



Racking systems and warehousing equipment.

The backbone of internal logistics.

JUNGHEINRICH

Machines. Ideas. Solutions.

Complete solutions from one supplier.

Racking is much more than just steel. Racking is the key to optimum throughput efficiency, because the efficiency of the entire material flow is optimised only through requirement-specific design of a racking system. Jungheinrich provides you with this key: Racking systems, mezzanines and self-supporting stores (silos). For the storage of pallets, containers and stillages – for cartons or long goods – Jungheinrich offers you the complete solution: comprehensive warehouse planning that sees racking and trucks/rack servicing cranes as one system working "hand in hand". From initial planning and projecting up to hand over. From consultation via tailor-made financing right up to one of the widest Service networks in Europe.

Experience makes perfect

As one of the leading industrial truck manufacturers, Jungheinrich is aware of the demands made on racking which is serviced by trucks. During the development of Jungheinrich racking systems, experience in planning, projecting, processing and commissioning gained in many thousands of warehouses throughout the world is utilised.

Excellent consultation

Jungheinrich Sales Executives know the requirements that have to be met for perfect fine-tuning of truck and racking. No matter whether working cycles are carried out with pedestrian trucks, front seat trucks, reach trucks or high rack stackers, rack servicing cranes or order pickers, Jungheinrich provides you with the complete solution package of truck and racking.

The tools for any storage job.

Application-specific, economical, reliable.

Pallet storage

1 Adjustable pallet racking

2 Adjustable pallet racking for narrow aisles

3 Single position racking

4 Clad rack silo

5 Mobile racking

6 Pallet live storage

7 Push back racking

8 Drive in/drive through racking

9 Shuttle compact warehouse systems

Container, stillage and carton storage

10 Shelving for storage and order picking

11 Carton live storage

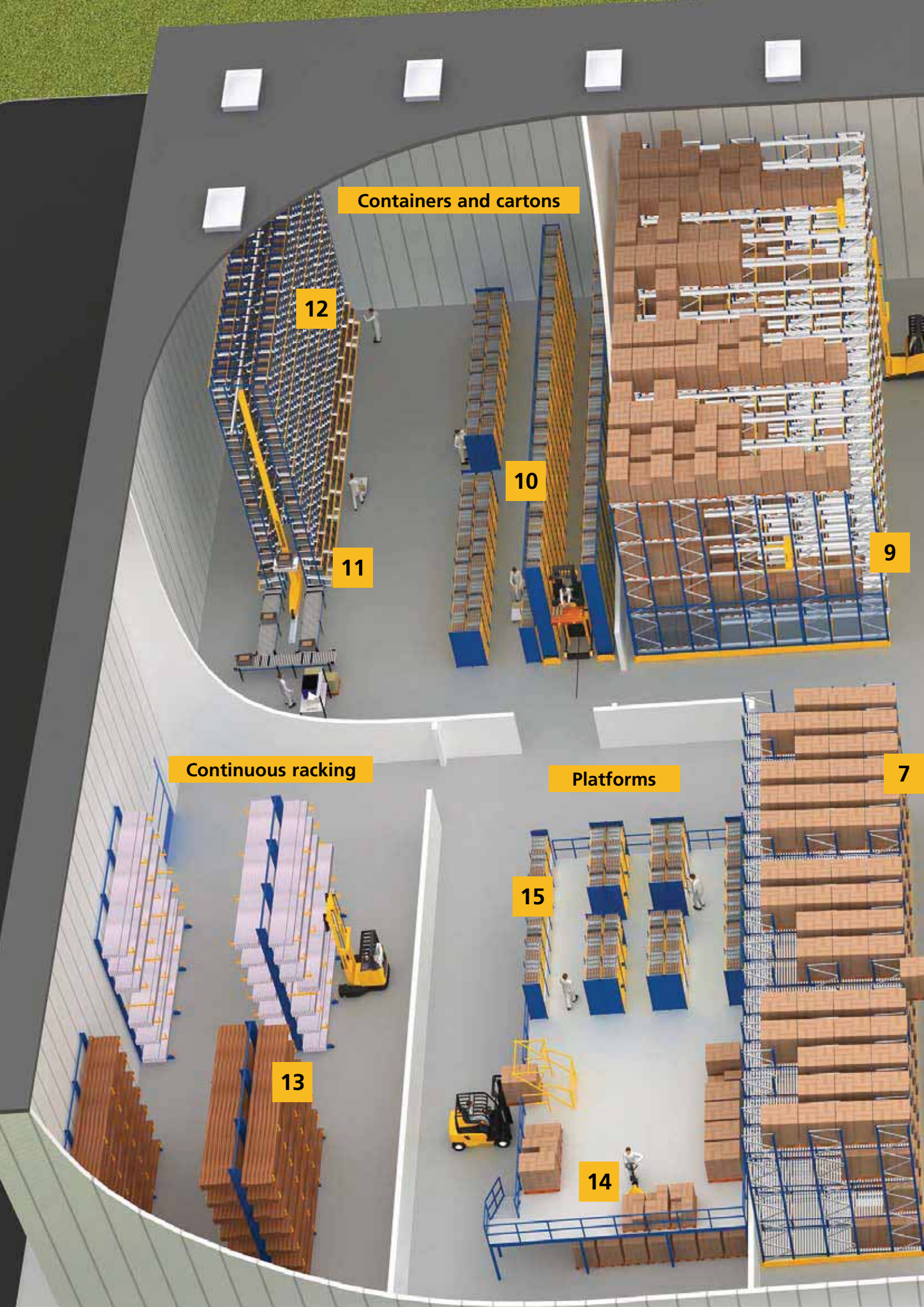
12 Automatic small parts storage (mini load)

