slip covering

- ensures safe shuttle relocation by fork lift truck



5 Distance sensor

- 2 sensors per shuttle, located in corner areas
- identifies mechanical stop points in the lane and communicates with the laser scanners to determine the location of the shuttle in the lane



PROmotion - Safety features

Audible warning signal

- gives a sound at every shuttle start
- increases safety by giving advance warning
- a low battery status is announced by a special signal



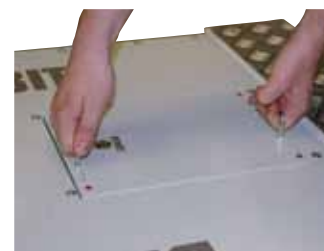
7 Pallet sensor

- one sensor each at the shuttle's front and rear face (pointing in in-feeding and out-feeding direction)
- detects other pallets in the lane
- measures distance to other pallets



6 Lithium-ion battery

- includes charger with overload protection
- weighs only 13 kg
- charging time approx. 3 hours
- up to 12 hours of battery operation
- can be recharged at least 900 times
- works in all temperature environments, also in deepfreeze stores
- stops automatically at start of lane when battery is empty
- battery is easy to remove and to recharge
- battery allows opportunity charging because there is no memory effect



Access and maintenance platform

- used to clear lanes from obstacles and to pull shuttles back to the lane front in case of disruptions
- integral part of the BITO safety concept
- ideal for racking safety inspections



8 Wheels

- durable wheels made of polyurethane for quiet operation and excellent traction (even at low temperatures)
- additional steel guide rollers to give straight, precise ride



9 Towing eyebolts

- safely connect the shuttle to the maintenance platform if the shuttle has to be moved out of the lane



Service

- shuttle maintenance
- racking inspection
- instruction and training
- retrofitting of accessories possible
- additional shuttle on request





Pallet live storage

Pallet live storage systems play an increasingly important role in warehousing and storage technology, as users recognise their potential for improving efficiency.

In the past, pallet live storage was mainly installed as a buffer store in the production area as well as in warehouses and dispatch areas. Today, there is a strong tendency towards using the pallet live storage system for order picking because the FIFO principle is strictly maintained. An equally interesting option is push-back pallet racking which allows compact storage according to the LIFO principle.

The system specific compact lane configuration in width as well as in height results in a high storage density and thus in an optimum utilisation of available warehouse volume.

With pallet live storage, floor space utilisation is 60% higher than with conventional racking. Moreover, constant availability of stock avoids idle times.

BITOwww.bito.com



Product information

Frequent application

- order picking, buffer stores, dispatch route related storage of picked goods, re-distribution centres

Service options

- manually with hand pallet trucks, electric lift trucks, forklift trucks, order picking trucks, stacker cranes; automated servicing possible

Storage options

- pallets handled short or long side facing

Surface/volume utilisation

- high degree of floor space and medium degree of volume utilisation

Stock rotation frequency

- suited for A and B-items = high to medium stock rotation frequency

System specific solutions



Retrieval by hand pallet truck

page 142



Extractable first pallet position, BITO-type »APP«

page 143



Tilttable roller conveyor

page 140, 143



Empty pallet return system, BITO-type »ASP«

page 145, 153

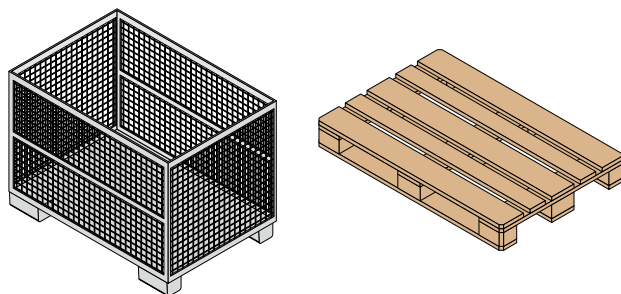


Storage units

Width x Length

Chep pallet	1000 x 1200 mm
Euro pallet	800 x 1200 mm
Industry pallet	1000 x 1200 mm
Bier pallet	1000 x 1200 mm
Brunnen pallet	1070 x 1100 mm
Four way pallet	1200 x 1200 mm
Düsseldorf pallet	800 x 600 mm
Hygiene plastic pallet	800 x 1200 mm
Hygiene plastic pallet	1000 x 1200 mm

Customer specific pallet



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“

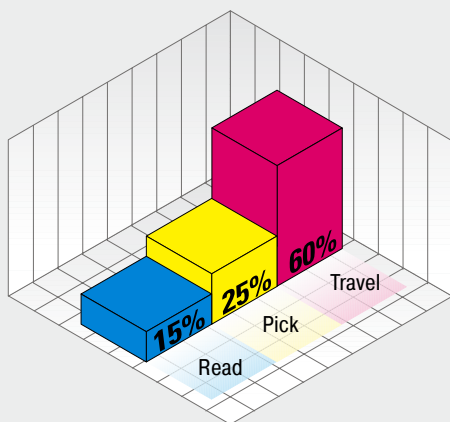
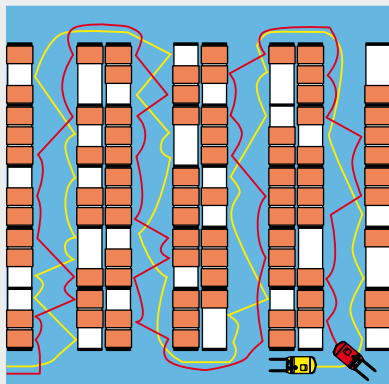
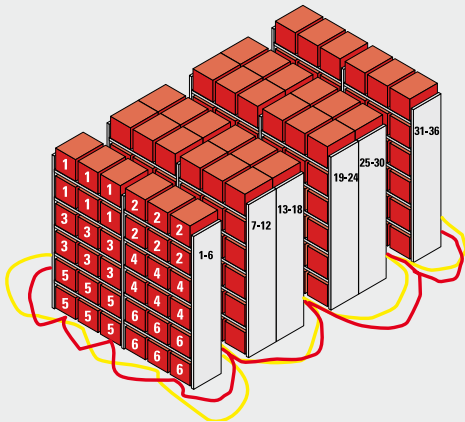
Our **PRODUCT CATALOGUE** provides detailed information on our entire delivery programme.

Ask for your free copy!

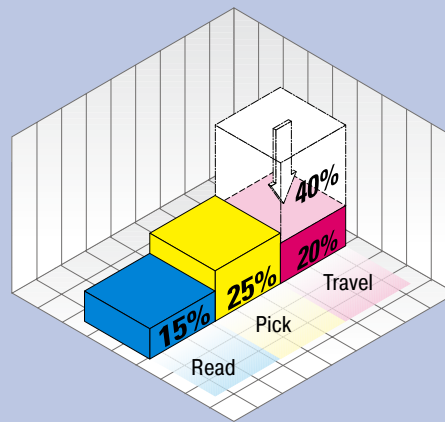
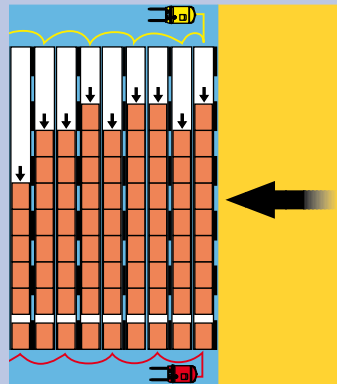
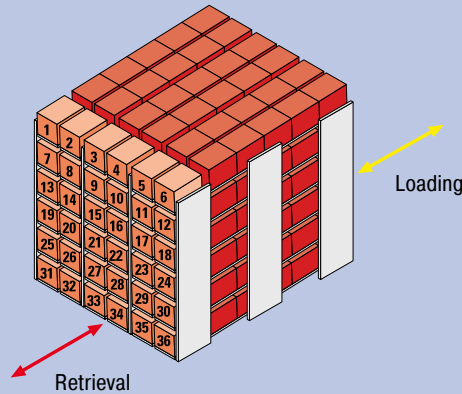


Economic evaluation

Static pallet racking



Pallet live storage



Comparison

Our example shows two storage solutions for the supply of 36 different reference lines.

Storage in the pallet live storage installation is definitely more compact and the different items are much easier to find.

All 36 reference lines are in direct access at the picking face. Upon retrieval of a storage unit, the next unit automatically moves into the picking position. Sufficient supply guarantees permanent availability of goods.

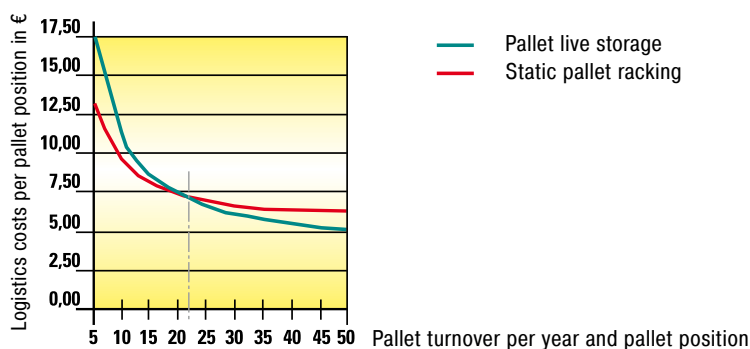
Compact storage and the elimination of unnecessary aisles results in a gain of floor space of up to 60%.

Strictly separated loading and picking aisles prevent that order pickers are disturbed by restocking which increases picking performance.

Short travel times improve productivity – in particular at loading docks where pallets are grouped together according to dispatch route.

Whereas information and picking times are almost the same in both solutions, there is a drastic reduction in travel times.

This saves working time and increases turnover frequency.



Save costs

Stock rotation frequency has a decisive influence on the overall costs per pallet position.

As of a turnover frequency of approximately 20 times a year, the costs per pallet position in a live storage installation are lower than in static pallet racking.

Advantages of the system

General advantages of pallet live storage

- compact storage maximises use of available warehouse space and reduces the number of aisles
- the increase in efficiency over conventional racking can be up to 60%
- in contrast to bulk storage live storage provides direct access to all items stored
- strict adherence to the FIFO principle eases control of sell-by dates, call-off quantities and production batches
- ideal system for fast movers, as there are always sufficient quantities of each item in reserve: no idle times
- increased staff efficiency, as loaders and order pickers do not disturb each other
- separate loading and picking aisles allow use of specific service vehicles
- shorter in-house travel routes, as the goods move automatically to the order picking side

Specific advantages of BITO pallet live storage

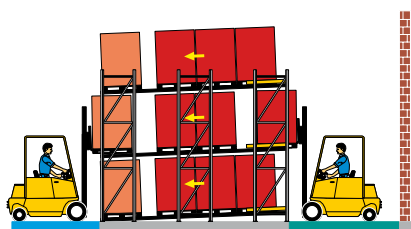
- the load carrying structure is based on the well established BITO pallet racking system
- bolted beam connectors allow to adjust flow levels at any required height and incline
- specifically designed and effective safety accessories and special components
- in accordance with customer needs, lanes can be equipped with roller tracks or roller conveyors

BITO Pallet live storage



This system operates according to the **FIFO principle** (first in - first out). In the loading aisle, the pallets are fed into the lanes of each racking block, travel gravity-driven to the opposite side and are retrieved in the picking aisle.

- Benefits:
- ideal for partially or fully automated warehouses
 - high degree of volume utilisation
 - separate aisles for loading and order picking
 - compatible with computer-controlled paperless order picking systems
 - order-based preparation of dispatch routes



BITO Push-back pallet racking

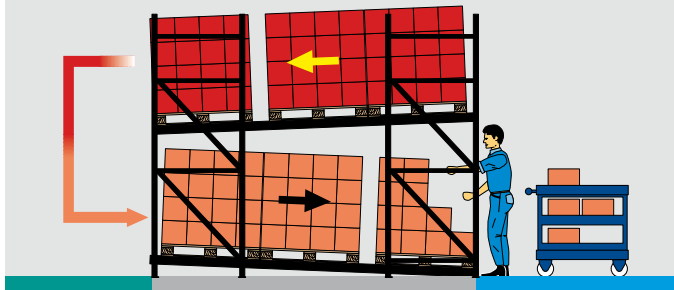


In this system, the forklift truck pushes the pallets into the lane against the incline. Retrieval is based on the **LIFO principle** (last in - first out). While taking out the first pallet in the picking aisle, the subsequent pallets in the lane travel smoothly to the front at the same speed the first pallet is taken out. As this system operates without braking devices and load separators, goods can be stored at low cost.

- Benefits:
- space-saving storage, as only one aisle is required
 - very good utilisation of the available warehouse volume
 - in contrast to drive-in racking, all reference lines are always accessible at the picking face
 - particularly appropriate for a broad range of products



1 Contraflow lane configuration



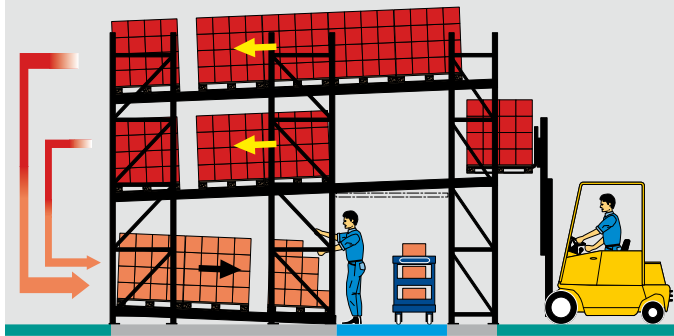
The upper level is used as a product buffer and provides supply for the floor level. Manual order picking and loading are done from the same racking side.

The opposite racking side is reserved for product relocation.

Your advantages:

- FIFO principle (first in - first out) is maintained

2 Single-sided picking tunnel



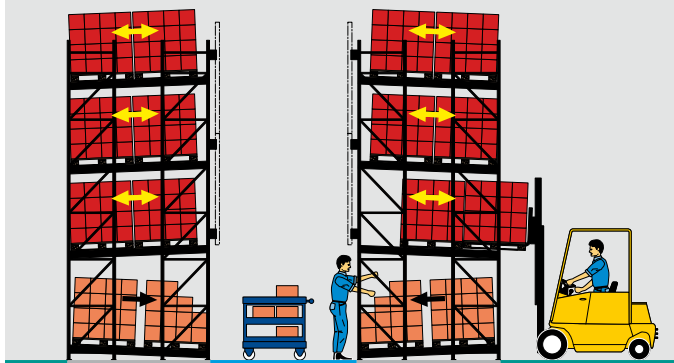
- contraflow lane configuration
- suited for large throughput references

The two levels on top serve as supply buffer for the floor level where individual storage units are picked in the picking tunnel.

Your advantages:

- FIFO principle (first in - first out) is maintained
- safe working environment as aisles are separated
- loading does not interfere with order picking

3 Push-back pallet buffer



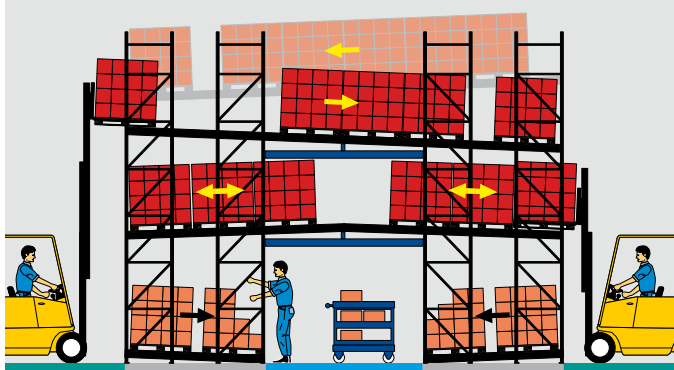
- cost-efficient buffering
- suited for large throughput references

The short lanes of the buffer levels favour push-back storage which is an economic solution as no braking system is required.

Your advantages:

- safe working environment as loading and picking aisles are separated
- highbay buffer store allows optimum utilisation of warehouse height
- huge buffer quantities ensure that order pickers do not run out of stock
- compact storage on a small floor surface

4 Central picking tunnel



- suited for huge quantities per reference

The push-back and live storage levels on top of the picking tunnel are used as buffer store and ensure constant product availability in the floor level lanes.

Contraflow live storage levels in the pallet buffer provide supply for both sides of the picking tunnel.

Your advantages:

- maximum utilisation of the available warehouse volume
- safe working environment as loading does not interfere with order picking

5 Man-operated stacker crane loading

- manual picking of individual storage units
- suited for references stocked in large quantities
- stacker crane loading for frequent replenishment

The order picking lanes on all three tiers are immediately replenished with the help of stacker cranes.

Your advantages:

- pallets are handled long side facing for improved access to goods
- fast restocking ensures constant product availability
- maximum utilisation of available headroom
- short order throughput times due to simultaneous order picking on several tiers



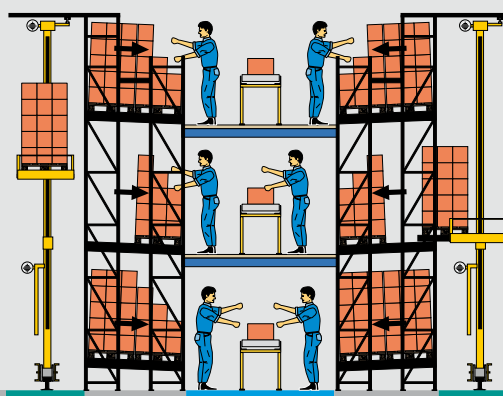
6 Automatic stacker crane loading

- manual picking of individual storage units
- suited for references stocked in large quantities
- automatic stacker crane loading for frequent replenishment
- reference oriented order picking (batch picking)

Automatic stacker crane servicing allows very fast restocking of all three tiers. There is no need for an extra operator to manoeuvre the stacker crane.

Your advantages:

- pallets are handled long side facing for improved access to goods
- fast restocking ensures constant product availability
- maximum utilisation of available headroom
- reduced lead times due to simultaneous order picking on several tiers
- automated, computer controlled replenishment directly from the buffer



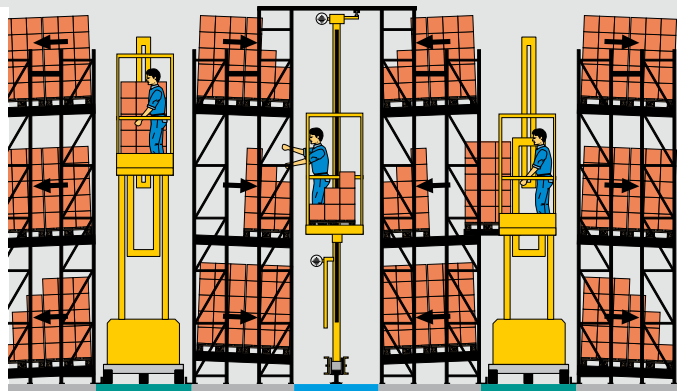
7 Automatic stacker crane loading

- manual picking of individual storage units
- suited for small picking quantities per reference
- stacker crane loading for frequent replenishment

The stacker cranes/order picking trucks are man-operated. The order picking vehicle allows easy access to all goods in the aisle.

Your advantages:

- pallets are handled long side facing for improved access to goods
- fast restocking ensures constant product availability
- maximum utilisation of available headroom
- excellent utilisation of storage volume



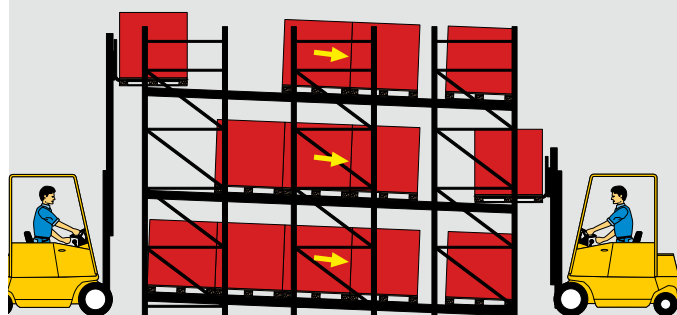
8 Retrieval of complete pallet loads

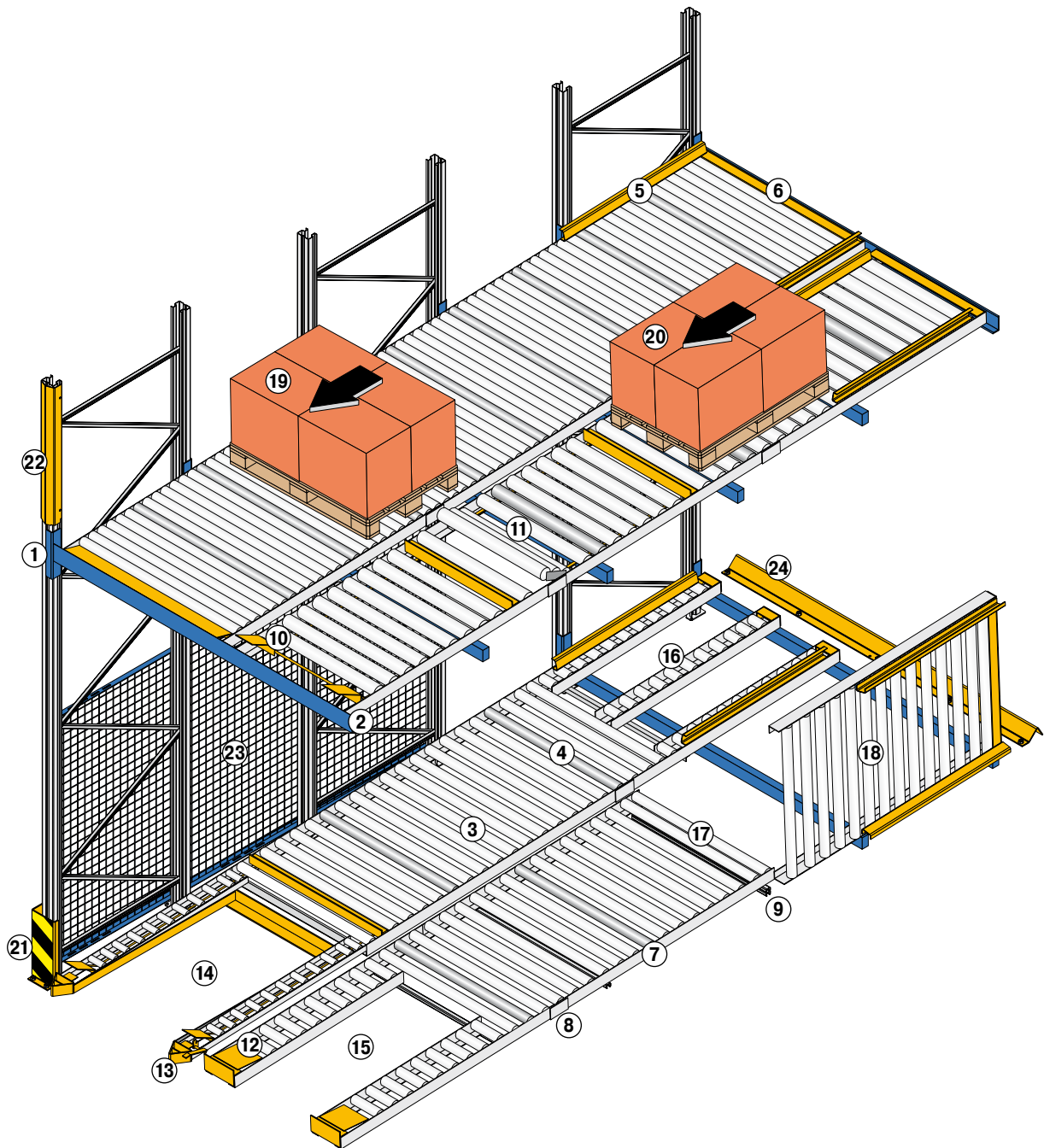
- loading and retrieval of complete pallet loads (f. ex. grouped together according to despatch routes)
- suited for picking large quantities per reference and a high stock turnover frequency

Separate loading and picking aisles ensure that order pickers are not disturbed by restocking which in turn increases productivity.