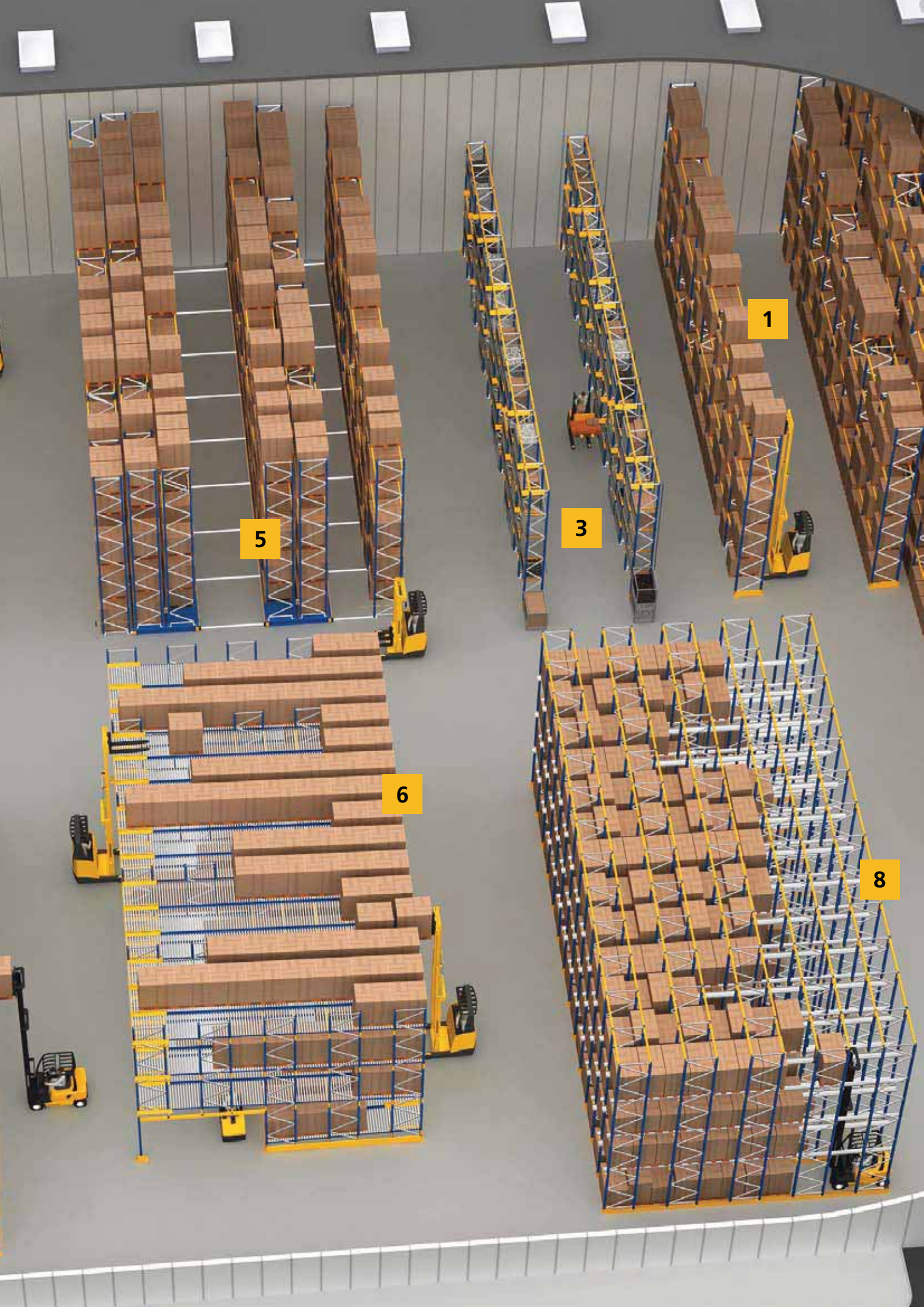
Long goods storage and platforms

13 Cantilever racking

14 Mezzanine platforms

15 Multi-tier shelving


Containers and cartons
12
10
11
9
Continuous racking
Platforms
7
15
13
14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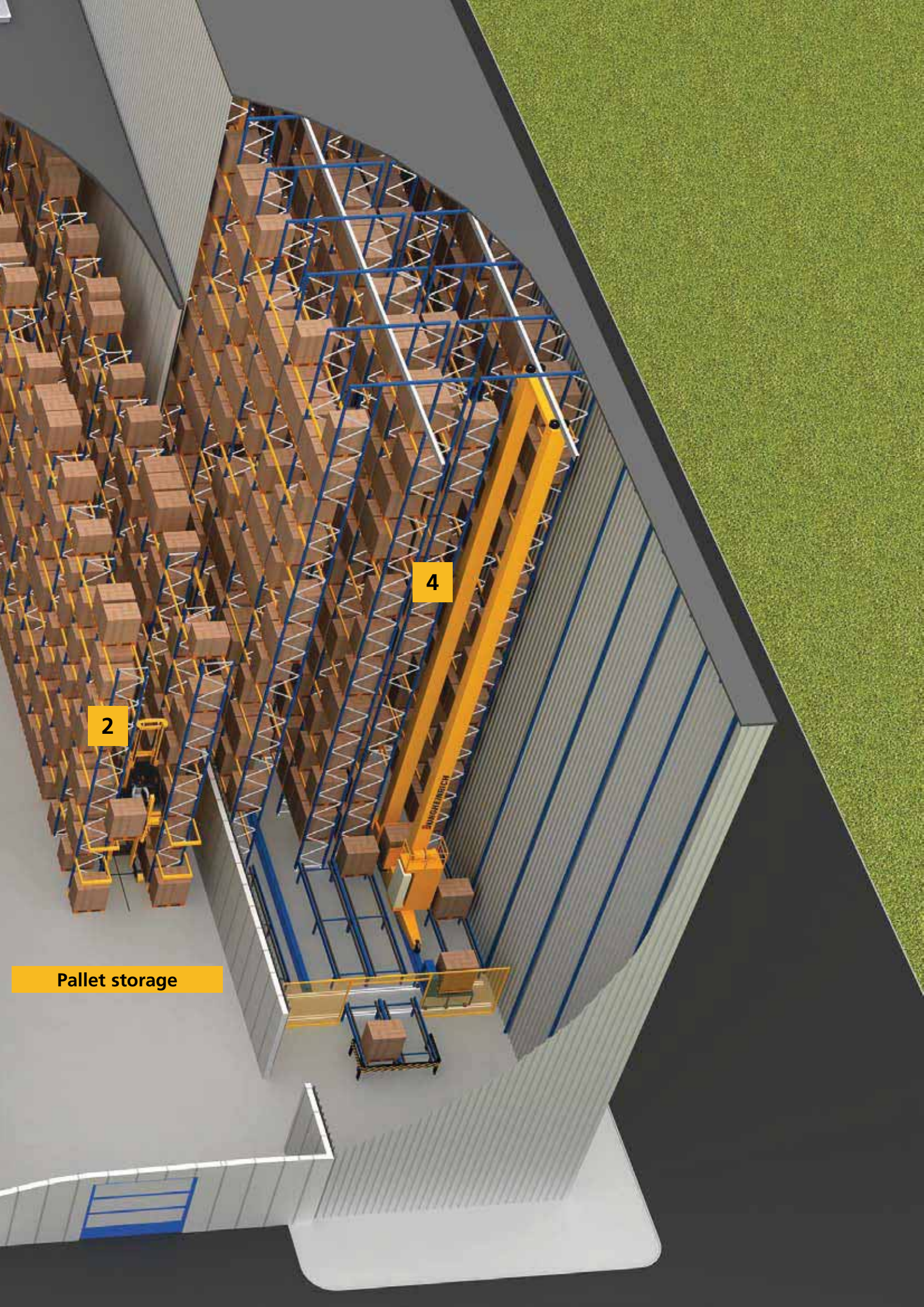
4
2
Pallet storage

Contents.

Pallet storage

Adjustable pallet racking 10–11

Adjustable pallet racking for narrow aisles 12–13

Single position racking 14–15

Clad rack silo 16–17

Mobile racking 18–19

Pallet live storage 20–21

Push back racking 22–23

Drive in / drive through racking 24–25

Shuttle compact warehouse systems 26–27

Container, stillage and carton storage

Shelving for storage and order picking 30–31

Carton live storage 32–33

Automatic small parts storage (mini load) 34–35

Long goods storage and platforms

Cantilever racking 38–39

Mezzanine platforms 40–41

Multi-tier shelfing 42–43

Racking accessories 44–45

Complete truck range 46–47

Type B

Type E

“The installation would not achieve optimum productivity without a strong partner.”

Adjustable pallet racking.

The classic among racking systems.

Characteristics
Adjustable pallet racking is the most common racking system. In contrast to single position racking, it carries several pallets between two uprights on every level. In standard design, it reaches heights of 8 to 10 m and it can also be raised to high racks with 12 m height and in automatic operation up to 30 m height.

Application
Adjustable pallet racking is particularly suitable for large quantities of individual, mainly palletised articles. In contrast to block stacking, there is no contact between pallets which allows direct access to all pallets. Easy adjustment of racking levels ensures optimum storage utilisation. Double-deep storage can also be realised.

Operation
The racking is loaded in the same way as single position racking with fork lift trucks or rack servicing cranes. Lengthways storage and retrieval is also possible by utilising narrow aisle trucks. This would reduce the aisle width required (narrow aisle on page 12).

Advantages
- Direct access to all articles
- Available for manual/automatic rack servicing
- Random storage position allocation

Adjustable pallet racking for narrow aisles.

The racking giant.

Application

Narrow aisle systems are the giants among multi-position racking systems. They have the performance characteristics of multi-position racking (see pages 10/11) at heights over 10 m and are free-standing. Reduced requirement for working aisles and extremely high lift heights are their distinguishing features. Narrow aisle systems are used specifically where a) the space is limited and b) it is necessary to increase throughput compared with multi-position racking. Here, narrow aisle stackers (rail or inductive guidance with the choice of automatic height selection) or rack servicing cranes (RBG) are utilised.

High rack stackers (rail or inductively guided) with automatic height selection or rack servicing cranes (pages 18 and 19) take on stacking and retrieval operations. Availability is ensured by cantilever arms at the head of the racking aisles. Jungheinrich high racks are free-standing. They are not a permanent part of the building and thus extremely adaptable during possible reorganisation.

Advantages

- Excellent space utilisation
- High throughput performance
- Low working aisle widths
- Gradual upgrading possibilities up to fully automatic operation


27
26
25
24
23
22

Single position racking.

Optimum space utilisation especially for box pallets.

Characteristics
Single position racking carries one load unit per bay between two uprights on every level. Angle profiles arranged in depth direction take on the shelf function – additional space is gained through the omission of beams.

Application
Single position racking is particularly suitable for storing ranges with large quantities per article and heavy goods. With the accessible arrangement of load units, single position racking is always advantageous when orders are picked straight from the pallet or box pallet.

Operation
The operation of Jungheinrich single position racking can be either manual or automatic – using either stackers or rack servicing cranes. Due to low shelf heights, the stacking process is particularly speedy and safe. Compared with block stacking, direct access to all load units and safe stacking up to height is an advantage.

Advantages
- Direct access to all articles
- Available for manual or automatic rack servicing
- Random storage space allocation
- Operator-friendly order picking

High rack silo (Clad rack).

Storage in all dimensions.

Characteristics
Clad rack silos are racking constructions to which roof and walls are fixed. The stores are automatically controlled and reach heights up to 40 m. The silo design provides shortest construction times and offers interesting depreciation opportunities.

Application
High rack silos are used for storing large quantities of high throughput articles.

Operation
The racking system is operated with automatic rack servicing cranes. Jungheinrich rack servicing cranes ensure operation up to a height of 40 m. They can transfer freely from one aisle to the next. Their curve-going ability linked with the Europe-wide patented points system is at the heart of aisle transfers. This system facilitates safe and fast aisle transfer effortlessly.

Advantages
- Heights up to 40 m achievable
- Utilisation of storage space to full height
- Reduction in the use of conventional buildings
- Reduced construction time


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Mobile racking.

Optimum space utilisation with variable working aisles.

Characteristics
Mobile racking is mounted on motorised mobile bases. This facilitates the opening of a racking aisle at any position of the system.

Application
Mobile racking saves working aisles and created storage space (up to 90 % compared with traditional racking). It nonetheless provides access to every load unit. Mobile racking is particularly suitable for medium quantities of goods and a medium number of different articles with low access requirement.

Operation
Mobile racking is serviced by trucks in individual aisles. Racking aisles can be controlled locally from an individual rack or by remote control. Photoelectric safety barriers at both racking fronts activate an emergency stop as soon as they hit an obstacle.

Advantages
- Saving of up to 90 % racking aisles
- Better space utilisation
- Single position access


19
20

Pallet live storage.

Excellent space utilisation for Fifo method.

Characteristics
Jungheinrich pallet live storage consists of racking uprights forming a channel. Storage is carried out on one side and retrieval on the other side of racking. As soon as a pallet is retrieved, the other pallets move up automatically to the retrieval position on inclined roller conveyors. Brake rollers keep gravity under control and an automatic separating device ensures that the pallet at the front is never under impact pressure from the following pallet. Automatically driven rollerbeds in the channel are optionally available.

Application
Pallet live storage is suitable for large quantities of the same articles. In keeping with the Fifo method, they ensure that goods are rotated effectively.

Operation
Storage typically in lengthways direction with fork lift trucks or also with support arm stackers.

Advantages
- Optimised filling ratio
- Optimised space utilisation


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Push-back racking.

Excellent space utilisation for Lifo method.

Characteristics
Jungheinrich push-back racking consists of racking uprights forming a channel. The conveyors slope between 3 and 5 %. Deposit and retrieval in this system is carried out on the same racking side. If there are already load units in one of the channels, the new load unit has to push the one previously deposited against the slope. Pallets already in the channel move up automatically when a pallet is retrieved. There are typically three pallets one behind the other in the channel.

Application
Push-back racking is suitable for storing medium quantities of the same articles.

Operation
Operated by fork lift trucks as well as support-wheel stackers.

Advantages
- Optimised filling ratio
- Optimised space utilisation


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4 4
3 3
2 2
1 1

Drive-in / drive-through racking.

Compact storage system.