Your advantages:

- short travel routes between picking point and final dispatch area (f. ex. lorries in front of a loading dock)
- good overview of products on stock and permanent product availability, as goods automatically move to the picking face





1 Beam with bolted connectors
allows continuous height adjustment of lanes

2 L-shaped beam
- protects roller conveyor lane
- low height construction

3 BITO Roller
with steel ball bearing

4 BITO Braking roller
exerts a smooth and uniform braking effect on the pallets

5 In-feed guide

6 Roller protector

7 Side section

8 Joining plate for side sections

9 Floor beam

10 Load separator with full width activator

11 Mid-lane separator
used in long lanes to absorb lane pressure on the load separator at the picking face

12 Speed reducing end stop
for lanes without load separator

13 Hand/foot operated lever for separator

14 Low height picking unit for hand pallet truck retrieval

15 Twin track picking unit

16 Triple track replenishment unit

17 Lane for "mixed" load carriers
Euro and industry pallets

18 Tiltable roller conveyor

19 Pallet handled long side facing

20 Pallet handled short side facing



SAFETY COMPONENTS

21 Column guard
to protect corner uprights

22 Upright protector

23 Wire-mesh side cladding

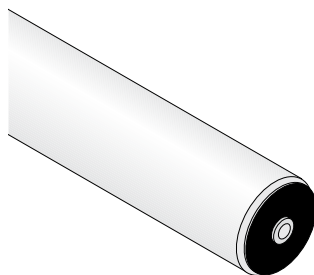
24 Truck wheel stopper



③ BITO Roller

Maintenance free, smoothly operating ball bearings provide for a low friction resistance and ensure a troublefree pallet start at the loading side.

- **high load capacity**
- **easy assembly**

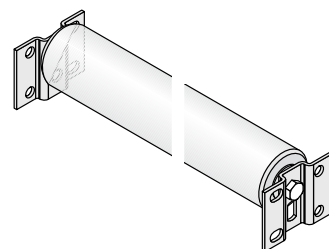


maintenance free

④ BITO Braking roller

For different pallet weights. Due to the optimised slot position on the supports, the braking roller does not need height levelling. As a rule, there is one braking roller per pallet position.

- **easy assembly, no height levelling required**
- **high load capacity**
- **maintenance free operation and minimal wear and tear for a long service life**

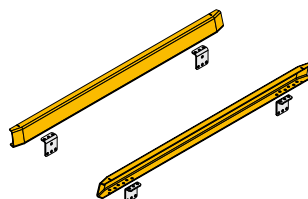


annual inspection recommended

⑤ In-feed guide

The in-feed guide is mounted directly to the roller conveyor side sections.

- **convenient in-feeding and pallet centering**
- **easy assembly**

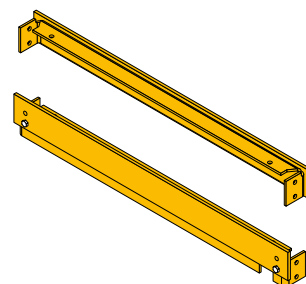


epoxy-coated in yellow, RAL 1003

⑥ Front/rear roller protector

Avoids potential damage of the rollers from lift trucks. Damage to the rollers can also be avoided by mounting robust L-shaped beams at the picking/loading side of each lane.

- **particularly robust component**
- **efficient roller protection**

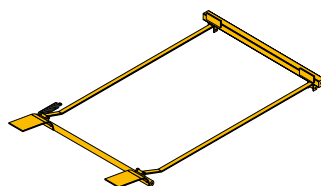


epoxy-coated in yellow, RAL 1003

⑩ Load separator with activator

Mechanical device to separate the first pallet from the other pallets in the lane in order to eliminate line pressure. In the automatic version, the separator drops as soon as the first pallet is removed. This mechanism can also be released by a hand or foot operated lever.

- **safe retrieval**
- **the next pallet moves automatically to the picking face**

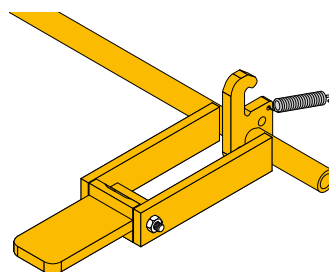


epoxy-coated in yellow, RAL 1003

⑬ Hand/foot operated lever for load separator

The lever is linked to the activator at the picking face. Only upon operation of the lever do the subsequent pallets move forward.

- **retrieval of individual storage units/items off the first pallet**
- **subsequent pallets can only move forward after operating the lever**
- **solid construction**

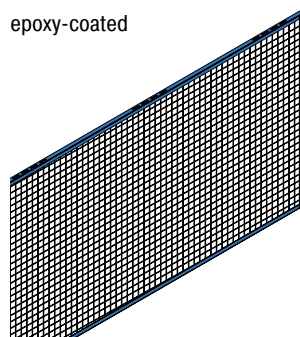


epoxy-coated in yellow, RAL 1003

②③ Wire-mesh side cladding

Mounted to the side of racking rows to prevent access to the lanes.

- **conforms to the latest security regulations**
- **prevents accidents**
- **mesh width 50 x 50 mm**

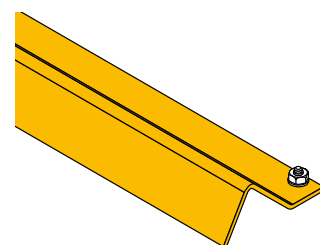


epoxy-coated

②④ Truck wheel stopper

This angled section is anchored to the floor in front of the racking's loading/order picking front in order to fix the optimum distance between service truck and racking.

- **keeps a fixed distance between service truck and racking**
- **protection of racking components against collision damage**



epoxy-coated in yellow, RAL 1003



VET Concept
Pet food



Features

- picking tunnel giving access to carton and pallet live storage lanes
- pallet buffer on top of the tunnel as well as in a separate live storage racking and in pallet racking
- cantilever racking for double sided use

Function

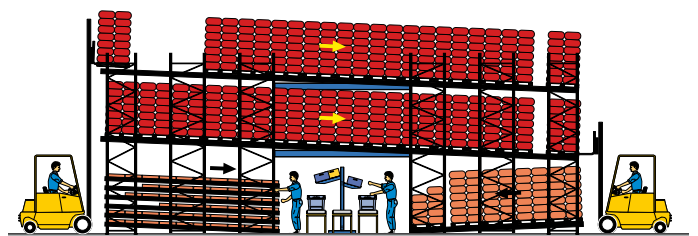
VET-Concept in Föhren produces well-balanced pet food. To allow immediate access to the products while maintaining the FIFO principle, the goods are stocked in carton and pallet live storage lanes which are inclined towards the central picking tunnel. The lanes are constantly restocked from the pallet buffer areas.

The products are supplied in BITO plastic containers with pick opening, in factory packaging units as well as in sacks of manageable size stocked on Euro-pallets. Picking is aided by picking lists. Picked goods are placed into BITO multi-purpose containers sized 600 x 600 x 320 mm. As soon as an order has been completed, the containers are conveyed to the packing stations.



Benefits

- short travel routes contribute to the high picking performance
- short order throughput times
- separate aisles for loading and retrieval allow operators to work undisturbed
- 6 metre deep lanes keep a sufficient quantity of products in reserve
- good utilisation of the headroom
- adherence to the FIFO principle





Stute Verkehrs-GmbH
Logistic services supplier



Features

- facility combines mezzanines, pallet live storage and static shelving
- order picking directly off the pallet

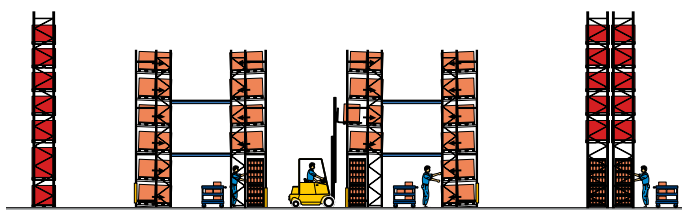
Function

The Stute Verkehrs-GmbH in Bremen is a fully-owned subsidiary of the Kuehne + Nagel Group who has grown into one of the world's major logistics suppliers of freight services by road, rail, air and sea. Within the Kuehne + Nagel organisation, Stute accounts for contract logistics ranging from inhouse logistics services, outsourcing solutions to the concept-to-completion realisation and operation of complex logistics centres. Their customers mainly come from the automotive industry and their suppliers, from the steel industry, the chemicals industry as well as from aviation and mechanical engineering.

In order to cope with frequent changes in their product lines and permanently varying lot sizes, the logistics centre in Nuremberg needed a storage system capable of adjusting to strong fluctuations. The company's responsiveness to customer requirements has now been optimised with a multi-tier pallet live installation with lanes for double deep storage. The facility incorporates static shelving blocks on the ground floor for manual picking. This solution stocks a large product range on a small surface area and provides flexibility to cope with fluctuating order volumes.

Benefits

- simultaneous order picking on several tiers
- order picking directly off the pallet
- accommodation of a huge range of product lines
- random storage
- good floor space utilisation



Plzensky Prazdroj
Brewery**Features**

- push-back pallet racking
- pallet live storage racking used to centralise stocks for export

Function

The Czech brewery Plzensky Prazdroj in Plzen has a long tradition in beer-brewing. Today, the trade mark unites renowned breweries such as Pilsner Urquell, Master, Gambrinus or Radegast. In order to reduce the number of depots as well as their visitor tour related transport activities, the brewery decided to merge all local depots into one central depot. This depot features two storage systems: a LIFO-operated push-back pallet racking installation for small order volumes and a compact FIFO-operated pallet live storage facility with 1.905 pallet positions. The new storage facilities for palletised loads tripled storage capacity. Catering for small and large order volumes, the storage installations allow the brewery to react very flexibly to customer requirements and to speed up order throughput. Moreover, the reduced picking error rate improves delivery accuracy.

**Benefits**

- storage capacity has been tripled
- reduced order throughput times
- improved delivery accuracy
- peak periods can be easily managed
- handling times and effort have been cut down



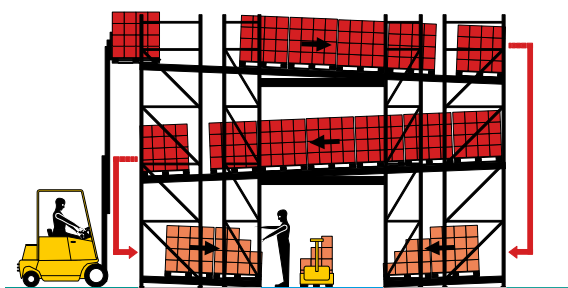
Getränke Mayer
Distributor of beverages

Features

- installation with order picking tunnel
- picking of unit loads off the pallet
- live storage pallet buffer

Function

Order picking installation operating according to the FIFO-principle with a live storage pallet buffer on top. The loading aisles are used for restocking as well as for relocating the goods from the buffer into the feeder lanes. In the picking tunnel, unit loads are collated order-based.



Benefits

- optimum utilisation of the warehouse volume
- goods are always available in sufficient quantities
- the picking tunnel provides a safe working environment and allows undisturbed working



**dm-drogerie markt
GmbH + Co. KG**
Distributive trade



Project realised in
cooperation with

swisslog



Features

- live storage lanes for double deep storage of Euro pallets handled long side on, pallet weight ranges between 70 and 1.000 kg

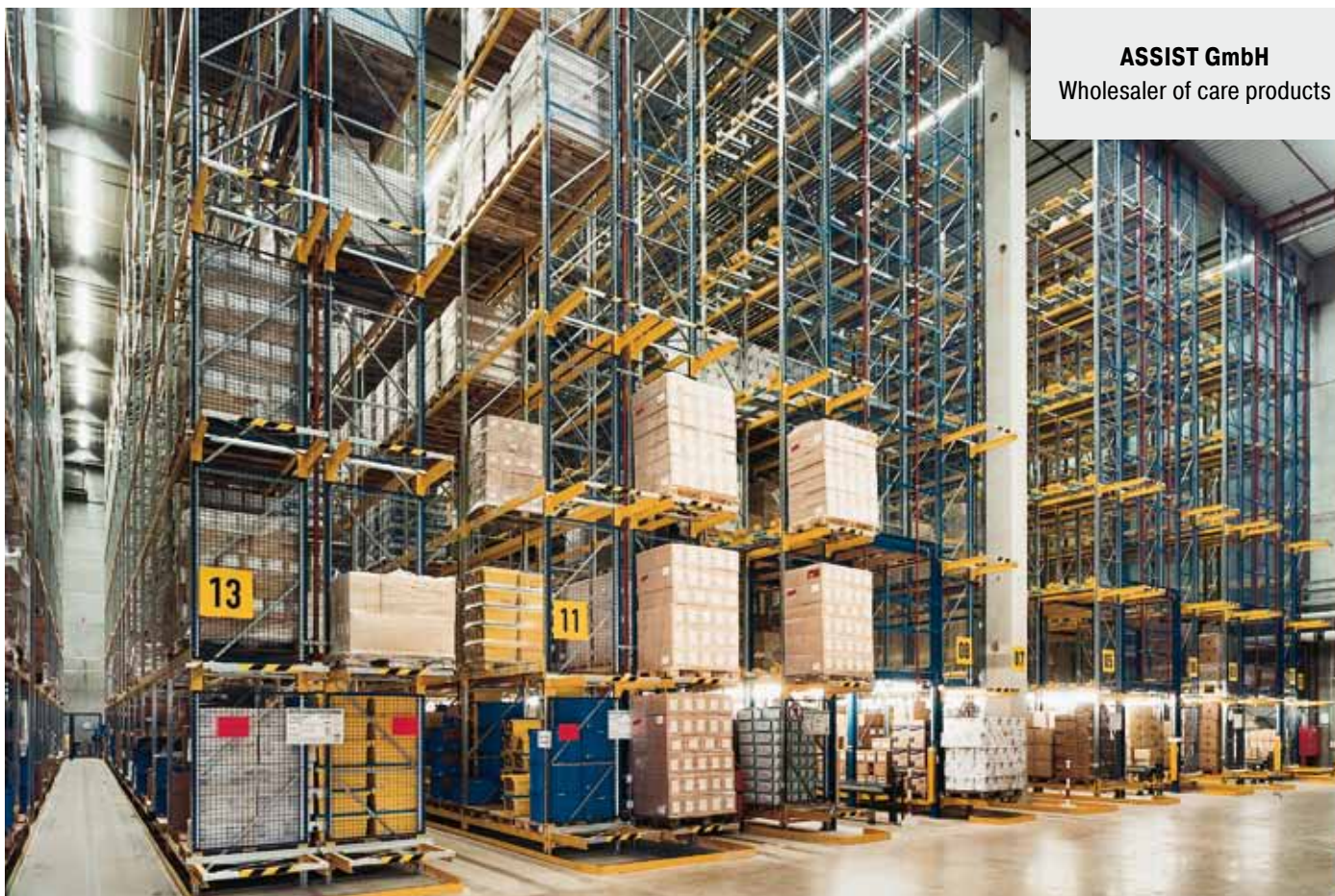
Function

The drugstore chain dm-drogerie markt is one of the major suppliers of drugstore products in Europe. At their distribution location in Weilerswist, the huge order throughput is handled with a pallet live storage system. Stacker cranes equipped with tiltable telescope forks feed the pallets into the roller conveyor lanes with a 4% incline. The pallets move gravity-driven to the picking face where operators manually pick cartonised unit loads directly off the pallet. When all cartons have been picked, the operator will pull the empty pallet out of the lane into the aisle. This will automatically activate the load separator: the pallet stop which separates the picking pallet from the second pallet in the lane will hinge down, allowing the next pallet to move to the picking face.



Benefits

- high picking performance
- short in-house travel routes
- automated replenishment



ASSIST GmbH
Wholesaler of care products



Features

- installation with picking tunnel
- servicing with narrow aisle trucks
- pallet live storage buffer

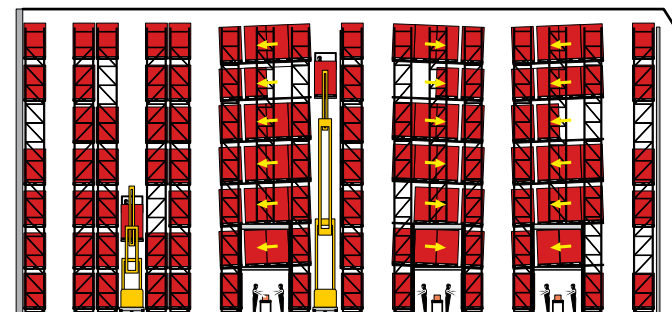
Function

The static pallet positions are replenished by the live storage lanes on top which are inclined either to the right-hand or the left-hand loading aisle in order to feed the picking places on both sides of the picking tunnel according to the FIFO-principle.

Picked goods are placed onto a powered roller conveyor lane in the middle of the picking tunnel. On the short side of the racking blocks, P&D stations facilitate handling of fully loaded pallets.

Pallet loading and retrieval is done by narrow aisle trucks with telescopic forks. For this reason, the roller conveyor lanes are split at the loading side.

The particularity of this installation is that the order picking tunnels and the narrow service aisles of the rail-guided VNA-trucks are very close together. For work safety, light barriers have been installed in the aisles.



Benefits

- optimum utilisation of warehouse space with compact storage
- storage according to the FIFO principle in the live storage lanes
- high degree of flexibility to respond to product range modifications
- many picking positions on a small storage surface
- high levels of work safety due to separate loading and picking aisles
- operator friendly layout of the picking aisles allows convenient working

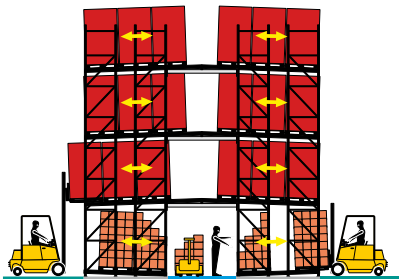
ALCAR Autoteile GmbH
Wholesaler of rims

Features

- installation with picking tunnel
- retrieval of individual storage units off the pallets on the floor level
- push-back pallet buffer

Function

Orders are picked off the pallets in the order picking tunnel on the floor level. Each lane is 2 pallets deep. The buffer stock is located on the 3 levels on top in 3 pallet deep push-back lanes.


Benefits

- high picking performance due to short travel routes
- separate loading and picking aisles allow undisturbed working
- immediate replenishment from the buffer stock on top
- immediate picking supply from the pallet behind the picking pallet
- tunnel construction provides high storage capacity





Features

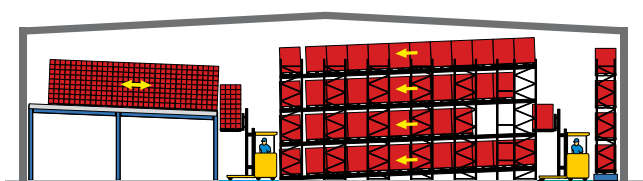
- pallet live storage racking with 800 pallet positions
- push-back pallet racking (mezzanine floor) for 330 pallets
- pallet racking on spill trays for 148 pallets
- servicing with various stacker types

Function

The company supplies products and services for hospitals and outpatient care. In the production area, a pallet live storage racking serves as buffer store for raw materials in big bags and sacks. The push-back pallet racking is located on a platform and stocks various types of casks and cans on lanes with a 4% incline. Due to the mezzanine construction, additional storage surface is gained on the ground level. This allowed to integrate underneath a pallet racking installation with spill trays for the storage of hazardous goods.

Benefits

- batch storage
- space can now be used to a better degree than with previous block storage
- lift truck travel routes have been considerably reduced
- very good utilisation of warehouse space
- ground level can be used in whatever way is required at the moment
- hazardous goods are stocked close to the production area





TUCANO Vertriebs GmbH
Beverage distributor



Features

- tiltable roller conveyor lanes on the ground level
- easy cleaning if damaged packages have soiled the floor underneath
- avoids hygiene problems, particularly in areas of food and beverage storage

Function

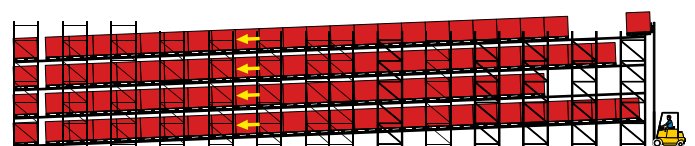
The distribution company Tucano Vertriebs-GmbH is a subsidiary of the beverage producer Mineralbrunnen Überkingen-Teinach AG headquartered at Bad Überkingen. The company counts among the biggest suppliers of brand fruit juices.

The distributor's dispatch depot has been fitted out with roller conveyor lanes with a length of 31.6 metres on which the pallets with beverage cartons move gravity-driven to the picking face. The modular built of the installations allows to realise fast and easy extensions or modifications of the facility in response to market developments.



Benefits

- optimum utilisation of the available headroom
- constant availability of goods for the order pickers
- no disruption in operations due to soiled areas underneath the roller conveyor lanes
- roller conveyor lanes can be supplied in any intermediate length





Unilever

Unilever

Food manufacturer



Features

- retrieval of individual storage units
- automated loading with stacker cranes

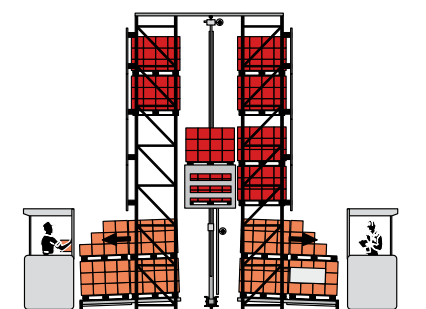
Function

The automated pallet live storage installation with a static pallet buffer on top is used for order picking.

The live storage lanes on the floor level are replenished automatically by stacker cranes from the static pallet buffer stock on top. Placed on the roller conveyor lanes on the ground level, the pallets move unassisted to the picking face where individual storage units are picked manually with the help of order picking stackers.

Benefits

- higher productivity on account of short travel routes
- link-up with an in-house conveyor system
- compact and safe storage, immediate overview of products on stock and good utilisation of available storage space
- service vehicles with a high operating frequency ensure that all product lines are constantly available
- the warehouse management system allows permanent stock control
- FIFO principle is strictly observed
- the number of service vehicles and operators can be adapted to requirement



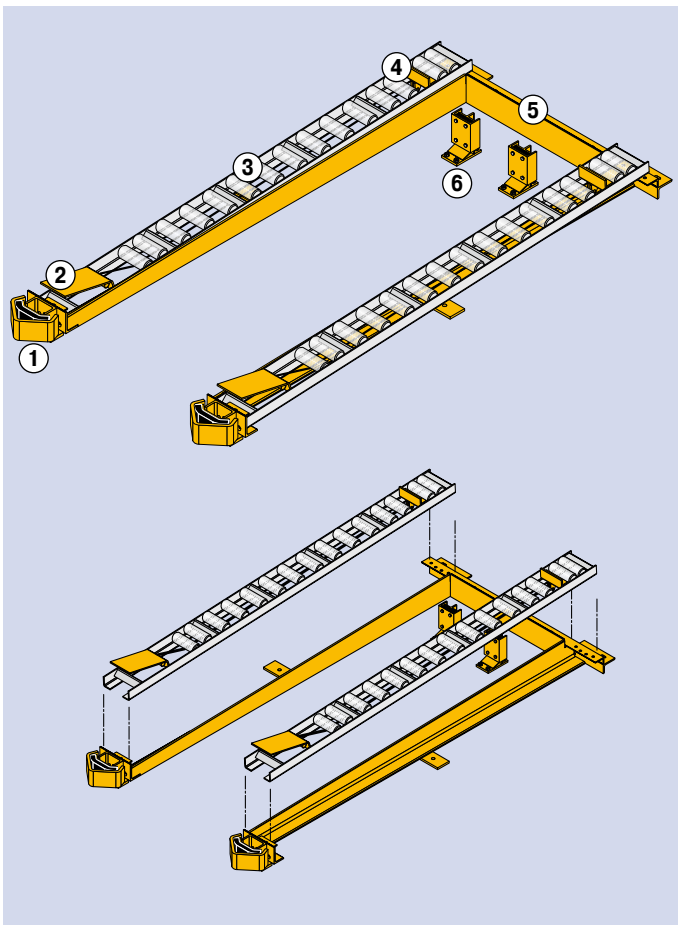
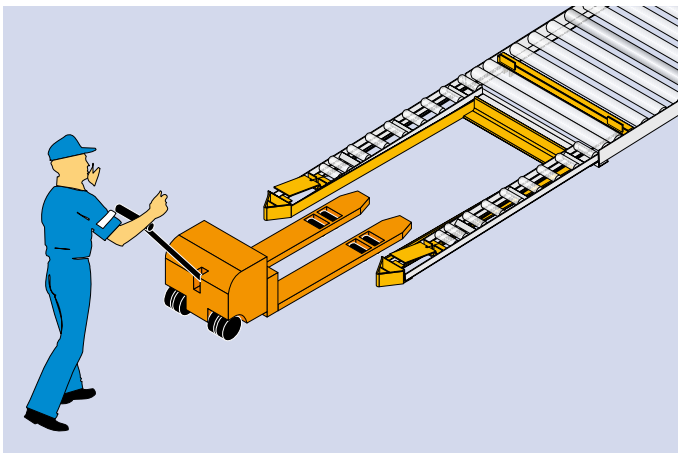


Picking unit for hand pallet trucks – standard version

If entire pallets are to be picked from the floor level, retrieval by hand pallet truck has the advantage that it is independent from lift truck availability and can be done whenever required.

Retrieval by hand pallet truck is restricted to long-side on pallet handling. In order to allow driving into the lane, the first pallet position is not equipped with full width roller conveyors, but - depending on the pallet weight - with two or three roller tracks. These roller tracks have a reduced height so that pallets can be retrieved by hand pallet truck with a standard lift height of 185 mm.

A robust inner frame protects the tracks from damage.



Picking unit for hand pallet trucks – heavy-duty version

This particularly robust version is ideally suited for tough applications. Servicing with electricity powered lift trucks and similar service vehicles is no problem. Additional components such as the fork stoppers protect the rollers of the subsequent roller conveyor/ roller track unit from damage.

- suited for rough handling
- long service life
- ideal for electricity powered vehicles such as electric pedestrian stackers
- particularly robust components protect conveyor rollers and roller tracks
- roller tracks can be removed to allow cleaning underneath

1 Triangular roller track nose

equipped with a rubber buffer for truck forks, helps in-feeding

2 Activator

When the first pallet is picked, the activator causes the load separator to drop so that the other pallets in the lane move forward.

3 Roller track

can be removed to allow cleaning underneath

4 Separator with pallet stop

holds back all other pallets in the lane until the first pallet is removed

5 Collision barrier

robust steel frame to protect the conveyor rollers/roller tracks of the unit behind

6 Fork stoppers

solid make, equipped with rubber buffer

Extractable first pallet position

As of a certain turnover frequency per order line, order picking off the pallet is the most economic solution.

In the case of small-sized and/or heavy-weight storage units, a picking depth of 800 mm may already exceed the ergonomically critical limit, especially, if the distance between the levels is small.

The extractable first pallet position, BITO-type »APP«, is an ideal solution. The front pallet position in the live storage racking is designed as an independent unit on wheels, which can be pulled out into the aisle with the help of a pull bar. Goods can now be picked – ergonomically favourable – from three sides. After the items have been picked, the pallet position is pushed back into the racking. This enables order pickers to handle pallet loads of up to 1000 kg without any effort. Manually operated load separators as well as a separate locking and unlocking mechanism make this construction absolutely safe.

- easy product picking without head bumping, in particular if products are accessed from the side
- easy manoeuvring of the extractable unit

Pulling out the pallet position allows convenient order picking directly off the pallet. After picking, the pallet position is simply pushed back into the racking.



Tiltable roller conveyor

Even if stocked products are handled with all necessary care, damage to packaging units by forklift trucks can not be excluded. Spilt products can soil the floor underneath the roller conveyors.

Special attention to this problem has to be given in (fresh) food areas.

As a solution, BITO has developed roller conveyor lane units which can be tilted up for thorough cleaning of soiled floors.

- avoids hygiene problems, particularly in food storage areas
- prevents damage to rollers by broken packaging units and their contents
- no disturbances in operation due to soiled areas underneath the roller conveyor lanes



Empty pallet retrieval

- ergonomic empty pallet retrieval

A purpose-built lifter reduces the lifting load to 10 kg maximum (Euro pallet = 20-25 kg).

- space saving solution allows to reduce picking aisle width

Empty pallets are pulled up into vertical position. Standing on their narrow side, the pallets are then pushed over the lateral relocation lane to the return lane.

- convenient pallet in-feeding into return lane

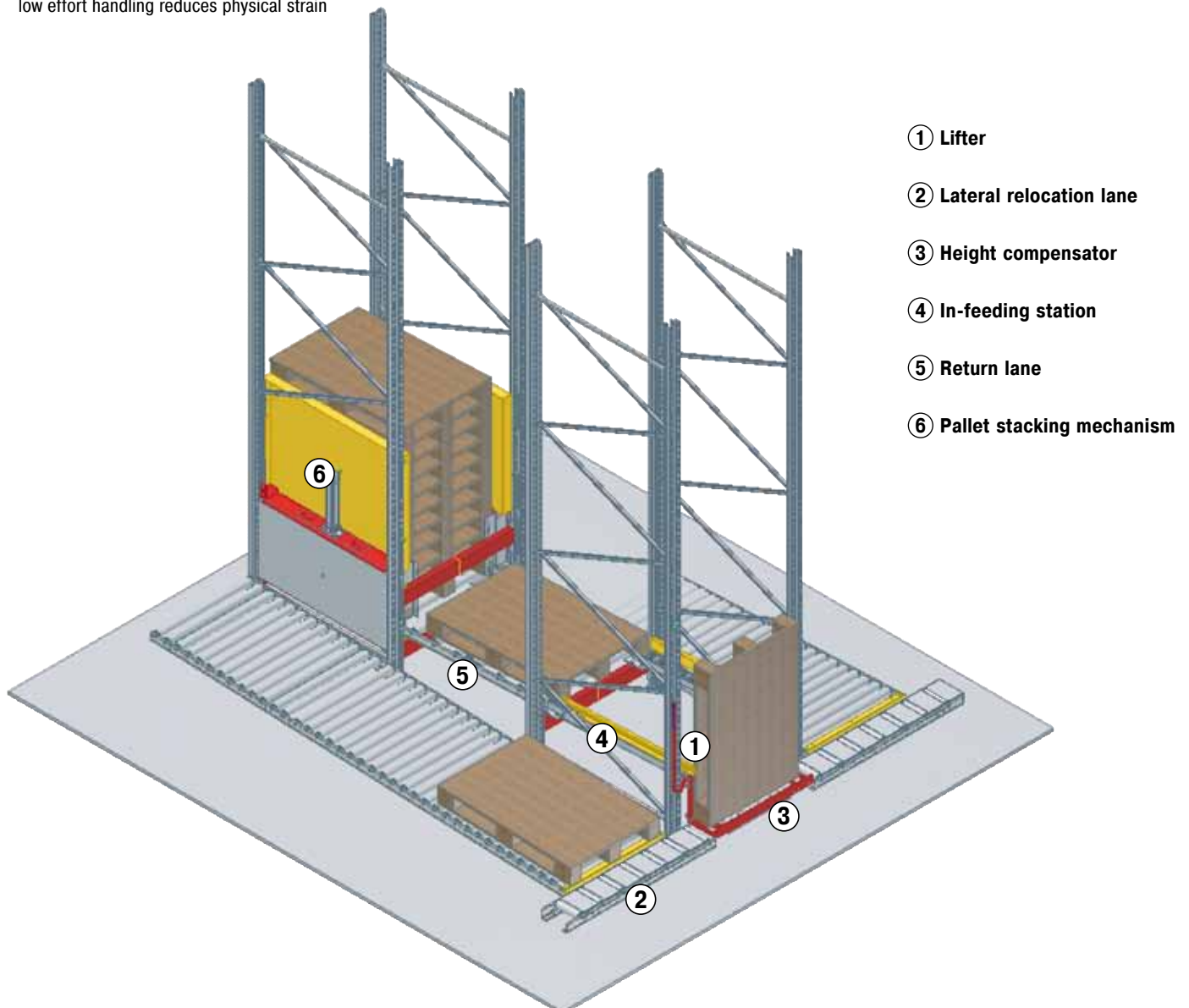
The full pallet wide height compensator in front of the return lane ensures easy and guided pallet in-feeding.

- automatic pallet stacking mechanism

allows to stack up to 15 pallets high
empty pallets can be retrieved individually at any time
retrieval of pallet stacks as required
stacking mechanism is activated pneumatically or electrically

- efficient order picking

order picking is interrupted for a very short time only
picking aisles are not obstructed by empty pallets
no extra handling required for pallet stacking
low effort handling reduces physical strain



Empty pallet handling

As a rule, removing empty pallets in an often narrow order picking aisle disturbs the work flow considerably. Empty pallet removal is a problem which should be solved in the planning phase, because integrating a solution into an existing order picking installation can often only be realised at the expense of other benefits and goes along with considerable extra costs.

BITO provides four solutions:

1 Vertical pallet return

The empty pallet is taken out of the order picking lane, placed standing on its narrow side onto a separate return lane with elevated guide sections and pushed back to the loading side. There should be several return lanes integrated into the picking side in order to minimise the distance over which the empty pallet has to be carried manually.

2 Horizontal pallet return

This solution provides a low-height roller conveyor return level underneath the order picking lane.

The empty pallet is pulled out in flow direction at the order picking face and without turning or pushing it sideways, it can immediately be fed into the return lane underneath.

3 Return lane for pallet stacks

Empty pallets are pulled out of the order picking lane, placed standing on their narrow side onto a lateral roller conveyor lane in front of the picking positions and pushed to the return lane onto which they are placed lying flat. Several empty pallets can be stacked on top of each other. As soon as a stack has been formed, it is pushed to the loading side for retrieval. It is possible to integrate several return lanes into the picking side.

4 Empty pallet return system, BITO-type »ASP«

In this solution, the first pallet position is a separate unit. By a lever movement, the hinged end of the first pallet position drops and allows the empty pallet to slip onto a sloped chipboard level or to move via a roller conveyor lane with inverse incline to the loading side, where it can be retrieved by a replenishment truck. By re-actuating the lever, the hinged first pallet position returns to its original position. The order picker can now operate the load separator so that the next picking pallet moves to the picking face.



LANCASTER, cosmetics manufacturer



RAVENSBURGER, manufacturer of games



HALFORDS, supplier of parts and accessories to the automotive industry



MAIER'S, publisher



Lanes with inclined picking tray facilitate picking of individual bottles, straight lanes are suited for picking complete cases.



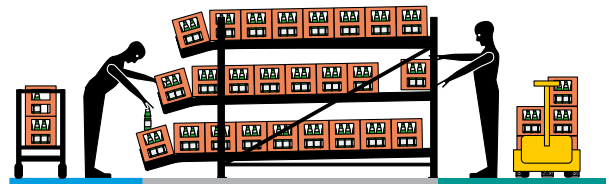
The loading side of the lanes is equipped with a push-back stop which tilts into the lane for ease of replenishment.

Roller conveyor lanes for beverage cases

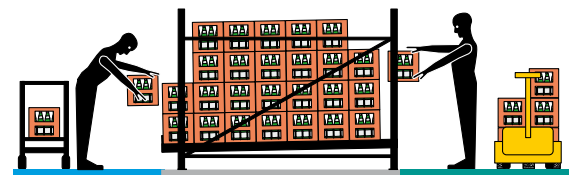
Available in three options, these roller conveyor units allow to pick complete beverage cases as well as individual bottles. Straight lanes allow to pile cases. Additionally, all options can be equipped with guide rails at the lane sides.

Due to the good utilisation of the available storage volume, the high quantity of supplied beverage cases and the fact that all storage units automatically move to the picking side, order pickers do not run out of stock.

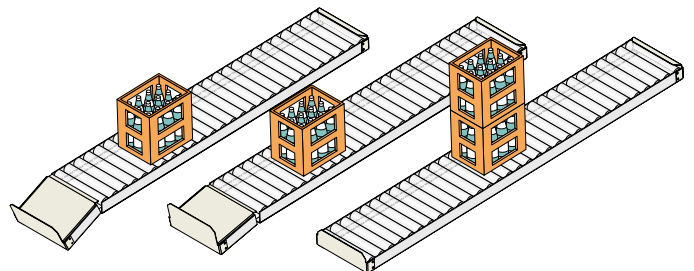
- high storage capacity providing huge buffer stock. In contrast to beverage dispensers, this installation is maintenance free and does not need frequent replenishment.
- good overview of all reference lines on stock
- short travel routes due to very compact stock supply
- supply of individual cases (not palletised)
- order picking of individual bottles
- goods are picked by final customer



Picking of individual bottles



Picking of complete beverage cases



Roller track system

In comparison to the roller conveyor system which is ideal for long lanes, the roller track system is the more economic solution for short lanes.

BITO system specific solutions such as the push-back rail system for two pallet deep storage are very convincing, both in terms of their functionality and their good price/performance ratio.

The roller track system is not limited to pallet storage. Lanes with a particularly narrow roller pitch ensure the smooth flow of units with a different skid/feet design such as wire-mesh box pallets.





Advantages of the BITO roller track system

Roller tracks are ideal for live storage in short lanes with a low incline and without braking devices as well as for push-back pallet racking.

BITO roller tracks are available in two track height options and can be supplied with three types of rollers which makes them suitable for a broad range of applications and for use in many industries.

- three different roller types
- with steel axle
- once assembled into the track, the rollers can not fall out any more; no additional securing elements are needed
- high load capacity
- cost efficient two pallet deep storage
- push-back rail system (refer to page 136)
- high quality ball bearings provide for excellent travel characteristics
- load capacities of 65 kg to 130 kg per roller
- flanged rollers safely guide storage units



Advantages of BITO roller conveyors

Roller conveyors combine the advantages of both the roller track system and full width roller conveyor lanes by featuring a broad surface for pallet skids and at the same time the narrow roller pitch of roller tracks.

- suited for long side or short side on pallet handling
- narrow roller pitch – 48 mm for pallets handled long side facing and 96 mm for pallets handled short side facing
- load capacities of 160 kg per roller
- smoothly operating ball bearings
- ideally suited as feeder lanes, f. ex. in front of loading docks
- suited for pallets of different widths such as Euro pallets (800 mm wide) and industry pallets (1000 mm wide)

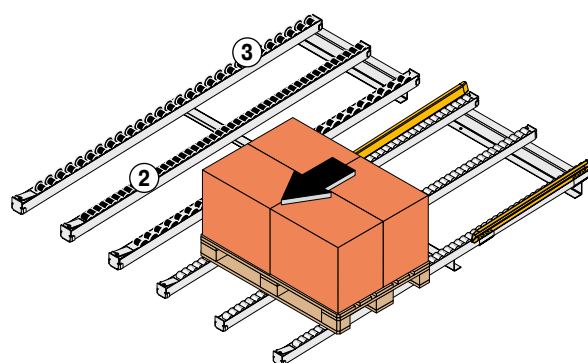
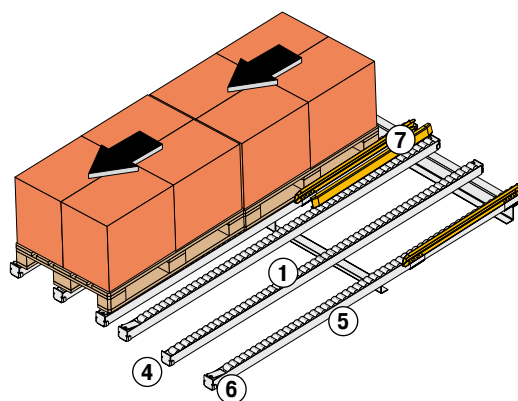
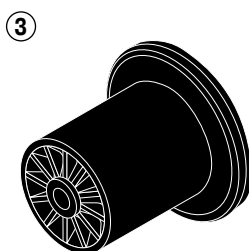
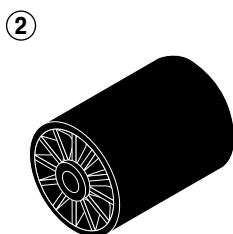
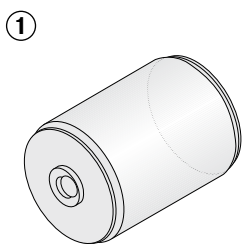
Roller types

There are 3 roller types available:

- cylindrical steel rollers
- cylindrical plastic rollers
- flanged plastic rollers

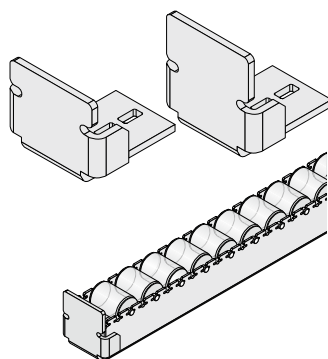
All rollers have a steel axle which can be gently pressed into the track section's edge indentations out of which they can only be removed mechanically with the help of tools. This guarantees that the roller remains seated in its original location without the need of additionally securing the steel axle.

- load capacities of 65 kg to 130 kg
- flanged rollers provide optimum guidance to storage units
- no start-up resistance
- self-locking steel axle prevents rollers from falling out



4 Roller protector

Mounted at the ends of roller tracks to protect the track section and the rollers from damage. The roller protector is simply pushed onto the track profile and is bolted, together with the track section, either directly to the static racking parts or anchored to the floor.

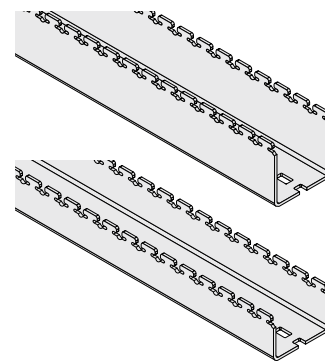


- easy push-on fitting
- protects the roller track from damage
- end stop for pallets

5 Roller track section

Roller track sections are available in two height options.

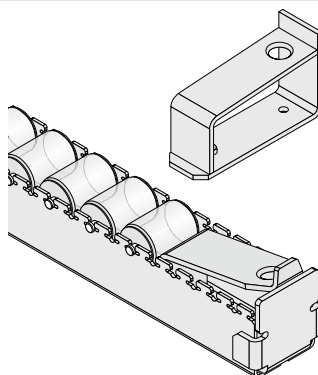
- particularly robust component
- special shape of edge indentations prevents rollers from falling out



6 Speed reducing end stop

This component combines the advantages of a roller protector and a speed reducing end stop providing a gentle braking effect and a smooth pallet stop.