Characteristics
With drive-in/drive-through racking several load units are stored behind each other in the rack on two pallet support bars (pallet rails). A loading/unloading cycle per racking lane from the top to the bottom (or the other way round) must be observed during depositing and retrieval. The trucks can drive into the racking lanes. With drive-in racking, rack servicing is only possible from one side (Lifo method). With drive-through racking in contrast, depositing can be carried out from one side and at the same time retrieval from the other side (Fifo method). Compared with drive-in racking, throughput is therefore higher with drive-through racking.

Application
Drive-in and drive-through racking are optimally suitable for storing goods with a low variety of articles. The racking system combines the advantages of block stacking and rack stacking: compact space utilisation at height and careful storage of goods.

Operation
Before entering the aisle, the truck lifts the pallet to the required racking level. The truck must not be wider than the pallet. Sideways seat stackers are particularly suitable as they provide the operator with unobstructed visibility also during reverse travel.

Advantages
- Excellent space utilisation
- Easy to expand
- Particularly suitable for the storage of seasonal goods

Shuttle compact warehouse systems.

Deep. Compact. Efficient.

Features
Pallet carriers that can travel autonomously in pallet channels lie at the heart of Jungheinrich shuttle compact storage systems. They are part of a Jungheinrich complete solution, consisting of channel racking, carrier truck and carrier modules. The unique thing about Jungheinrich shuttle systems is that they are designed both to go under pallets (Under Pallet Carriers, UPCs) and enter pallets (In Pallet Carriers, IPCs). Jungheinrich offers a range of versions to suit individual needs. With Jungheinrich shuttle systems you can have fewer aisles and more pallet space over the same surface area, and therefore more efficient cube utilisation (in particular with different articles).

Application
The application areas are the same as for drive-in and drive-through racks (see page 24/25). However they have the added advantages in that the shuttle system throughput is greater and that you only have to store one type of article per channel. This enhances cube utilisation significantly. The system is designed not only for a large but also a medium number of items with medium to large distances between them. Typical application fields include cold stores, production buffer stores, picking replenishment stores and the transporting service sector as a whole.

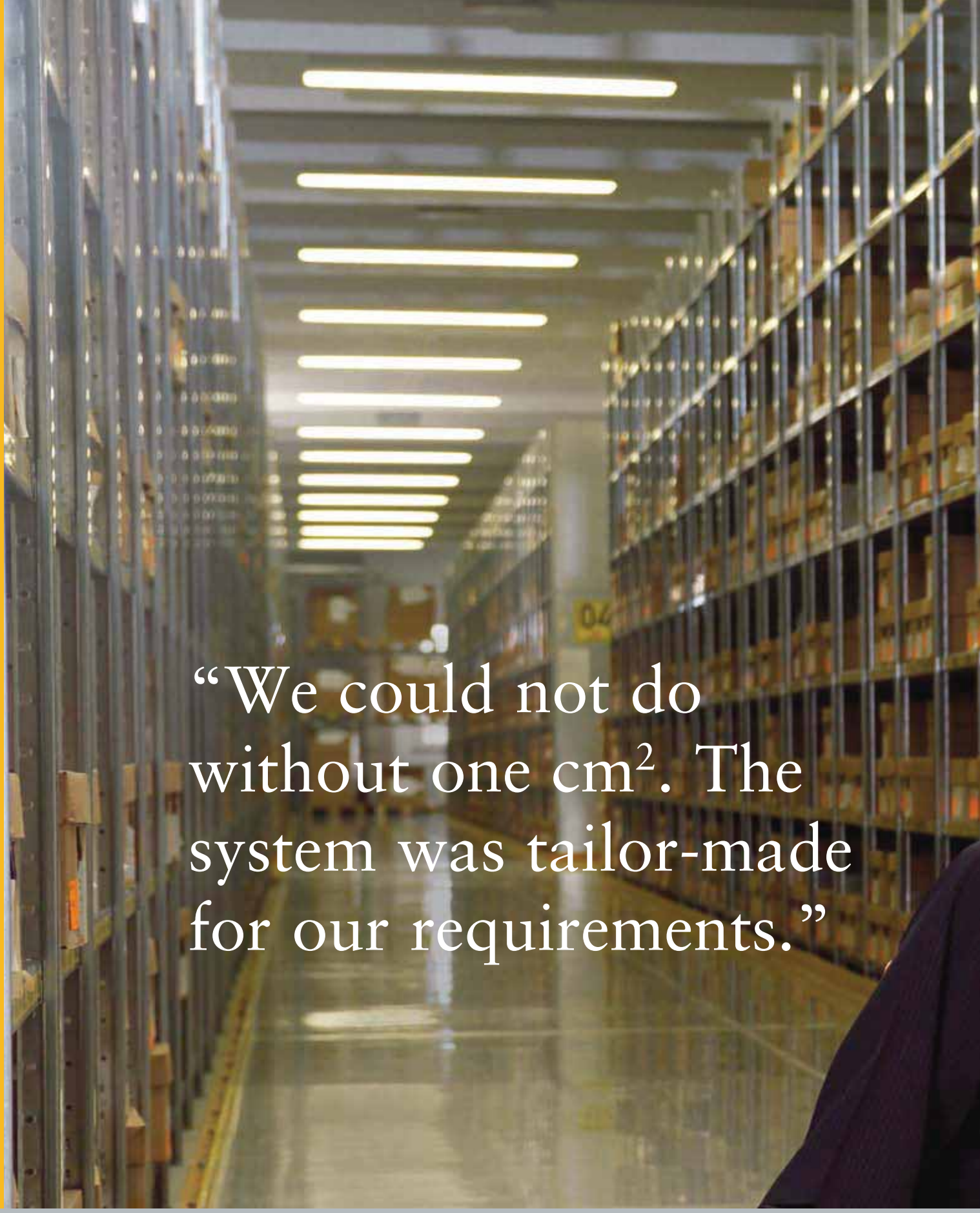
In Pallet Carrier (IPC) operation
High throughput levels with frequent channel changes (e.g. due to small number of pallets per item, shorter channels, combined orders from various articles or replenishment in picking tunnel systems). Pallets are raised by the carrier truck directly with the IPC and used together in the channel. Stacking can then begin immediately.