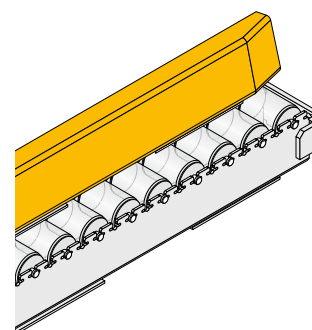
- pallets travel smoothly to the end of the lane



7 In-feed guide

Directly bolted to the roller track section, the in-feed guides allow convenient in-feeding and pallet centering.

- easy pallet in-feeding
- protects roller flanges from damage during stock replenishment



**LTW Lagerhaus und
Transport GmbH**
Contract warehousing



Features

- push-back pallet racking
- order picking with lift trucks

Function

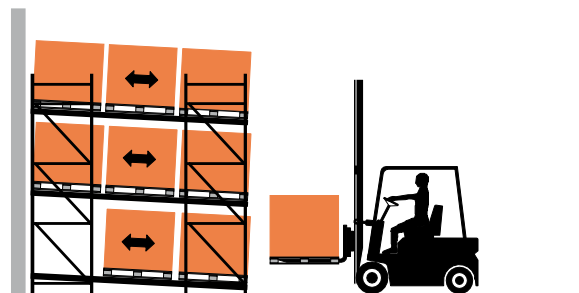
The installation is located in a coldstore and serves as a buffer stock for slow movers which are stored in relatively small quantities.

In order to facilitate cleaning of the warehouse floor, the ground level is fitted with roller tracks. The two upper levels are equipped with full-width conveyor rollers.



Benefits

- compact, clear and safe product presentation providing access to all items
- only one service aisle is required which ensures a better utilisation of the high cost coldstore area





IVECO

IVECO
Automobile industry



Features

- pallet live storage
- servicing by reach trucks with tiltable mast
- retrieval of driver cabins
- customer specific steel rack

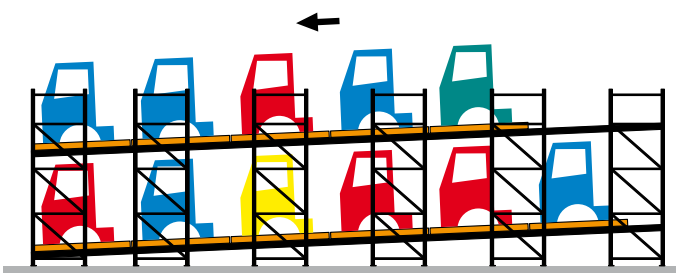
Function

The huge range of vehicles designed, manufactured and marketed by IVECO Magirus AG is manufactured in six locations in Europe and includes fire fighting and multi-purpose emergency vehicles and equipment. The production site in Ulm stocks lorry driver cabins in live storage installations to supply the production lines.

The live storage facility provides compact storage of a large variety of cabin types. Upon retrieval of a cabin, the other cabins in this lane move unassisted on conveyor rollers to the picking side. The speed of the forward movement is braked continuously. A speed reducing end stop ensures that each storage unit is gently stopped at the picking side.

Benefits

- undisturbed working in separate loading and picking aisles
- short replenishment routes
- compact, easy-to-view and safe storage along with a very good utilisation of storage space
- the FIFO principle is strictly adhered to





Push-back rail

This **BITO-designed variation to the push-back principle** features push-back pallet racking equipped with a push-back rail.

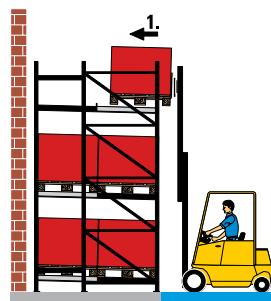
While maintaining all advantages of the push-back principle, this variation allows **low cost and efficient** short side on pallet in-feeding and also easily accommodates pallets with unfavourably shaped skids or feet.

The carefully designed configuration of roller tracks and push-back rails guarantees that pallets are safely located on the rollers or the rails.

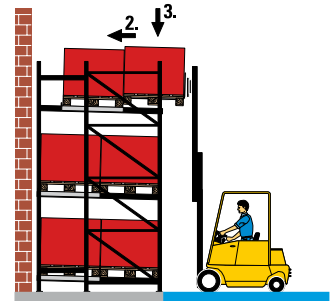
The first pallet is placed onto the push-back rails. When the second pallet is fed into the lane, the first pallet is pushed back – together with the push-back rails which glide smoothly over the rollers. The second pallet is seated directly onto the roller tracks.

Due to the use of ball-bearing rollers, the installation operates with a very small lane incline. This means that service trucks do not need as much push-in drive as would be required for conventional systems.

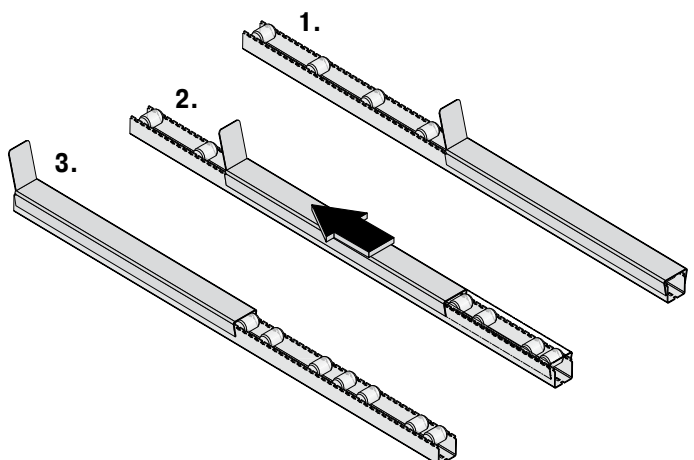
- space-saving storage according to the LIFO principle
- particularly efficient for 2 pallet deep storage and short side on handling
- reduced lane incline makes this solution ideal for low building heights
- optimum utilisation of the available warehouse height
- constant availability of pallets at the picking side
- optimum adaptation to all types of pallet skids or feet
- system also accepts pallets with poor travel characteristics



The first pallet is placed onto the push-back rails.



It is pushed back into the lane by the second pallet which is placed onto the rollers of the roller tracks.

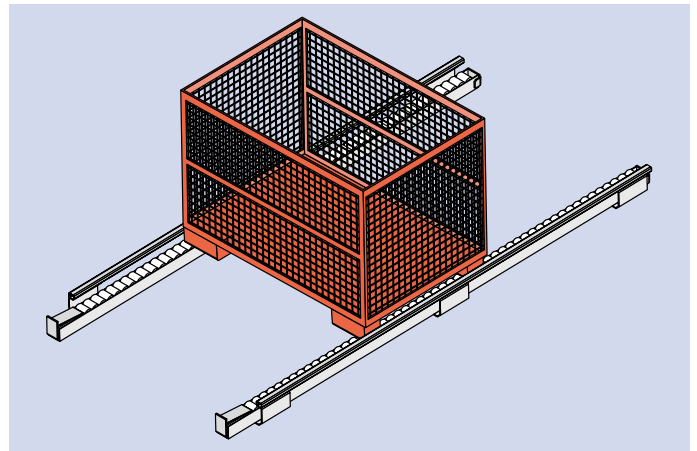


Short side on handling of wire-mesh box pallets

Due to the narrow feet of the wire-mesh box pallet, each pallet foot travels on two roller tracks mounted next to each other. Moreover, the rollers of each track are set off against each other.

Guide rails can be mounted to the track section sides with the help of adapters.

- continuous flow movement despite narrow pallet feet
- order picking lanes feature a very slight incline (no acceleration)
- ideal for 2 to 3 pallet deep storage



Mechanical separator

This mechanically operating component keeps back the second pallet behind the picking pallet thus avoiding line pressure.

Only after all storage units have been picked off the first pallet will the order picker lift the lever of the mechanical separator. The opposite end of the separator goes down and allows the second pallet to move to the picking face.

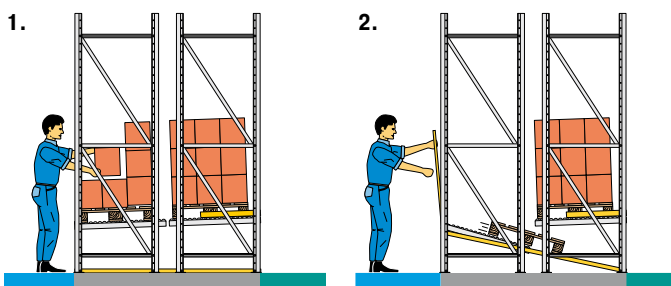
- system suited for 2 pallet deep storage



Empty pallet return system, BITO-type »ASP«

This system is designed for shallow depth racking with two pallets per lane handled long side facing. After all items have been manually picked off the pallet, the first pallet position can be dropped which allows the empty pallet to move to the lane underneath and return to its "point of departure" at the loading side. A load separator holds back the second pallet until the first pallet position is returned to its original position. By a lever movement, the load separator is lowered to let the second pallet move into the order picking position.

- convenient picking of individual items off the pallet
- no manual handling of empty pallets
- fast return of the empty pallet to the loading side





Automated pallet racking

In many cases, automated or partially automated systems are a clever alternative to manually serviced installations. Computer-controlled warehouse management systems provide permanent stock control and the economic advantage due to savings in time is particularly evident with **automated carton and pallet live storage as well as with pallet racking**. Moreover, the closed system prevents unauthorised access to the goods on stock.

Further advantages are:

- shorter order throughput times
- lower error rate
- constant availability of goods
- gain in floor space and storage volume

BITO's longstanding cooperation with renowned stacker crane manufacturers guarantees our customers optimum functionality and operational safety of our solutions.

BITO

www.bito.com

Pallet racking

As a rule, automated pallet racking installations are realised as fully automated systems and, in most cases, serve as buffer or supply store. As a system specific feature, the P & D stations located at the short sides of a racking run have to be mentioned. In these stations, complete pallet loads are deposited before in-feeding into the racking or after out-feeding for further transport to production facilities, order picking areas or the goods-out department.



Storage on solid shelves at Papstar, a manufacturer of disposable tableware and party supplies



Stacker cranes with curved track routing



Order picking / retrieval area at Papstar

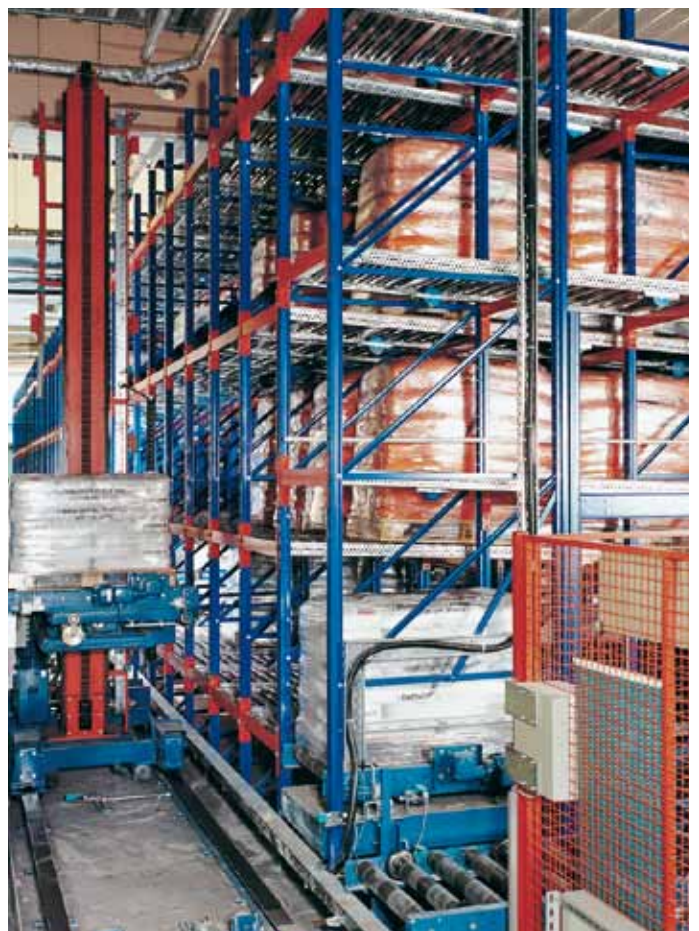


Stacker crane serviced highbay installation



Pallet racking being loaded at Papstar. At floor level height, pallets are loaded into live storage lanes to supply the order picking area.

Automated pallet live storage





Müller Milch
Dairy products

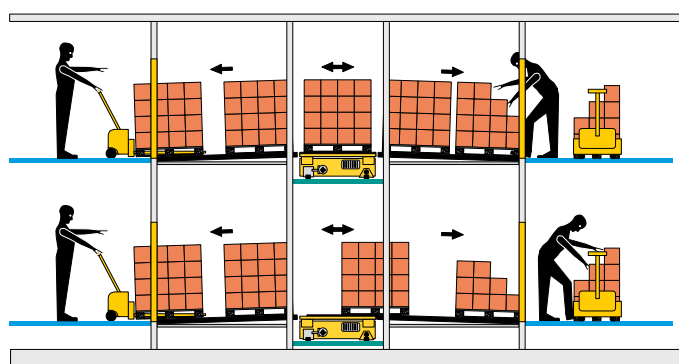


Features

- infeeding of complete pallet loads with a chain feeder
- retrieval of individual storage units off the pallet
- picked goods are transported with a picking trolley

Function

Loading is done automatically by a mobile feeder system. The order picker always has a second pallet in reserve. As soon as this reserve pallet has moved to the picking face, the buffer storage position is replenished. The picking position is equipped with a triple track roller conveyor unit with ride-on steel sheets between the tracks for hand pallet truck retrieval.



Benefits

- continuous order picking of complete pallet loads as well as of individual storage units



For light and medium weight applications



For heavy duty applications

Cantilever racking for light weight and heavy duty applications

Cantilever racking constitutes a flexible storage system which accommodates a wide range of long loads such as profiles and tubes, palletised goods, timber and steel sheet material as well as bulky goods.

The particularity of this racking system is that all components are manufactured to suit individual requirements, i.e. the racking configuration will take into account the dimensions and weight of your products and your available warehouse space. Benefit from

- above-average quality manufactured in our own plant in Germany
- the wide choice of uprights and cantilever arms which are available in various material thickness options and makes to adapt the racking configuration to your application and to ensure cost efficiency
- optimum dimensional planning to make sure that racking dimensions fit your products
- optimum space utilisation
- roofing for outdoor storage
- integration into existing storage and logistics concepts

Based on customer specific data as to warehouse space, flooring and products to be stored, we work out individual offers. Our professional and experienced teams will be pleased to assist you!

BITO

www.bito.com



Product information

Frequent application

- no strict subdivision into racking bays allows continuous storage, outdoor use

Service options

- manual servicing, automated servicing possible
- compatible with all current lift truck models

Storage options

long or short side on handling, coils, vertical storage, single/double sided storage

Surface/volume utilisation

optimum utilisation of „unobstructed“ storage space as there are no front uprights



Storage units

Long loads

Chipboard panels, wood and sheet material

Steel sheet packages

Cassettes for long loads, steel sumps/trays

Small unit loads such as plastic bins, cartons or loose goods

Pallets of any type or size, wire-mesh box pallets

Customer specific load carriers, etc.



Racking variations

Boltless system: cantilever arms can be adjusted in height increments of 60 mm

Bolted system: cantilever arms can be adjusted in height increments of 100 or 50 mm

Single sided use

Double sided use

Columns and cantilever arms can be supplied

- with epoxy coating or painted for indoor use
- hot-dip galvanised for outdoor use



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

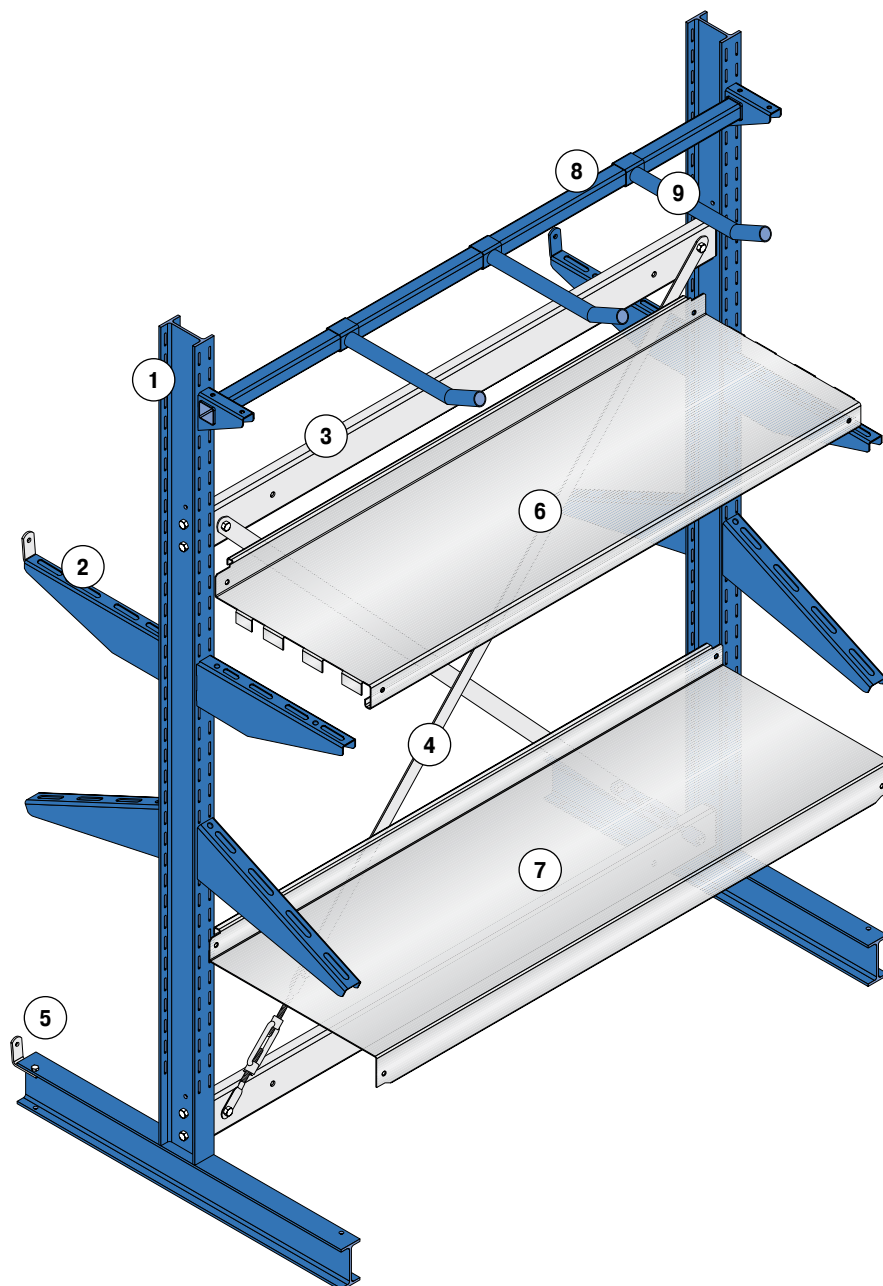
“Dynamic storage“

Our **PRODUCT CATALOGUE** provides detailed information on our entire delivery programme.

Ask for your free copy!



For light to medium weight applications



There is no limit as to racking length.
Broad range of accessories and safety equipment.



RAL-RG 614/5
Cantilever racking

Boltless system

- assembly without bolts: hook-in adjustment of cantilever arms and shelf levels
- arms can be adjusted on a 60 mm pitch
- single or double sided configurations

Columns and column feet from IPE profiles are welded together.

U-shaped cantilever arms from quality steel.

- 1 Double sided column
- 2 Cantilever arm with end stop
- 3 Connector beam
- 4 Diagonal bracing
- 5 Cantilever foot with end stop
- 6 Steel shelf
- 7 Base shelf
- 8 Support rail for tubular arms
- 9 Tubular arm

① Columns

Epoxy-coated

For single and double sided configurations.

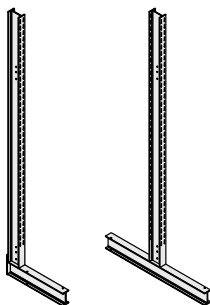
Made from IPE profiles.

All racking components comply with the latest safety regulations.

Delivery includes floor anchors and shims.

Height options: from 1980 mm to 3700 mm

Useful depth ranging from 400 to 850 mm.

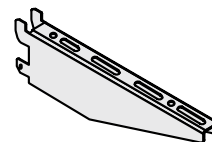
**② Cantilever arms**

Epoxy-coated

Delivery includes safety pin.

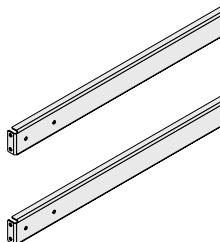
Height adjustable in 60 mm increments.

Useful depth ranging from 400 to 850 mm.

**③ Connector beams**

Galvanised

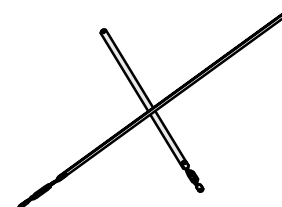
1057 mm or 1247 mm long

**④ Diagonal bracing**

Galvanised

Gives extra rigidity to racking runs.

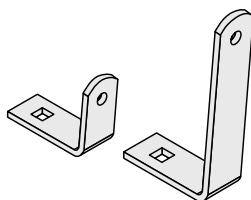
Supplied as illustrated.

**⑤ End stop / divider for cantilever arms**

Galvanised

Delivery includes fixing material.

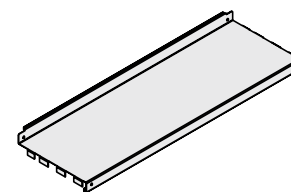
Height options: 60 and 150 mm.

**⑥ Steel shelf**

Galvanised

Drop-on fitting onto cantilever arms.

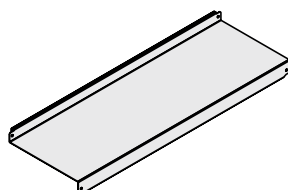
Useful depth ranging from 400 to 600 mm.

**⑦ Base shelf**

Galvanised

Drop-on fitting onto column feet.

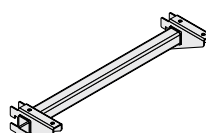
Useful depth ranging from 400 to 600 mm.