Under Pallet Carrier (UPC) operation
High throughput levels with frequent channel emptying/filling (e.g. due to greater number of pallets per item, longer channels or combined orders for largely the same items). Pallets are deposited by the carrier truck onto a UPC in the channel. During the carrier journey the truck driver can fetch another pallet and deposit it at the start of the channel. The next stacking operation can therefore already begin. Retrieval is carried out in the same way.

Advantage
- Excellent surface area and cube utilisation
- High throughput levels
- Load-saving handling
- Two carrier types for different applications
- Lifo (last in first out) and Fifo (first in first out) can be performed with both types
- Different pallet types can be used in the same racking system
- Ideally suited to Jungheinrich trucks and racking systems through individual interface and optimum residual capacity utilisation

In Pallet Carrier (IPC)

Under Pallet Carrier (UPC)


“We could not do without one cm². The system was tailor-made for our requirements.”

Shelving for storage and order picking.

Optimum access to any article.

Characteristics
Shelving over multiple levels made of steel plate or wood is used for storage. Jungheinrich shelving is available as slot together or bolted style. It is also suitable for high rack installations over 12 m high.

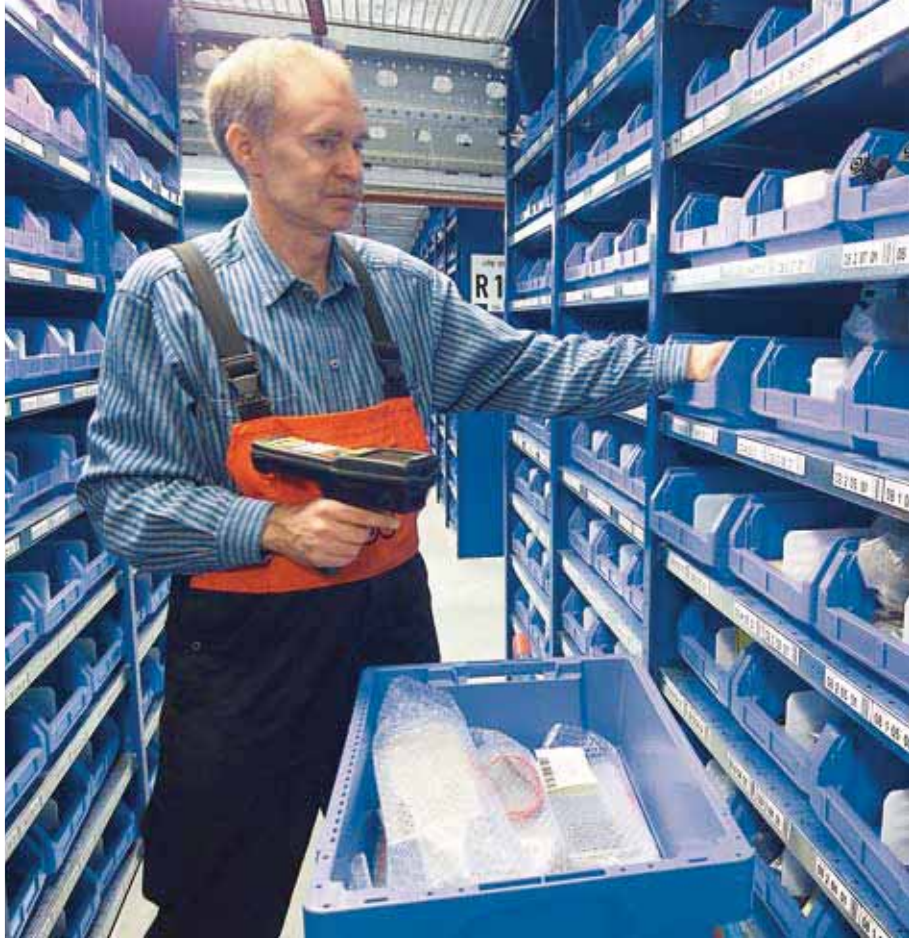
Storage application
Jungheinrich shelving facilitates the storage of goods with large article ranges at small to medium quantities. The racking can be universally utilised in all industry branches for small parts but also for bulky parts.