**⑧ Support rail for arms**

Epoxy-coated

For fitting tubular arms.

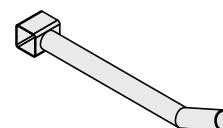
1057 mm or 1247 mm long.

**⑨ Tubular arm**

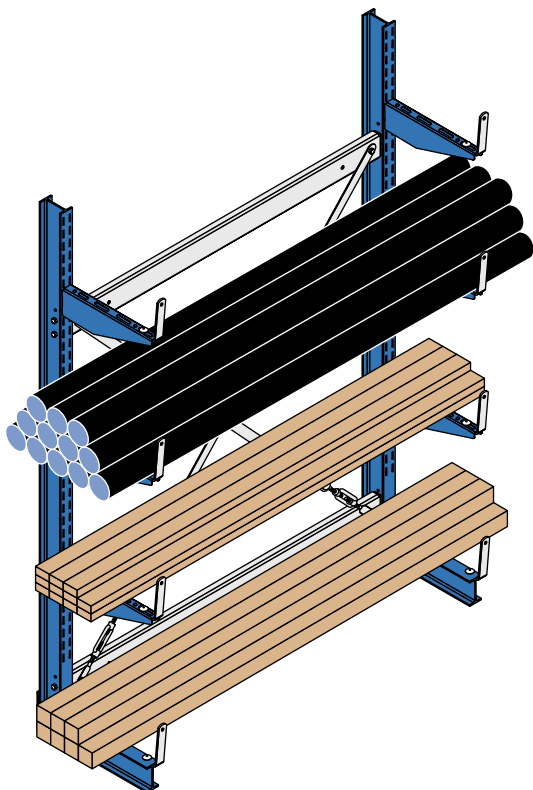
Epoxy-coated

Adjustable anywhere along the support rail.

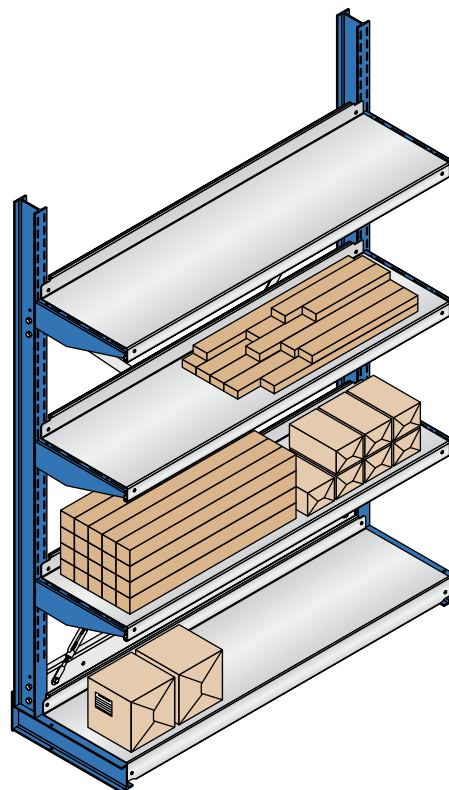
Useful depth: 400 mm



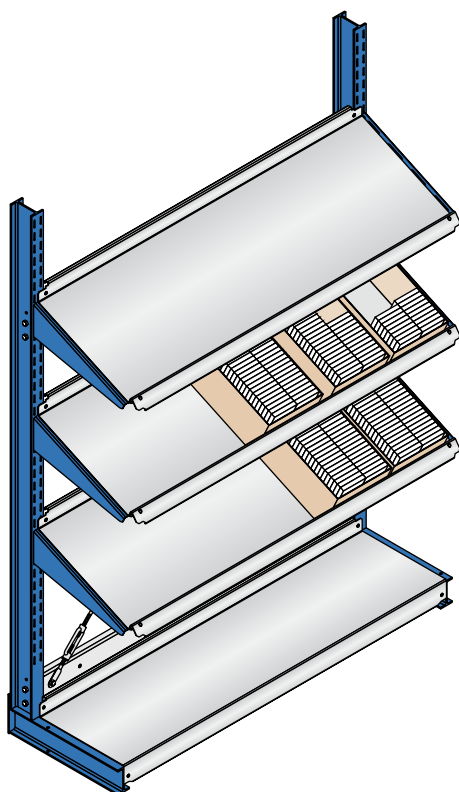
① Complete racking unit with end stops



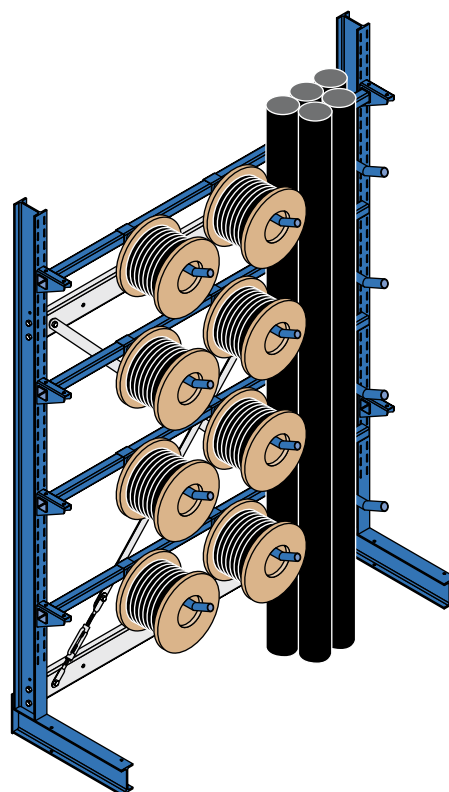
② Complete racking with steel shelves



③ Complete racking unit with inclined shelf levels



④ Complete racking unit with tubular arms for coils





LEDERER
Qualität verbindet
Lederer GmbH
Connecting/fastening
elements



Features

- cantilever racking used for order picking
- serviced with front stackers
- manual picking

Function

Lederer GmbH in Ennepetal is a trader of high-quality stainless steel connectors and fasteners such as bolts, nuts and standardised parts and components.

The company's asset is their optimum stock supply with more than 25000 different reference lines. Their warehouse is equipped with cantilever racking which stocks long loads such as threaded bars. This central depot ensures constant availability of the entire range of long material needed for further processing in all industries.

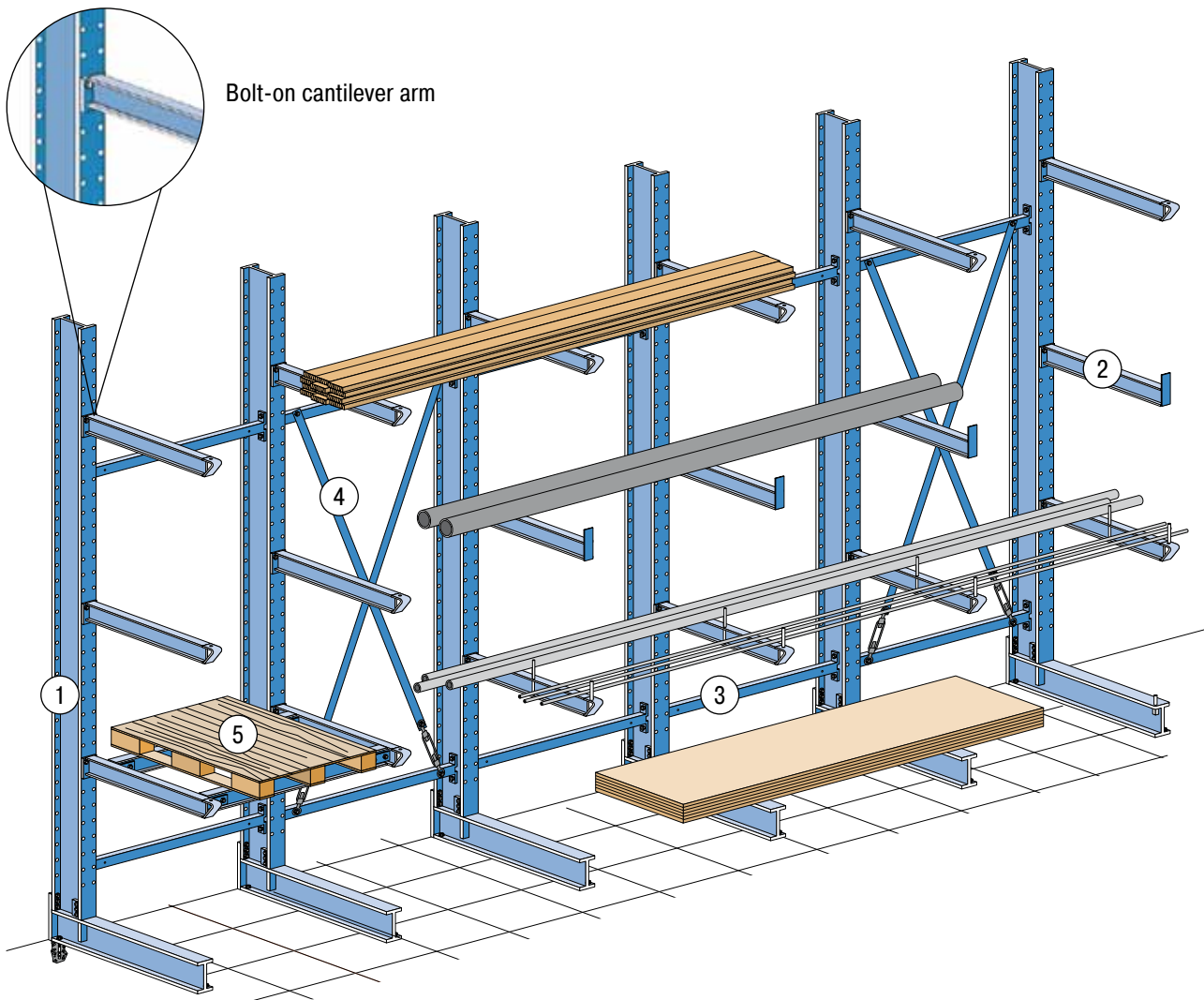
Benefits

- optimised travel routes in the production area increase efficiency
- production staff has direct access to all goods
- optimum product visibility of all goods on stock

For heavy duty applications

Verification documents of static calculations are based on DIN 18800, RAL-RG 614/5 and BGR 234.

Steel profiles are selected in compliance with officially acknowledged static parameters.



Bolted system

- cantilever arms and shelf levels are mounted with bolts
- level spacing can be adjusted in 100 mm increments
- single and double sided configurations

The bolted system is based on very solid column and cantilever arm steel profiles.

A broad range of accessories completes our offer.

Static calculations are made according to the specifications of official testing institutes.

BITO also provides suggestions as to the optimum flooring qualities.

- 1 Column**
- 2 Cantilever arm**
- 3 Connector beam**
- 4 Diagonal bracing**
- 5 Cantilever arm bridges**

① Columns

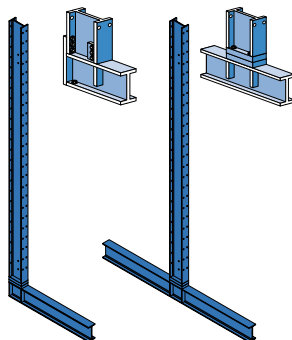
For single and double sided configurations.

Columns and column feet from hot-rolled IPE-profiles (IPE 120 – IPE 500)

Delivery includes floor anchors and shims.

Height options: 2 to 12 m

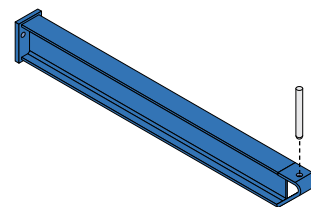
Useful depth: up to 3 m



② Cantilever arms

Made from hot-rolled IPE profiles (IPE 80 – IPE 180)

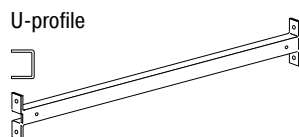
Useful depth: up to 3 m



③ Connector beams

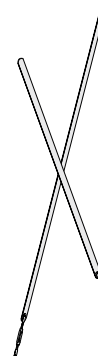
Connects columns to form a rigid unit.

Accommodate diagonal bracing.



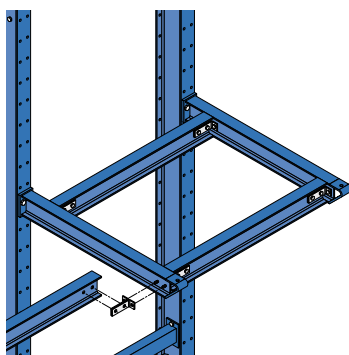
④ Diagonal bracing

Increases lengthwise racking rigidity.



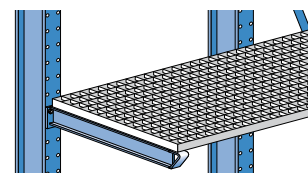
⑤ Cantilever arm bridges

Bolt-together unit give solid support to pallets, chipboard and wire shelves.



Mesh decking

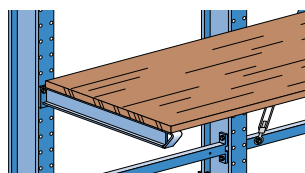
Supplied according to your specifications.



Chipboard decking

V20, E1, 38 mm

Delivery includes fixing material.



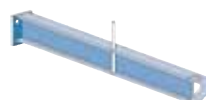
Spacers / End stops

Various spacers / end stops can be adjusted along the length or at the end of cantilever arms.

Standard



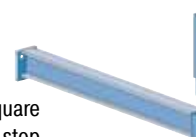
Spacer



Welded-on end stop



Push-fit square tubed end stop



Surface finish

For indoor use

- Columns + arms**
- profiled steel, shot-blasted
 - electrostatic, water-based single layer paint film; in line with the latest emission regulations
- Diagonal bracing**
- strip steel, galvanised according to EN 10 326
- Column bracing**
- bay width $\leq 2,25$ m: U-profile, galvanised steel according to EN 10 326
 - bay width $> 2,25$ m: painted steel tubes



For outdoor use

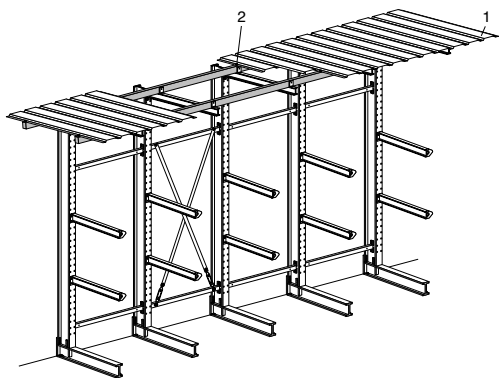
- Columns + arms**
- profiled steel, hot-dip galvanised
- Diagonal bracing**
- strip steel, galvanised according to EN 10 326
- Column bracing**
- bay width $\leq 2,25$ m: U-profile, galvanised steel according to EN 10 326
 - bay width $> 2,25$ m: painted steel tubes



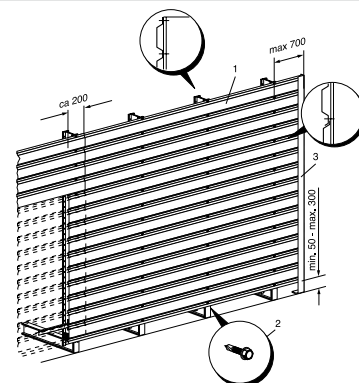
Hall and racking from a single supplier



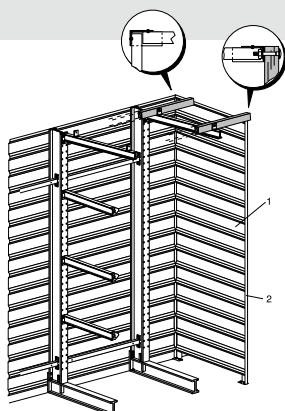
① Roof from troughed sheet steel



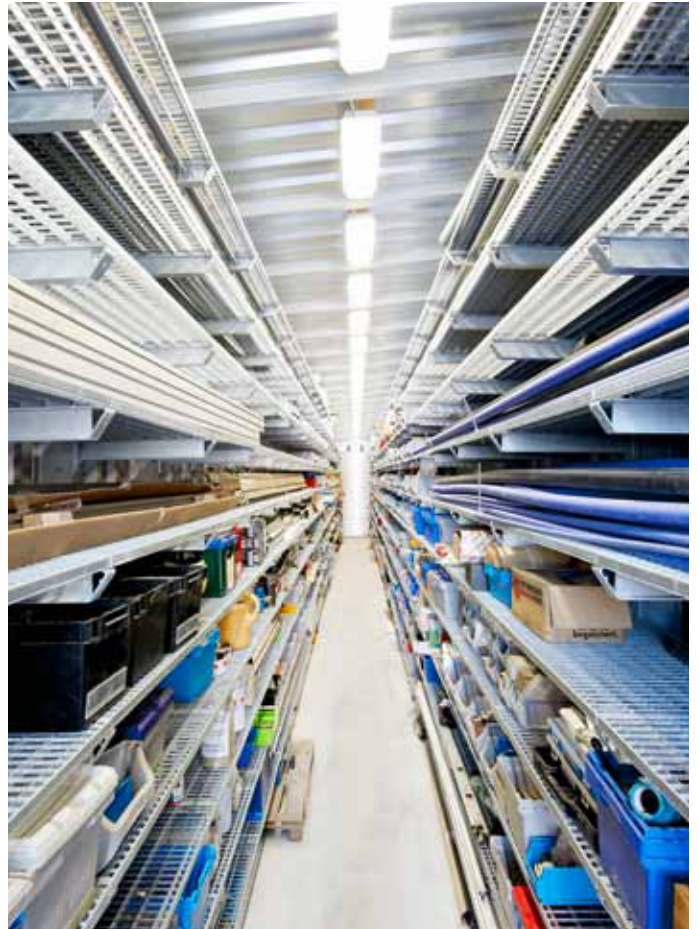
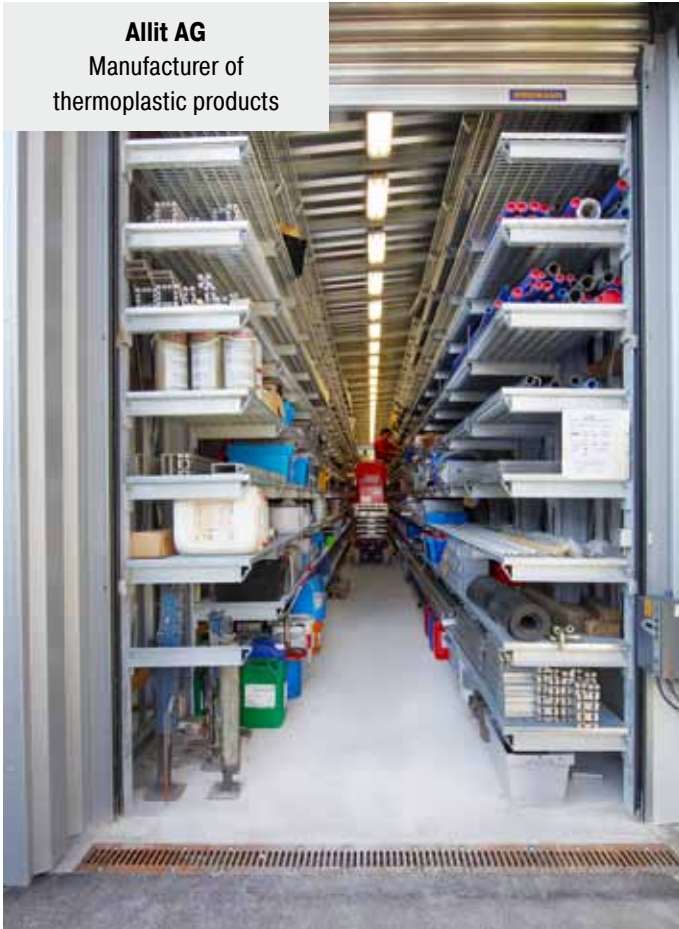
② Back cladding from troughed sheet steel



③ Side cladding



Allit AG
Manufacturer of
thermoplastic products



Features

- storage of materials and production equipment of varying size and weight on mesh-decked shelving
- outdoor store can be locked
- storage area is protected by allround corrugated steel sheet cladding and two roller shutters

Function

The cantilever racking facility has been installed outdoors in order to create more space for production. Cladding on all sides and two roller shutters on the short sides provide dry storage and prevent unauthorised access to materials and parts needed for production. The shutters can be locked after working hours.



Benefits

- dry storage outside the production plant
- storage area can be locked
- storage capacity has been outsourced to save valuable indoor space



Hörmann KG

Manufacturer of
doors and gates



Features

- cantilever racking used as intermediate stock for finished products
- replenishment and retrieval with front stackers

Function

The Hörmann group is one of the leading suppliers of construction elements such as doors, gates, casing and drive systems. The dispatch area is used as intermediate store for the broad product range offered by the family owned enterprise. For this purpose, this area features cantilever racking in single or double sided configuration, mounted along the walls or in the middle of the hall. Some of the products stored are very heavy. The racking units are loaded with front stackers.



Benefits

- easy-to-access intermediate storage of collated orders ready for dispatch
- optimum utilisation of warehouse height
- heavy load storage



Mobile pallet racking at its best: BITO PROmobile

Floor space optimisation and storage density are key to any consideration of cutting down on warehousing costs. When your aim is to make optimum use of existing floor space or to reduce floor space occupation in order to create space for another purpose, a mobile racking installation will be the most efficient solution.

Depending on which system is installed, storage capacity increases by up to 180% and floor space occupation reduces by up to 50%. These savings translate into a real money value, as investment costs are reduced considerably if a new warehouse is to be constructed.

Modern warehouse management systems that ensure an efficient workflow/product flow, thorough planning and knowledgeable support from concept to completion are a sound basis for forward-looking solutions which will also make your warehouse operate more efficiently.

BITO

www.bito.com



Product information

Frequent application

- supply store
- seasonal store
- deep-freeze environments/cool room storage
- tool store

Service options

- manual servicing
- fork lift truck servicing
- fork lift truck servicing with remote control support

Space utilisation

- excellent floor space utilisation of up to 75%

Stock rotation frequency

- low to medium

Product line diversity

- high

System specific solutions



Mobile pallet racking operated in a deep-freeze environment



Safety

The German quality mark RAL-RG 614 guarantees the highest levels of quality for structural safety, load capacity and sufficient rigidity both lengthwise and front to back.