Order picking application
When making goods available – according to the "man to goods" principle – attention must be paid to goods being directly available for the order picker. The Jungheinrich order picking racking provides the best preconditions for this. Flexible in application and easily adjustable, it is particularly suitable for large volume, bulky goods and containers. Order picking by hand is easier, picking times are reduced.

Operation
By hand, with horizontal/vertical order pickers or rack servicing cranes (RBG).

Advantages
- Immediate access to all articles
- Flexible and expandable
- Easy to assemble


DR
DS
DS


R1

Drive-through racking for small parts.

The solution for Fifo.

Characteristics
Drive-through racking works according to the Fifo method for small parts or packages of any size. Roller conveyors ensure that stored goods move forward automatically to the retrieval point. This strict adherence to sequence ensures that nothing gets out of date in drive-through racking. This extremely compact form of storage ensures very short order picking distances. Clear demarcation also helps avoid errors.

Application
Drive-through racking is mainly utilised for order picking work. Roller conveyors can also be retrofitted in any standard racking and they are also available for cold stores. A pick-by-light solution can also be integrated in drive-through racking.

Operation
The racking is operated manually or with horizontal or vertical order pickers. Order picking platforms are inserted in multi-storey installations.

Advantages
- Fewer working aisles
- Continuous reserve zones
- Separate depositing and retrieval
- Retrofitting possible
- Fifo method

Automatic small parts storage (mini load).

Top performance in warehouses.

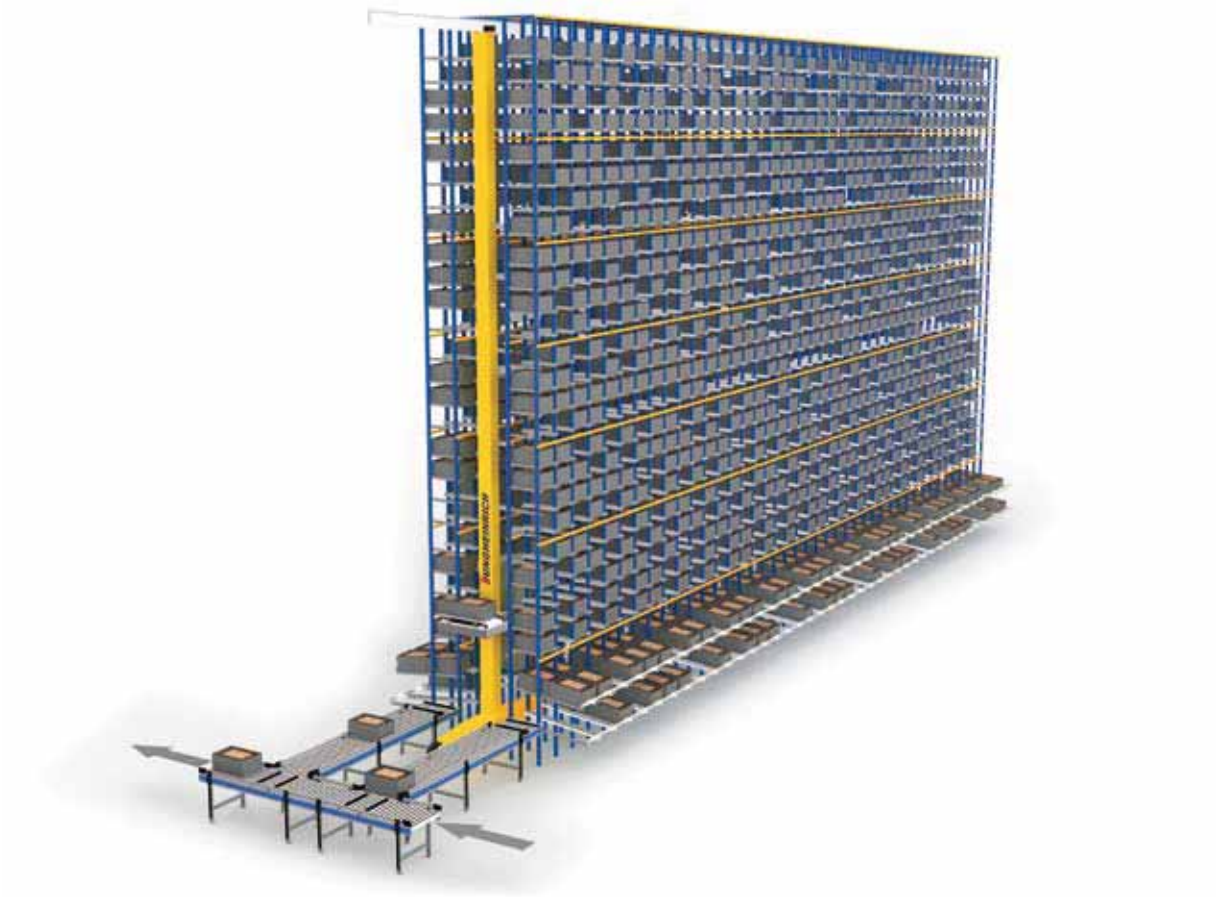
Characteristics
Automatic small parts storage ensures excellent space-saving storage of small parts in containers, stillages or cartons. These are stored on angled supports – with full utilisation of room height.