All components fully comply with the latest safety regulations.



CE Certificate of Conformity

BITO-Lagertechnik herewith declares that all engine parts of the PROmobile system conform to the latest safety regulations and standards. The sophisticated BITO safety concept provides for all potential health and safety hazards by

- carefully selecting high-quality components
- making sure that the installation meets all functional requirements
- ensuring a very high degree of operational safety



Mobile cantilever racking for long loads



Mobile pallet 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"

Our **PRODUCT CATALOGUE** provides detailed information on our entire delivery programme.

Ask for your free copy!



Advantages of the system

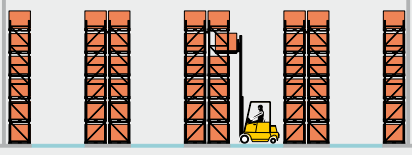
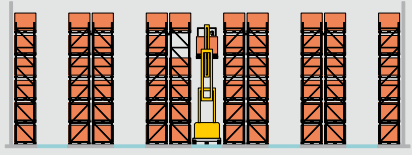
General advantages of mobile storage installations

- optimum floor space utilisation
- improved storage capacity
- reduction of floor space costs as compared to static storage
- increase in storage capacity by up to 180% over conventional solutions
- good utilisation of warehouse volume
- adaptation to customer needs will result in low cost solutions
- direct access to all items and 100% availability of all reference lines
- very cost efficient solution for cold storage as compact storage saves energy costs



Compact storage

- very good utilisation of storage volume

Static pallet racking with reach truck servicing		Static pallet racking with narrow aisle truck servicing		Static pallet racking PROmobile with reach truck servicing	
					
Aisle width:	4 x 3.000 mm	Aisle width:	5 x 1.800 mm	Aisle width:	1 x 3.000 mm
Pallets levels:	6	Pallets levels:	6	Pallets levels:	6
Storage capacity (in Euro pallets):	1.008	Storage capacity (in Euro pallets):	1.260	Storage capacity (in Euro pallets):	1.764
Costs of storage premises:	ca. 560.000,— €	Costs of storage premises:	ca. 560.000,— €	Costs of storage premises:	ca. 560.000,— €
Purchase of racking installation:	ca. 20.160,— €	Purchase of racking installation:	ca. 25.200,— €	Purchase of racking installation:	ca. 105.840,— €
Purchase of conveyor technology:	ca. 24.000,— €	Purchase of conveyor technology:	ca. 57.000,— €	Purchase of conveyor technology:	ca. 24.000,— €
Investment in total:	ca. 404.160,— €	Investment in total:	ca. 642.200,— €	Investment in total:	ca. 689.840,— €
Total costs per pallet position:	ca. 600,— €	Total costs per pallet position:	ca. 510,— €	Total costs per pallet position:	ca. 391,— €
Floor space utilisation	This figure serves as a base for calculating	Floor space utilisation	Increase in storage capacity	Gain in floor space	Cost reduction
40 %	- increase in storage capacity - gain in floor space - cost reduction	51 %	25 %	11 %	18 %
Floor space utilisation	Increase in storage capacity	Gain in floor space	Cost reduction	Floor space utilisation	Increase in storage capacity
75 %	75 %	35 %	53 %	75 %	75 %

Economic evaluation

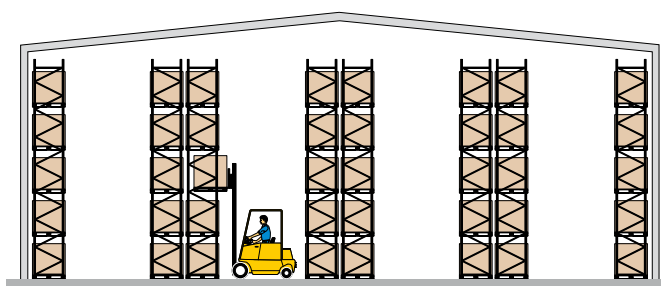
Substantial savings of floor space in new constructions

If a new hall is to be constructed, storage in mobile installations is a very competitive solution without compromising on product accessibility. Mobile racking is an ideal option for product ranges with a low to medium turnover.

- compact storage requires less storage volume
- reduced floor space occupation as only one aisle is required
- savings of energy costs, particularly in deep-freeze environments
- substantially reduced investment costs

Example:

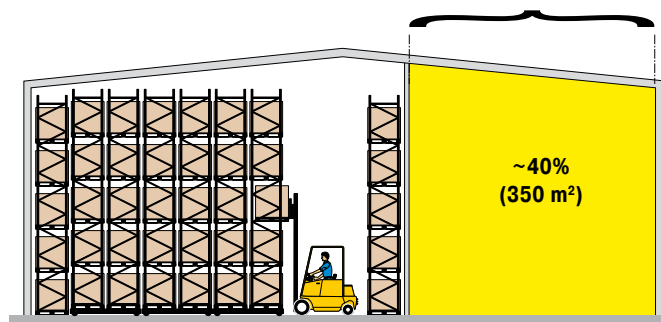
Surface area 800 m² = 1.008 pallet positions



Conventional pallet racking

Surface area 450 m² = 1.008 pallet positions

Floor space occupation reduces by:



BITO PROMobile pallet racking

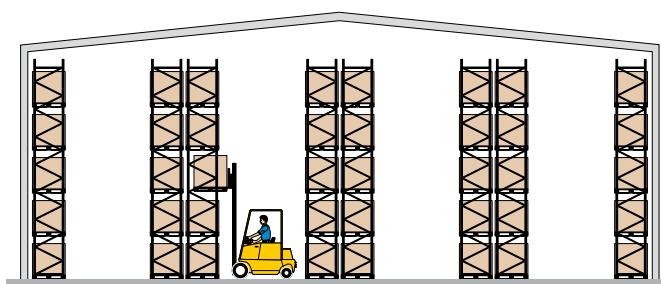
Important gains in storage capacity in existing premises

If setting up a new building is no option, mobile storage is an excellent solution to increase storage capacity in an existing storage environment. As only one aisle is needed to access all product lines, this solution offers enormous space savings compared to a conventional facility where each racking block needs a service aisle. The space saved can either be used for another purpose or to install further racking rows.

- substantial increase of storage capacity on the same surface area
- no costs for setting up a new building
- improved utilisation of warehouse volume
- optimum use of floor space in the existing premises

Example:

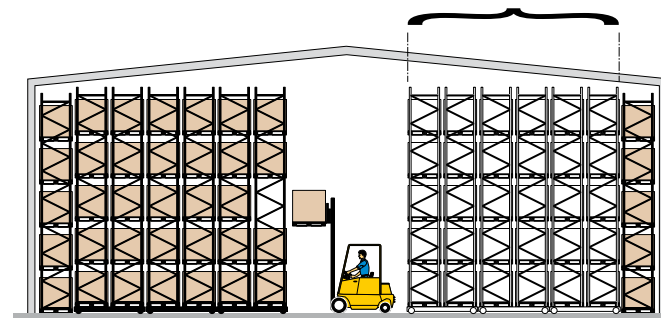
Surface area 800 m² = 1.008 pallet positions



Conventional pallet racking

Surface area 800 m² = 1.764 pallet positions

Storage capacity increases by
~75% (756 pallet positions)



BITO PROMobile pallet racking

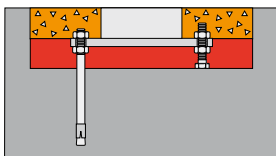


PROmobile – Rail options

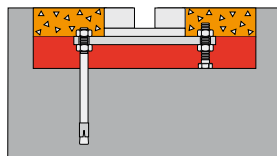
Flat rails - for existing flooring

- various rail widths for light, medium and heavy duty applications
- millcutting of rail beds to be realised by client
- supporting cast from non-shrink mortar supplied by BITO
- bed in-fill to be supplied by client

Flat rail



U-type guide rail

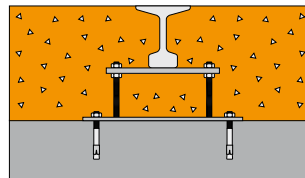


- Bed in-fill
- Supporting cast from shrink-free mortar supplied by BITO
- Existing floor slab

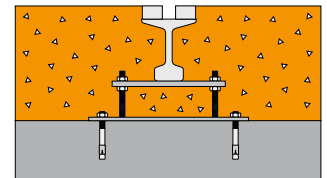
Crane rails - for new flooring

- various rail types for light, medium and heavy duty applications
- installation on raw concrete, in-fill with final floor layer
- installation on strip foundation, in-fill with monolithic floor plates (single surface flooring)
- floor plate dimensioning and static calculations to be made by customer

Flat rail



U-type guide rail



- Floor plate / Final floor layer
- Strip foundation / Raw concrete

PROmobile – Mobile base

Mobile base units are hard-wearing and torsion-resistant. Realised from hot-rolled profiles to guarantee high rigidity and dimensional stability for smooth operation. Flat steel leashes and welded base frames further increase stability.

Geared motor

- each mobile racking base is driven by at least one electric motor
- number of drives depends on the length and the load capacity of the mobile base
- robust flange couplings
- operating speed 4,7 m/min



Full-length shaft

- all mobile racking bases are connected to the motor by a full-length shaft
- guarantees parallel running of all mobile base units



Connecting plate

- solid connecting plate for optimum absorption of static and moving loads



Photo-electric cells

- protects mobile racking base as well as persons and objects from collision damage
- a solid steel angle protects the light barrier unit



Foot panel und wheel protection cover

- optimum protection for wheels and rails
- neat look of short sides of mobile racking base





PROmobile – Control system

Switch cabinet

This cabinet accommodates the most important part of a mobile racking installation: the control system. Made of high-quality components. Touch screen display is on the front.



Control module

- most recent version
- all-in-one embedded controller
- high degree of flexibility
- customer specific programming clears the way for innovative solutions
- even when the mobile base is executing a move, it is possible to change direction
- little time required for analysing and correcting operator errors



Frequency converter

- standard feature which ensures smooth starts and stops
- allows to move a mobile base into its exact position



Touch screen display

- simple and innovative operational mode
- user-friendly touch screen display
- no downtimes and delays during trouble shooting
- display is available in various sizes



Remote control unit on each mobile base

- easy to use
- emergency stop button (included in the BITO safety concept)
- intuitive operation



Light barrier at aisle entrance

- photo-electric cells stop mobile base movement as soon as a truck or an operator enters the aisle
- additional photo-electric cells (optional) register all trucks entering and leaving the aisle. Automatic aisle unblocking. No manual aisle clearance required.
- the system meets highest safety standards by distinguishing trucks from persons



PROmobile – Steering options

Intelligent aisle illumination

- as soon as an aisle is opened, aisle lighting switches on automatically
- reacts as soon as a mobile base starts to move
- time setting possible via touch screen display



Radio remote control

- facility can be controlled with one or more radio remote controls
- one radio control per truck is advisable



Separate control panel

- typical solution for cold stores
- switch cabinet is installed in normal temperature environment



Picking function

- 4 picking settings can be freely programmed by customer
- if required by customer, several aisles for order picking can be opened simultaneously
- stock control function
- night setting is supplied as standard function



Keyless Go

- allows to assign operator authorisations
- chip identifies the operator and gives clearance to operate the system



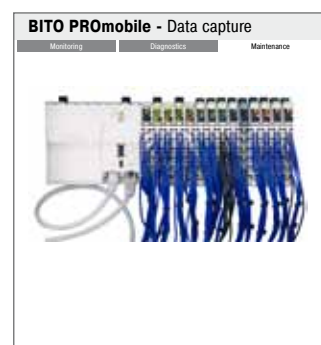
Electric sockets on mobile base

- plug-in for of external equipment such as vacuum cleaners for weekly cleaning of guide railing



Data capture and log file creation

- the system lists all in-feeding and out-feeding operations as well as error messages
- provides the basis for material flow analyses



Remote maintenance option

This option allows external network access to displays and control systems for analysing and eliminating operator errors. System infrastructure is to be supplied by customer.





Brezel Ecker
Frozen foods



Features

- PROMobile pallet racking operating in a coldstore
- installation groups ready-for-despatch orders according to despatch route
- ground clearance allows order picking with straddle based pallet stackers

Function

For more than 80 years, Brezel Ecker GmbH in Homburg-Erbach has been distributing a large range of deep-frozen products such as pretzels, pizzas and pastries in compliance with the International Food Standards (IFS). The goods are stored in cartons on pallets. In-coming goods are stored in PROMobile racking which consists of two blocks separated by a main aisle. The mobile installation ensures accessibility to all product lines.

The products are picked order-related on pallets which are grouped together according to despatch route.

System specific advantages make PROMobile pallet racking particularly efficient in cold store applications as high storage density helps to save on energy costs.



Benefits

- compact storage
- very efficient for cold storage
- ideal for storing a huge number of reference lines
- all pallets are in direct access
- system is designed to prevent idle times
- versatile in use



Nellen & Quack
Transportation



Installation features

- racking installation and carriages have been designed in special imensions to suit customer's large-size storage units
- high flexibility in view of distances between levels, load capacities per level/bay
- separate safety and installation steering units

Function

The truck operator is directed by a terminal. All racking run movements are monitored and effected via remote control. Manual replenishment and order picking is also possible.

Benefits

- customer-specific configuration
- short travel routes
- further modifications to customer specific requirements are possible



Hörmann KG
Manufacturer of
doors and gates



Features

- mobile pallet racking installation used as production buffer
- replenishment and retrieval with front stackers

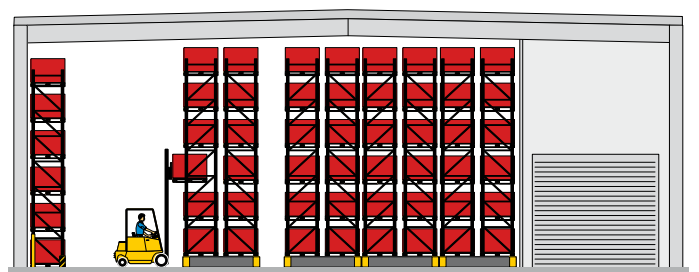
Function

The Hörmann KG is one of Europe's biggest suppliers of doors, gates, casings and drive systems. In their depot in Steinhagen, a mobile pallet racking facility serves as buffer stock for the production area. Production elements are stocked as complete pallet loads or in wire-mesh box pallets which are also retrieved as complete units. Loading and retrieval is done with front stackers. As a mobile installation operates with a reduced number of service aisles, optimum use can now be made of the available warehouse floor space. Access to all pallets is possible at any time by opening or closing the required aisle.



Benefits

- all reference lines can be accessed at any time while optimum utilisation of warehouse space is ensured
- fast order throughput due to the warehouse management system link-up
- if required, several narrow picking aisles can be opened at the same time





uvex

UVEX

Protective equipment for people
at work, sport and leisure



Features

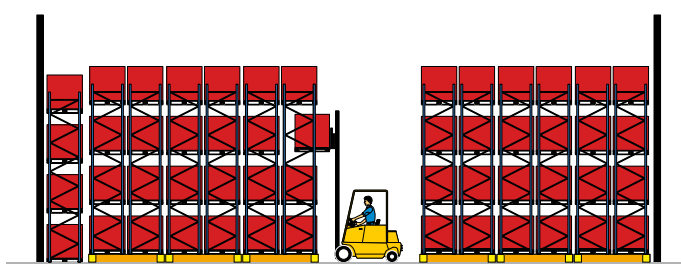
- mobile pallet racking
- material supply for final assembly
- storage of finished goods for dispatch

Function

In their safety line, UVEX Arbeitsschutz GmbH in Fürth is a distributor of safety eyewear and respiratory protection masks. Products assigned for final assembly as well as finished products are stored in palletised bins, containers and cartons on mobile pallet racking. Pallets are fed out for order picking as required. As mobile installations do not need several service aisles, floor space occupation is considerably reduced. i.e. can be optimised. By opening a racking aisle where and when required, all pallets can be accessed at any time. Replenishment and retrieval are effected by hand pallet truck or front stacker.

Benefits

- compact storage saves on floor space
- good utilisation of the available warehouse volume
- instead of one broad aisle for fork lift truck servicing, it is also possible to open several narrow picking aisles





Plastic bins and containers

BITO provides a huge range of bins and containers for any application – from order picking containers over various stacking container series in Euro footprint to the very successful multi-purpose container series, from bins and trays for automated storage to containers in pallet size.

In working out the optimum, customer-oriented solution, the BITO R&D department is also able to respond to specific customer applications and to coordinate the introduction of new bin and container types – from the initial steps to the three-dimensional, digital model, from the prototype to the final product ready to be manufactured in series.

Reduction of packaging waste, lower storage and freight costs, easy handling, a robust make, a broad range of models and sizes and a 5 year warranty on quality and function are just some of the features and benefits of BITO bins and containers.

BITO

www.bito.com



Product information

Storage bins

- many size options with pick opening on the short side, smart accessories

Stacking containers with Euro-footprint

- available in many sizes and models
- dimensions adapted to the size of Euro pallets

Trays

- "adapter" for unit loads which, by their characteristics, would not be suited for automated bin storage

Bins and containers for small parts storage

- large choice to suit any of your material flow needs

Volume savers MB

- transport, picking and storage container in one

Large volume containers

- handling with hand pallet and fork lift trucks

Plastic pallets

- various models available

Customer specific solutions

- We provide a solution for every application!



Frequent application

- automated and manually serviced facilities
- order picking
- despatch and transport/distribution of goods



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"

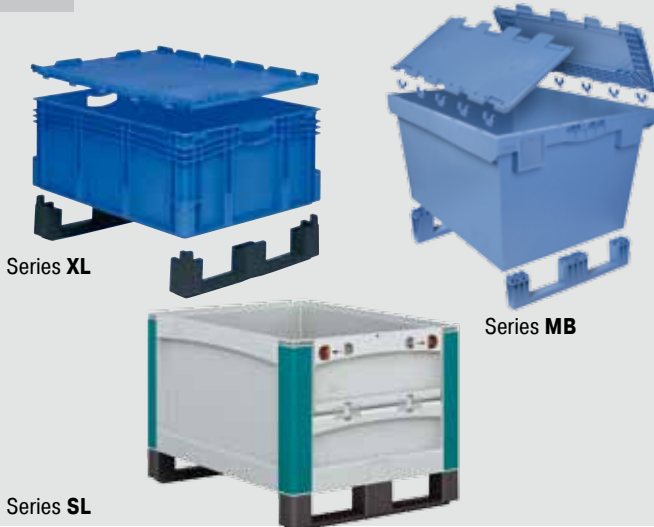
Our **PRODUCT CATALOGUE** provides detailed information on our entire delivery programme.

Ask for your free copy!



Our “project containers” in overview

1 Large volume containers sized 800 x 600 mm



- large volume containers of the XL, MB and SL series are the size of half a Euro pallet
- XL and MB containers with double base and runners have a load capacity of 200 kg
- SL containers fitted with runners can carry up to 500 kg
- containers with runners are suited for hand pallet truck and lift truck handling
- suited for automated bin storage
- hinged lid optionally available
- broad range of accessories

2 Multi-purpose containers, series MB



- up to 75% less volume when nested empty
- designed for a long service life
- reduces packaging waste
- no unnecessary repacking
- transport, storage and order picking container in one
- also available in the size 800 x 600 mm
- accessories: security tags, lid, stacking rails, container dollies, connector clips, etc.

3 European standard stacking containers, series XL



- containers have Euro-footprint
- large inside volume
- various base options
- also available in the size 800 x 600 mm
- with pick opening (windows from polycarbonate)
- ergonomically designed open hand grips
- label holders on all 4 sides
- container dimensions are in line with the size of Euro pallets
- accessories: handle, label covers, dust cover, container dolly, etc.

Our “project containers” in overview

4 Small parts containers, series KLT

- various base options:
standard base, double base and ribbed base
- ideal for automated handling
- high rigidity
- ideal container for automated bin storage facilities
- accessories: security tags, lid, container dolly, etc.



5 Trays

- compatible with most stacker crane types
- smooth outer base ensures silent handling
- inner ribs provide high rigidity
- special designs for any requirement
- “adapter“ for unit loads which, by their characteristics, would not be suited for automated handling
- interstackable with stacking containers BN, XL, KLT
- optionally available: push-fit fixings



6 Storage and handling bins, series RK

- perfectly fitting into BITO shelving systems
- large inside volume
- high rigidity
- very good stacking stability
- large choice of accessories: safety/carry handle, dust cover, dividers for front to back and side to side subdivision, etc.



7 Storage bins, series SK

- textured base and rounded edges provide optimum travel characteristics
- insertable window has a firm fit and can also be opened when bins are stacked
- safe stacking due to positive locators on the stacking edge
- comfortable integral hand grips
- supplied with label card
- 9 models in 5 size options



Heavy duty SL containers 800 x 600 mm

- 2 height options (520 mm and 720 mm)
- half-drop door optionally available on short or on long side
- can be handled with hand pallet truck or with fork lift truck
- stackable
- suited for conveyors and live storage installations
- runners can be exchanged
- 2 lid variations (two-part hinged lid and drop-on lid)
- snag-free internal sides allow easy cleaning
- container version for use in automated bin storage can also be supplied


Material:
Standard version:

from PP copolymer

Optionally available:

 from regranulated PP,
colour: black or dark grey

ESD version:

 electrically conductive,
colour: black


Stacking load 1.500 kg

high rigidity and long service life

lightweight alternative to same size metal containers

NEW!

Load capacity

500 kg

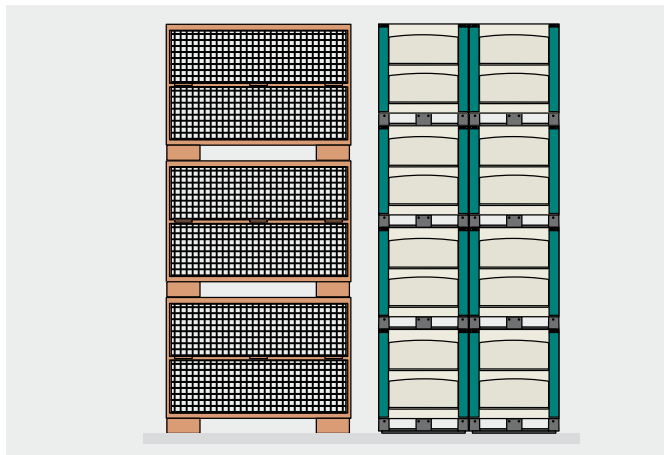

Features

Optimum container size

...particularly in LEAN PRODUCTION environments

The advantages of this series are particularly valuable for lean production operations.

The 800x600 mm SL container is a forward-looking solution to meet the trend towards reduced batch sizes in production and assembly operations. This means that in many cases, the filling height of bulk storage containers and wire-mesh box pallets in use is not reached any more. While the remaining filling space is unused, floor space occupation is still the same. Another contribution to process improvement is that empty SL's can be moved manually – ideal for operations without powered lift trucks.



Safe and clean in operation

Smooth interior sides are soil-resisting and very easy to clean. The closed sides and base help to keep dirt out and in case of any leaking from stocked items, liquids or grease will not soil your shop floor or pollute the environment.



Dual colour design

...ensures that everything is kept in the right place

Corner uprights can be different colour to containers.

Colour coding facilitates stock identification, allows to attribute containers to various areas of operation or to match containers to your corporate colours!

Ask for minimum order quantities!



COLOURS create CLARITY!



Features



Lid variations

- **hinged two-part lid**
firmly attached, suited for strap-sealing, can be locked with security tags
- **drop-on single piece lid**
perfect protection against soiling, drop-on fitting, can be removed any time



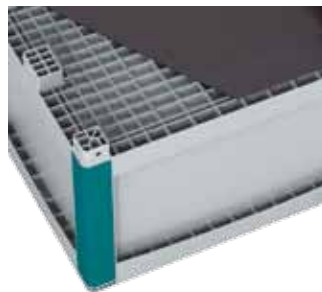
Runners

- **convenient handling with a fork lift truck or a hand pallet truck**
- **easy to mount and to remove**



Double base

- **welded sandwich construction for high load capacities**
- **version for automated bin storage (smooth base, no runners) can be supplied upon request**



Half-drop door

- **can be supplied upon request, available on long or on short side**
- **no jamming**, synchronised hinges provide smooth motion
- **only one hand needed to close door**



Accessories

- container dolly
- hand pallet truck with a fork length of 600 mm
- intermediate drop-in layer
- divider strips
- rubber anti-slip matting
- label holders
- document pockets



Applications

Lift truck serviced operations

For all operations where materials are handled with fork lift trucks, runners with large entry gaps for all truck designs ensure excellent mobility. Even in stacks of two and fully loaded, truck handling of SL containers is safe and fast.

- excellent mobility



Environments without powered service vehicles

In line with LEAN PRODUCTION principles, modern plants increasingly organise their material flow without the help of fork lift trucks. BITO SL containers are also perfect for these working environments, as they can be moved with a hand pallet truck with a fork length of 600 mm or with a container dolly.

- low tare weight allows manual container handling
- filled with products, SL's are easy to handle with a hand pallet truck



Product supply

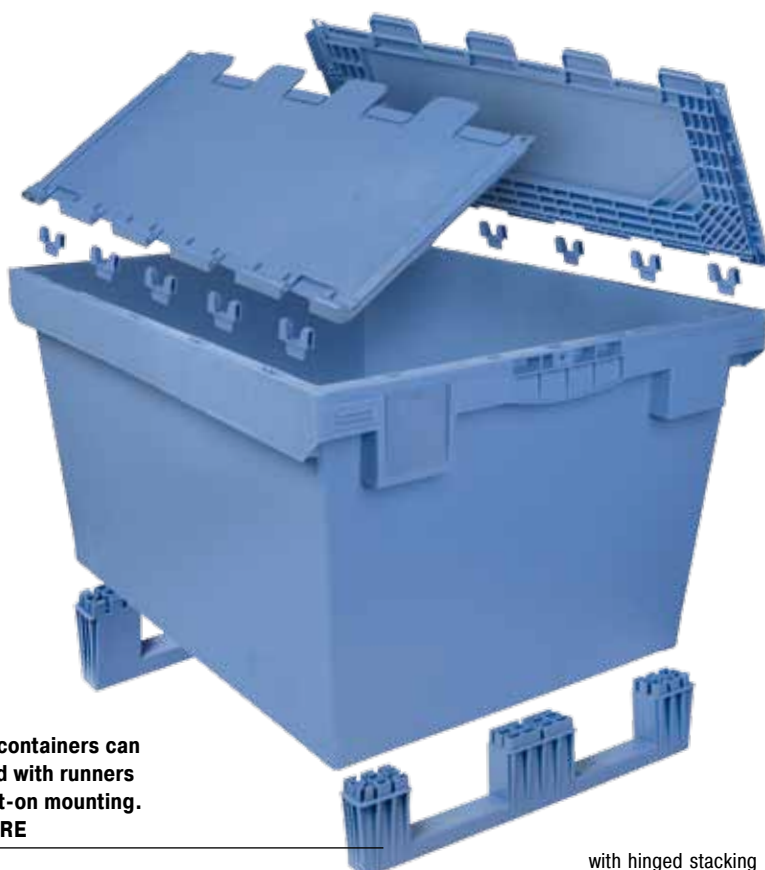
SL heavy duty containers can be conveniently moved with a dolly – whether empty or fully loaded. Supporting the LEAN principle, the SL series is ideal for operations in which materials are handled without fork lift trucks.

- empty containers can be moved without lift truck
- goods can be easily accessed, also when containers are stacked



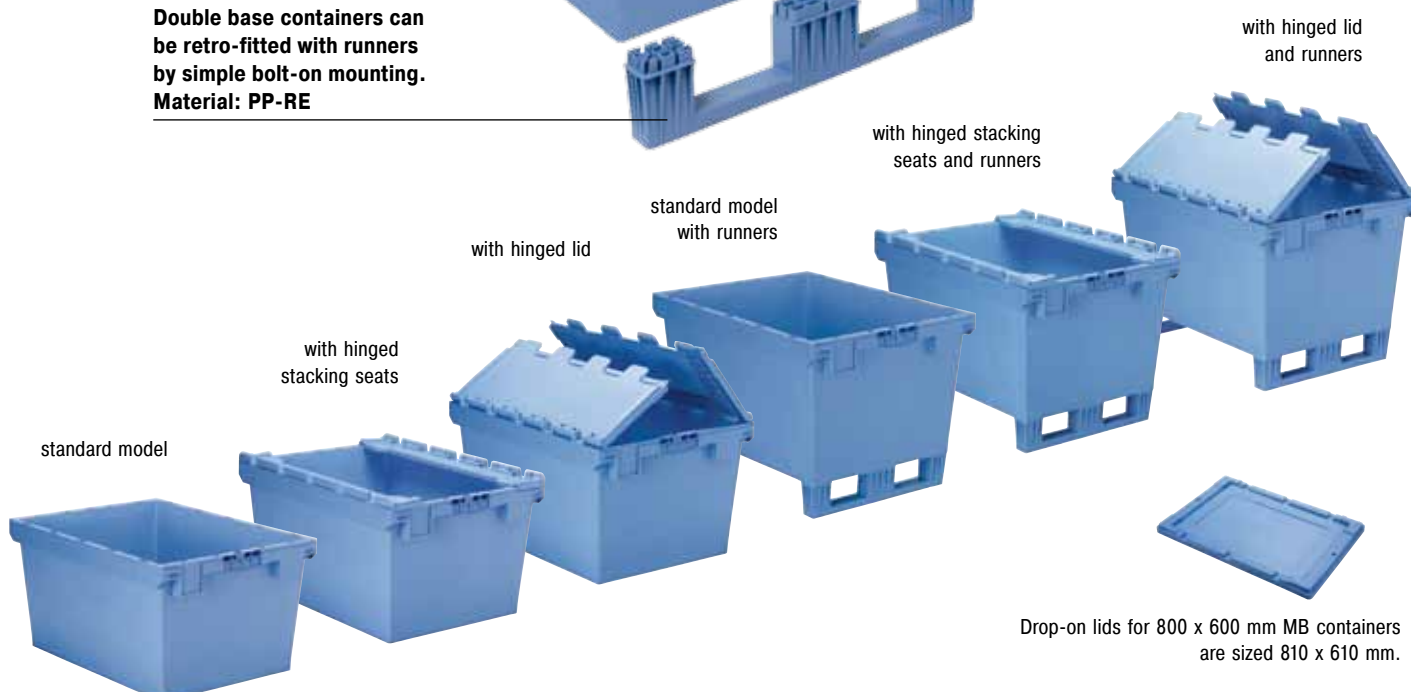
Multi-purpose containers MB 800 x 600 mm

- 75% less volume when nested
- designed for a long service life
- adapted to European standard dimensions
- less packaging waste
- no unnecessary repacking
- stacking load of up to 800 kg



Double base containers can be retro-fitted with runners by simple bolt-on mounting.
Material: PP-RE

Stacking load
200 kg
for double base containers



Base variations

Load capacities of containers with standard base: up to 50 kg, ribbed base: up to 75 kg, double base: up to 200 kg.



Space saving storage



Integrated label covers

Integrated label covers provide room for insertable address labels (paper or cardboard).

Recessed areas accept barcode or RFID labels.



Convenient handling

Closed pocket handgrips allow easy and safe handling.



Safety

The hinged two-part lid together with the well proven, tamper evident BITO security tags provide increased safety against unauthorised access during transport and distribution. Containers can only be opened by breaking the single use security tags.



Label areas with dimpled surface

An area with dimpled surface on the outside of the lid allows exact positioning and removal of adhesive labels.



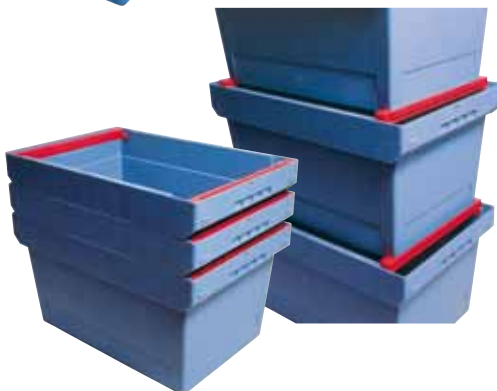
Multi-purpose containers MB

- 75% less volume when nested
- designed for a long service life
- adapted to European standard dimensions
- less packaging waste
- no unnecessary repacking
- stacking load of up to 800 kg



Swivel mounted stacking rails

- allow container stacking without lid



Base dimensions:

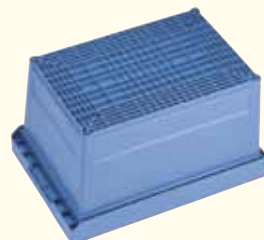
300 x 200 mm

400 x 300 mm

600 x 400 mm



Standard base



Ribbed base



Double base

Save time

The BITO multi-purpose container MB is a storage, order picking and transport container in one. The perfect handling unit for the entire logistic chain. **Avoids unnecessary repacking and related costs.**



Save space

Nested into each other, BITO MB's save up to **75% of freight and storage costs**. Empty containers – also those equipped with stacking rails and lid – are equally suited for nesting. The hinged two-part lids do not build up in stacks.



European standard dimensions

All container sizes of our MB series fit the Euro pallet size of 1200 x 800 mm.

Container dimensions:

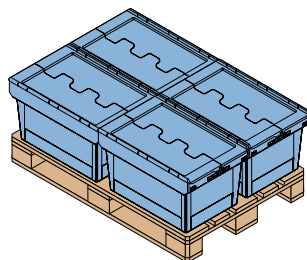
300 x 200 mm

600 x 400 mm

800 x 400 mm

800 x 600 mm

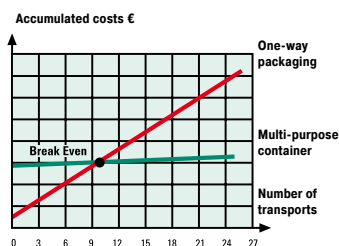
All container dimensions are available in various heights.



Reduce costs

The MB not only helps to protect the environment, but is also very cost efficient. Save money by eliminating unnecessary repacking or repeated ordering of new cartons for the despatch of your products!

Moreover, easy container handling helps you to reduce order processing times.



Warranty

BITO Multi-purpose containers meet the highest demands as to their robust execution and load capacities. Resistant to temperatures of -20 °C up to +90 °C, food safe and recyclable.

All BITO MB's come with a 5 year warranty!



Safety

Tear-off security tags allow **optical control over unauthorised access and secure the lid.**

Meeting the high security standards of insurance companies, BITO MB's with security tag have been permitted as transport unit by parcel services and forwarders.

Company specific colours and marking upon request.





GEPA
Fair Trade



Features

- containers are used for
 - transport
 - storage
 - order picking
- various container sizes and models are employed

Function

“Three in one” – this is the motto which best suits the BITO multi-purpose container series MB which can be used for transport, storage and order picking. Available in various Euro-sizes from 300 x 200 to 800 x 600 mm, this container series offers a high load capacity, comes with or without hinged lid and features smooth inner sides – a real allround talent for any application.

Benefits

- containers can be nested empty to reduce storage volume by around 70%, thus allowing to save on transport costs on return trips
- no unnecessary repacking of loads for distribution
- packaging waste is reduced to a minimum
- containers can be security tagged in order to protect goods from unauthorised access



Voigt GmbH & Co. AG
Pharmaceutical wholesaler



Features

- used as order picking and dispatch unit
- with stacking rails
- pick opening at the short side
- complete with company logo

Function

Voigt GmbH & Co. AG opted for BITO multi-purpose containers with stacking rails and a base dimension of 600 x 400 mm. The containers are 223 mm and 323 mm high and are equipped with durably fitted label holders and 6 barcode labels. Moreover, the facility also operates with BITO multi-purpose containers sized 600 x 400 x 273 mm with pick opening on the short side. The containers with stacking rails are used for order picking. Without the need for repacking, the collated orders are dispatched in the same containers to some 1500 pharmacists and drug stores.

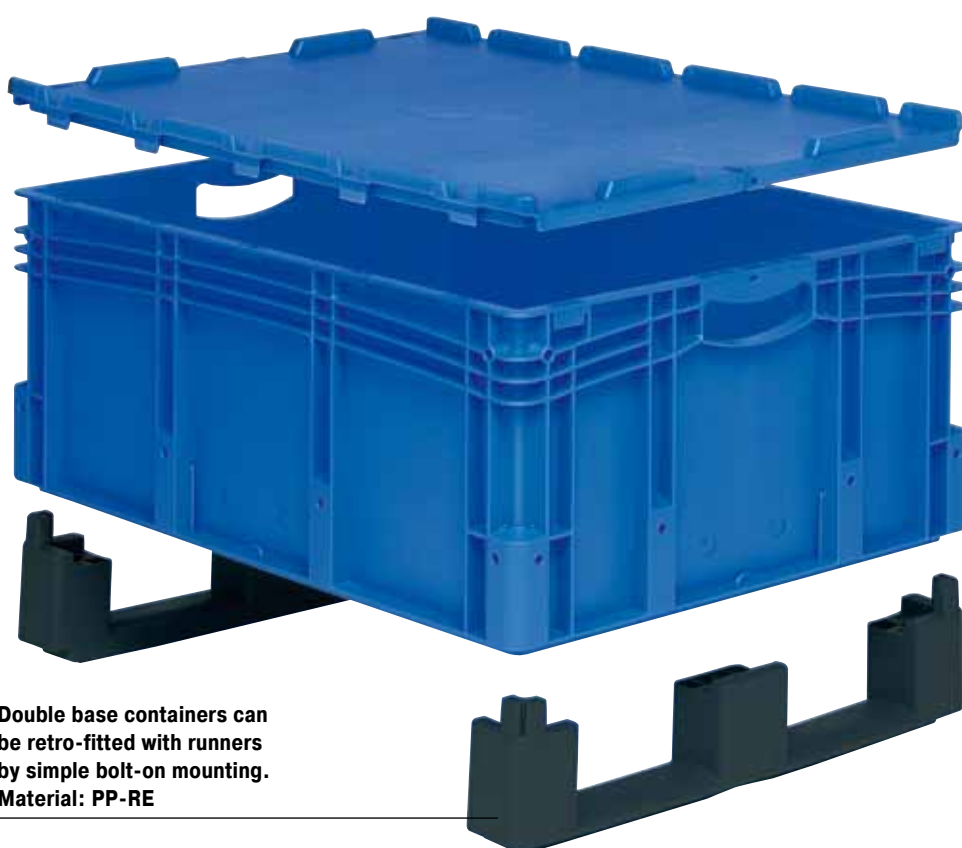


Benefits

- with their dimensions and their textured base the containers are ideal for handling on conveyors
- the container volume has been chosen to suit standard dispatch quantities
- no need for repacking the goods, as orders are picked directly into the dispatch containers
- stacking rails provide safe stacking along with full volume utilisation
- when nested, 75% of the container volume is saved on return trips

Stacking containers XL 800 x 600 mm

- optionally available with runners for hand pallet truck and fork lift truck handling
- label holder on all 4 sides
- large hand grip with rounded hand rest
- location holes for lifting devices
- centering holes on all sides for automated bin handling



Double base containers can be retro-fitted with runners by simple bolt-on mounting.
Material: PP-RE

Stacking load
200 kg
for double base containers

5 height options:

120 mm

220 mm

320 mm

420 mm

520 mm



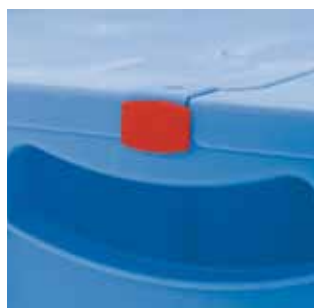
Base variations

Containers with a standard base have a load capacity of 60 kg, double base containers can take loads of up to 200 kg.



Hinged lid

The hinged lid allows safe stacking. It can be security tagged and is firmly attached to the containers.



Handgrip variations

The ergonomically designed open hand grips allow convenient carrying. They can also be located on the container's long sides. Closed pocket handgrips protect the contents from dust and unauthorised access.



View and pick opening

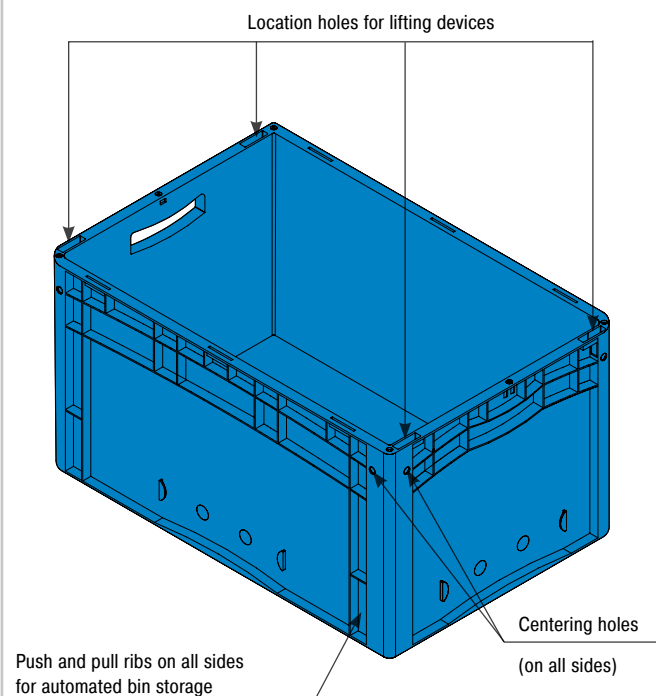
Containers with view and pick opening allow convenient order picking, even from stacked containers. Optionally, the opening can be closed by a window to protect the contents.



European standard stacking containers XL

also refer to page 86-87

Construction details to support automated handling



Advantages

- many models and sizes
- numerous accessories
- containers can be subdivided by insertable bins, longitudinal and cross dividers
- barcode areas on the hand grip sides
- reinforcing ribs provide high rigidity
- tamper evident security tags



Large storage volume

Due to the optimised side construction of XL containers, storage volume is particularly large.

- large inside volume



Ribbed base

Ribbed base containers can carry up to 50 kg and have a very low base deflection of 5 mm max.

- high rigidity
- load capacity of up to 50 kg*
- max. base deflection of 5 mm*



EURO footprint

Stacking container dimensions have been adapted to the size of Euro pallets which avoids repacking loads for further transport.

Stacking loads:

400 x 300 mm = 250 kg
600 x 400 mm = 300 kg

- sizes adapted to Euro pallets
- no repacking of loads for despatch



Double base

Double base containers can carry up to 50 kg and have a very low base deflection of 2 mm max. With their smooth outer base, the containers offer particularly good travel characteristics on conveyors.

- high rigidity
- load capacity of up to 50 kg*
- max. base deflection of 2 mm*



* All load capacities indicated refer to UDL, lengthwise storage and an ambient temperature of 23 °C



Wenglor Sensoric GmbH
Sensor systems



Features

- ribbed base containers have a load capacity of up to 50 kg
- containers are made from electrically conductive polypropylene
- containers complete with barcode labels and logos applied in tampon print
- container sides are completely closed

Function

The company develops, manufactures and distributes sensors for contact free object recognition for use in mechanical engineering and in the packaging industry. In order to ensure that the optimum filling height is not exceeded, Wenglor opted for XL stacking containers type XL64121R and small parts containers KLT type 64220R to stock their electronic parts. The ergonomically designed pocket handgrips allow convenient handling and the electrically conductive material prevents that undesired electric charging could damage the goods. The containers are stocked in an automated bin storage facility.

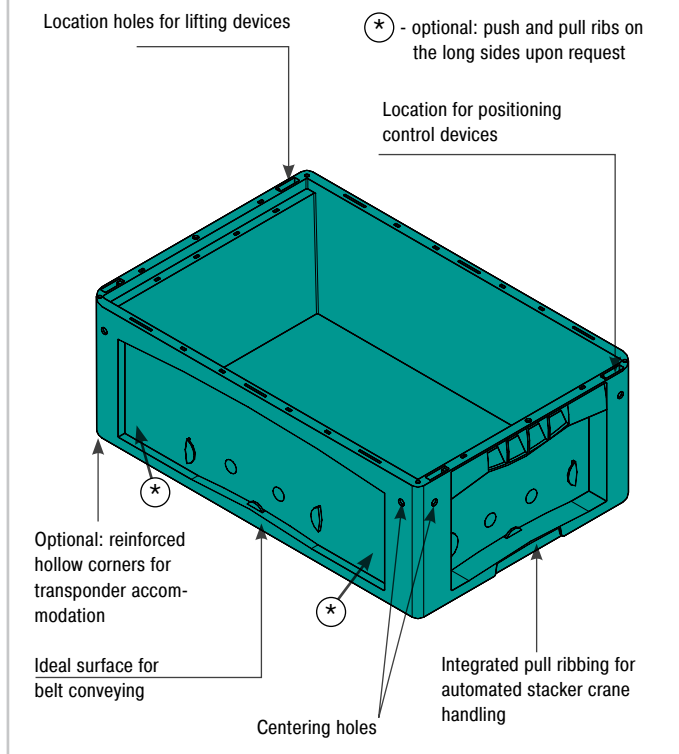
Benefits

- optimum filling height
- ergonomic handling
- container material prevents electro-static discharge
- protection of sensitive components

Small parts containers KLT

also refer to page 88-89

Construction details to support automated handling



Advantages

- many models and sizes
- broad range of accessories
- containers can be subdivided by insertable bins, longitudinal and cross dividers
- tamper evident security tags
- company logos can be applied by tampon/screen print, hotstamping or injection moulding



Standard base

Load capacities depend on the container size and are between 25 and 50 kg.

With the smooth outside surface of the base, the container has particularly good travel characteristics on conveyors.

- load capacities are between 25 - 50 kg* depending on the container size



Conveyor handling

Troublefree operation on all conveyor systems. Outstanding travel characteristics on all roller tracks and roller conveyors, on belt and chain conveyors, transfer lines, etc.

- optimum travel characteristics
- silent operation



Ribbed base

Ribbed base containers can carry up to 50 kg and have a base deflection of less than 1 mm.

- load capacity of up to 75 kg*
- base deflection of less than $< 1 \text{ mm}^*$



Transport

The KLT container dimensions are adapted to the current pallet sizes to make optimum use of a lorry's freight space. Safe stacking of up to 500 kg – this applies to containers with or without lid.

- safe stacking
- high stacking load
- dimensions adapted to the size of Euro pallets



Double base

Double base containers can carry up to 75 kg and have a very low base deflection of less than 2 mm.

With the smooth outside surface of the base, the container has particularly good travel characteristics on conveyors.

- load capacity of up to 75 kg*
- base deflection of less than $< 1 \text{ mm}^*$



* All load capacities indicated refer to UDL, lengthwise storage and an ambient temperature of 23 °C

Plastic trays



Tray storage has become increasingly important in automated storage and is now a cost reducing factor in the logistics business. As a tray can accommodate bins or cartons of various sizes and shapes, it is possible to store also those goods which, by their characteristics, would not be suited for automated handling.

BITO provides plastic trays manufactured in their own plants.



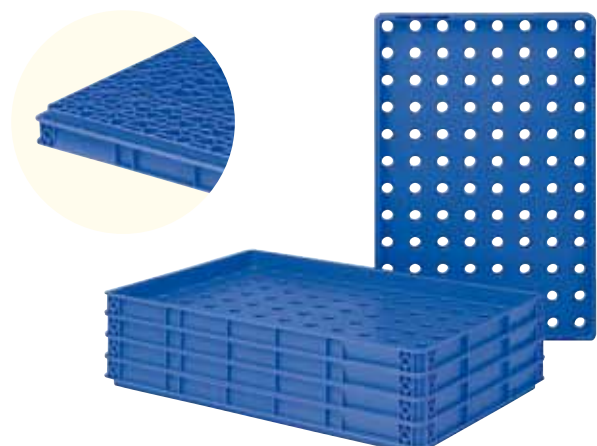
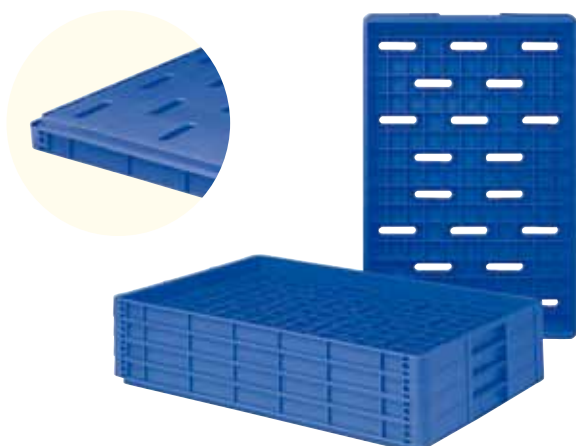
Advantages

- “adapter“ for unit loads which would normally not be suited for automated bin storage; available in the dimensions of 670 x 410 mm, 640 x 426 mm, 600 x 400 mm and 400 x 300 mm
- cartons, even if damaged, can now be handled in automated installations
- safe storage of plastic bins without any features to support automated handling
- appropriate for all types of stacker cranes
- a smooth outer base and edge ribbing make for low noise travelling
- double base (sandwich construction) upon request



Subdivision with Euro-sized bins

applies for tray size 640 x 426 mm





Integrated solutions

Functional and efficient operations are rarely single system stores as to organisation, picking strategy and shelving and racking technology. Seen from the economic point of view, the “optimum” warehouse will always be a combination of several strategies and techniques. With shelving and racking at the heart of a warehouse, the right “mixture” of systems will considerably increase work efficiency in a picking store.

The selection and use of different shelving and racking systems as well as the quantities per reference line to be supplied for order picking are determined to a large degree by reference turnover in a given period of time. In general, the decision on the right warehouse equipment should not be based on the number of replenishment operations, but on reference turnover quantities.

Insufficient stock quantities are also inefficient as this would require too many replenishment operations or lead to workflow disruptions at the picking locations on account of items lacking.

BITO

www.bito.com

Example layouts

Welche Regalsysteme miteinander kombiniert und wie diese im Einzelnen angeordnet werden, ist von mehreren Faktoren abhängig. So können Kommissionierzeiten, Wegoptimierungen, Platzeinsparungen oder der Artikel an sich maßgeblich für die Gestaltung eines Lagers sein. Rationelle Betriebsabläufe, Arbeitszeiteinsparung durch verkürzte Zugriff- und Wegezeiten, Flächen-gewinn, Leistungssteigerung der Arbeiter und somit Erhöhung der Produktivität resultieren aus solchen Investitionen.

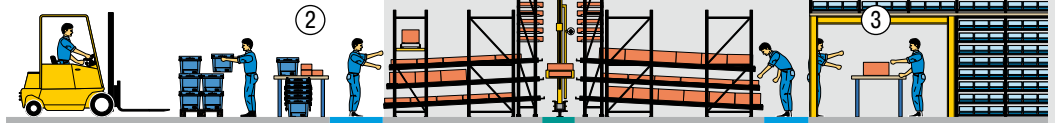
BITO hat sich am Markt durch solche Projekte als feste Größe etabliert. Spezielle Projektteams planen den Materialfluss genau und erarbeiten eine wirtschaftliche Lösung.



1 Example

Together with the carton live storage system, the automated bin storage installation in zone 1 constitutes a central distribution and buffer store. The computer monitored stacker crane continuously replenishes the picking areas (2 and 3).

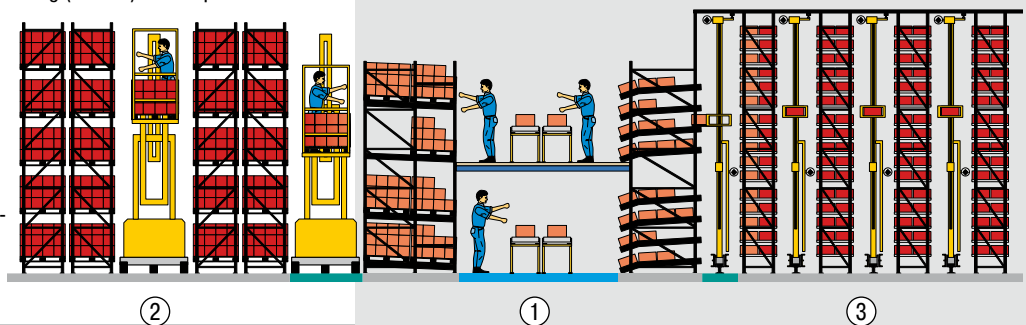
In zone 2, completed customer orders are picked directly into multi-purpose containers and are then transported into the despatch area. Zone 3 has been integrated into a multi-tier installation and is used for final assembly. With the assembly area at floor level and two tiers on top, floor space has tripled.



2 Example

The order picking zone (zone 1) is supplied with goods from two different racking systems. The highbay pallet racking (zone 2) stocks palletised storage units which are fed into a pallet livestorage installation as required. The automated bin storage installation holds individual items which are fed out by stacker cranes into the carton live storage installation in the picking area.

After an order is complete, it is transported to the goods-out department on a powered conveyor lane.

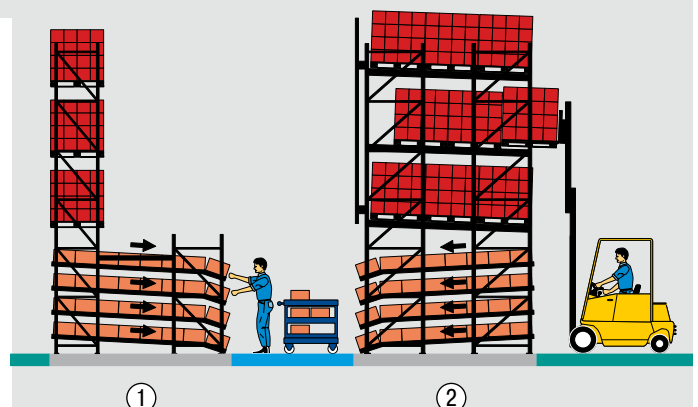


3 Example

The combination of carton live storage with a static pallet buffer or a push-back pallet buffer stock on top is very common. The buffer stock on top always holds sufficient reserve thus avoiding idle times in the order picking area.

Compared to the push-back pallet buffer, the static pallet buffer in zone 1 is the lower cost variation. However, the space on top of the live storage installation is not fully used.

On account of its deeper lanes, the push-back pallet racking in zone 2 provides full space utilisation, thus multiplying potential reserve quantities.



MEWA

Industrial laundry and
textile care service

**Multi-tier facility with
static shelving, carton and
pallet live storage installations**



Features

- further expansion of a continuously growing storage facility
- modular storage installations
- the MEWA warehouse combines several types of efficient storage and order picking systems

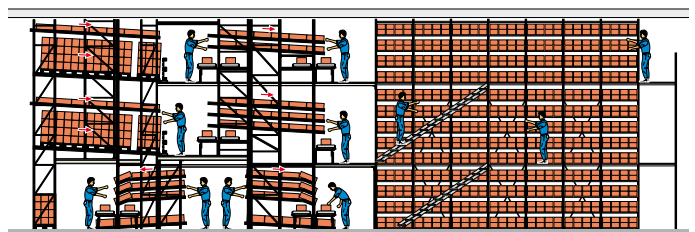
Function

MEWA conceives, provides and develops multi-trip systems for all kinds of textiles used in work environments such as work apparel, protective clothing and technical equipment. Storage, picking and distribution are effected in a logistics centre in Immenhausen which has been constantly growing over the years. Among others, this depot features pallet racking, carton live storage and multi-tier shelving as well as an integrated conveyor system to link the picking stations. The system has been completed in 5 steps. From the beginning, the construction layout and static calculations took further expansion into account.



Benefits

- expansion whenever required is no problem
- existing storage systems and equipment can be integrated into new facilities
- increased performance
- storage and order picking capacities have been doubled





Office Depot

Global supplier of office products and services – mail order depot

Multi-tier facility featuring carton and pallet live storage

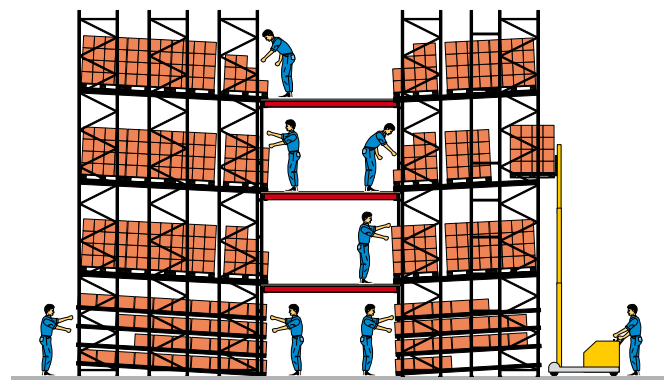


Features

- planning, delivery and assembly of carton and pallet live storage installations, pallet racking and shelving
- modular system provides flexibility
- pick-by-light order picking

Function

Office Depot is a leading provider of office supplies and services. In the course of business expansion, a new distribution centre has been established in Großostheim. A three-tier facility featuring pallet racking and pallet live storage with an integrated platform as well as carton live storage installations with integrated conveyors make sure that order pickers at the picking stations never run out of goods. Due to the modular layout, these systems allow maximum flexibility and optimum adaptation to current requirements. Order pickers are guided by a pick-to-light system.



Benefits

- high throughput
- efficient picking
- short delivery times
- possibility to increase output whenever required
- modular racking layout allows to adapt configuration to material flow requirements

A

Adapta-Flow modules	62-63
Angled pallet seat	111
Angled runner	79
AS/RS installation	76
Automated bin and tray storage	72-89
Automated carton live storage	52, 64-71
Automated installations	19, 52-53
Automated pallet live storage	140
Automated pallet racking	138-141

B

Back cladding	150
Back stop	94
Base plate	79
Base shelf	145
Beam	69, 95
Bin buffer storage	52, 76
Bins and containers	160-173
Block storage	17
Boltless system	22, 144
Bolt-on bracket	111
Bracing	79
Braking roller	119
Broad aisle installation	92, 102
Buffer stock for bins	52

C

Cantilever arm	145, 149
Cantilever arm bridges	149

Cantilever racking	142-151
Carton and pallet live storage	19
Carton live storage	46-63
Castors	40
Chipboard decking	27, 95, 149
Clamping saddle	69
Coil storage	146
Column	33, 145
Column guard	94, 111
Connector beam	145
Connector beam	149
Connector clamp	43
Containers	162-168
Containers for automated bin storage	87, 167-168
Contraflow lane configuration	116

D

Diagonal bracing	145
Double base	85, 87, 167, 168
Double deep storage	18, 79, 82, 92
Drive-in racking	18, 106-111
Drop-in steel panel	95
Drop-on steel panel	95
Dust protection sheet	57

E

Empty pallet handling	129
Empty pallet retrieval	128
Empty pallet return system, BITO type ASP	113, 129, 137
End plate	69
End stop for cantilever arms	145, 147
Entry guide	111
ERGO	44-45

Extractable first pallet position	92, 127, 113, 127
Extractable storage positions	73

F

Fencing	94
FIFO	49, 68, 112
Flow shelf	54
Frame	22, 79, 95, 111
Front lip	43

G

Gap cover	43
Guard railing	27

H

Half-height connector	40
Hand pallet truck retrieval	113, 126
Highbay installation	53
Highbay pallet racking	91, 101
Hook-in bracket	111
Horizontal pallet return	129

I

Inclined shelf levels	146
In-feed guide	119, 133
Integrated buffer stock	76
Integrated solutions	174-179
Inclined shelf levels	146
In-feed guide	119, 133
Integrated buffer stock	76
Integrated solutions	174-179

J

Joist	33
-------	----

K

Kickplates	27
KLT small parts containers	82, 87, 168, 171

L

Label holders	56
Large volume containers XL	162, 164-165
Level decking	27
Levelling foot	69
LIFO	106
Live storage systems	19
Load carriers	78, 84-89, 160-173
Load separator	119
Load spreader	111

M

Mechanical separator	137
Mesh decking	27, 149
Mezzanine floor system, BITO type BBS	32-35, 123
Mobile pallet racking	19, 93, 157-159
Mobile shelving and racking	19, 51, 152-159
Modular storage system BITO ERGO	44-45

Multi tier shelving and racking 20-31, 53
 Multi-position storage 77, 80-81
 Multi-purpose containers MB 162, 166, 170, 172
 Multi-tier order picking 53

N

Narrow aisle installations 18, 93, 96-97, 100, 105, 121

O

Outfeeder lane 73, 79
 Outfeeder track 78, 79

P

Pallet access position 29
 Pallet buffer 51, 59 176
 Pallet extraction unit 98
 Pallet live storage 112-137
 Pallet live storage buffer 120-121
 Pallet racking PRO 90-105
 Pallet support bar 95
 Paperless order picking 60-61, 65, 70-71
 Pick-by-light order picking 60-61, 179
 Picking face configuration 50
 Picking tunnel 116, 120-122
 Picking unit for hand pallet trucks 126
 Plastic tray 88, 169
 Push-back pallet buffer 116, 122
 Push-back pallet racking 19, 115, 123, 134

Push-back rail 136
 Pusher bar 69
 Push-flat guide rail 39

R

Retro-fitting of static pallet racking 62-63, 99
 Return lane for pallet stacks 129
 Ribbed base 85, 87, 167, 168
 Roller conveyor lanes for beverage cases 130
 Roller conveyor stand 47, 55
 Roller conveyor system 118-119
 Roller protector 119, 133
 Roller track 39
 Roller track section 133
 Roller track system 131-133
 Roller tracks 55
 Rollers 119, 133

S

Separate buffer stock 76
 Set-back pallet access position 29, 33
 Shelf 22, 145
 Shuttle-serviced system 77
 Side cladding 150
 Side lip 43
 Side section 39
 Single position storage 76-77, 104-105
 Single tier shelving and racking 20-31
 Sliding access gate 29, 33
 Small parts containers, BITO type KLT 82, 87, 163, 168
 Spacer 149
 Speed reducing end stop 133

Stacking containers XL 85, 162, 167, 173
 Stairway 28, 33
 Standard base 87
 Standard divider 55
 Static pallet buffer stock 176
 Static storage systems 17-18
 Steel tray 89
 Step-up rail 47, 55
 Stiffening beam 22, 40
 Stock control system 54
 Storage and handling bins RK 163
 Storage bins SK with view and pick opening 163
 Supply racking 36-45
 Support clip 55
 Support rail for tubular arms 145
 Support tray 95
 Swing access gate 29, 33

T

Tiltable roller conveyor 113, 124, 127
 Track protector 69
 Tray 88-89, 163, 169
 Tray shelf 22
 Tray storage 83, 88-89, 169
 Tray subdivision with Euro-sized bins 88-89
 Truck wheel stopper 119
 Tubular arm 145

U

Universal divider 55
 Upright adapters to convert existing pallet racking 47, 56
 Upright protector 94

V

VDA/KLT containers 177
 VDA/KLT flow shelves 38
 VDA/KLT racking units 40-41
 Vehicle guide rail 111
 Vertical pallet return 129

W

Wire basket 22
 Wire divider 22
 Wire divider 22
 Wire shelf 22
 Wire-mesh box pallet 137, 177
 Wire-mesh cladding 94, 119
 Worktop 41

... is just a mouse click away!



Internet shop: www.bito.com

All catalogues, brochures, DVD's ...

... are available free of charge!

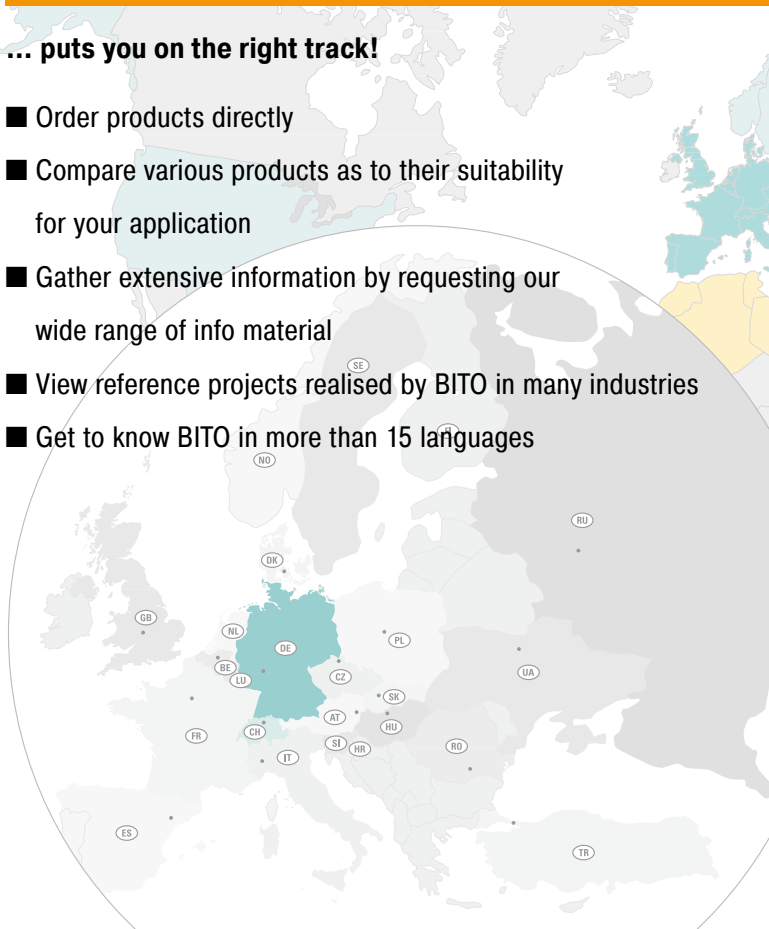
- BITO Corporate Image brochure
- BITO Product catalogue
- DVD on storage and order picking options
- Instructions of assembly and use, technical data manuals
- Products in focus with special topic folders



The BITO website www.bito.com ...

... puts you on the right track!

- Order products directly
- Compare various products as to their suitability for your application
- Gather extensive information by requesting our wide range of info material
- View reference projects realised by BITO in many industries
- Get to know BITO in more than 15 languages



Direct contact

- Enter your postcode on our customer service page to view the contact data of your local sales engineer
- Use our Email form for your requests to our distribution centre
- Call our hotline for any advice you may require:
+49 (0) 67 53 / 1 22 1 64

www.bito.com