Application
AKL mainly serves for the storage of small parts with large number of articles in limited unit numbers per article and with high throughput requirements.

Operation
Depositing and retrieval is carried out with automated rack servicing cranes.

Advantages
- Short picking times
- High throughput performance
- Optimum space utilisation
- Direct access to every article


02
03




“Cantilever racking plus
regular racking inspection.
That is the right package.”

Cantilever racking.

For long goods of any type.

Characteristics
There is practically no limit to the length of cantilever arm racking. This racking for the storage of long goods such as poles, pipes and boards. Each racking upright is equipped with several cantilever arms (supports) for carrying the load. The distance between uprights depends on the weight of the goods to be stored.

Application
Goods which are heavy and small to large quantities per article at medium throughput are stored on cantilever arms.

Operation
The racking is serviced by fork lift trucks such as Jungheinrich multiway reach trucks. They work without turning in the aisle and therefore only require very narrow aisle widths.

Advantages
- Extendable to any length and expandable
- Flexible adjustment to changes in the range of goods

Mezzanine platforms.

Additional storage space in existing buildings.

Characteristics
The mezzanine platform is a self-supporting walk-on steel construction. It is erected in an existing building.

Application
Mezzanine platforms create additional storage areas on the platform itself and at the same time room underneath – e.g. for production. Compared with integral mezzanine floors, racking platforms offer many individual design options. For instance, they can also be used as order picking platforms.

Operation
Mezzanine platforms can be designed so that not only hand pallet trucks but also electric fork lift trucks can work on them. Fork lift trucks or conveyors take care of the material flow from ground level to the platform. Personnel access is provided by stairs.

Advantages
- Extension of storage area
- Efficient utilisation of room height
- Flexibility on/underneath platform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Multi-tier shelving.

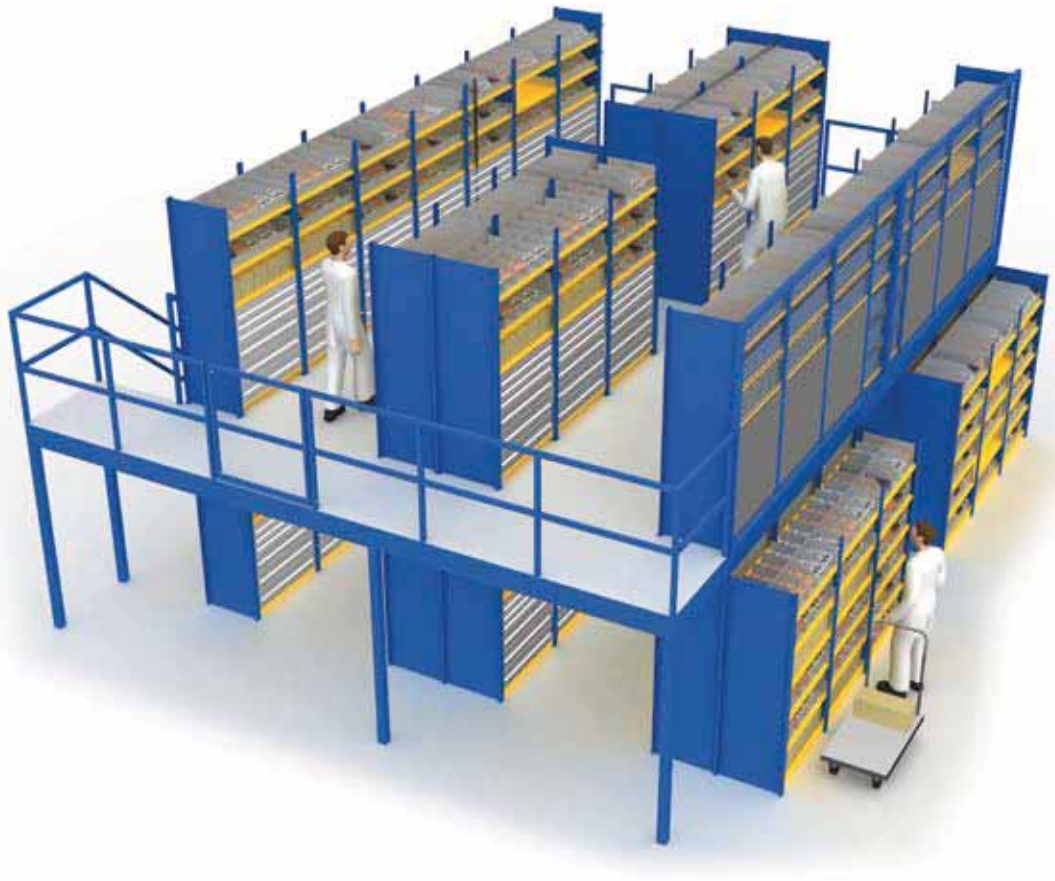
Mezzanine platform with integral shelving.

Characteristics
Dependent on the type of goods, operational capacity and available picking time, a combination of two existing systems often provides an economic solution. Best example: Order picking platforms, i.e. a combination of shelving and storage platform. This multi-tier construction has the main advantage of operators being able to retrieve stored goods on several levels simultaneously.

Application
Order picking platforms incorporate the upper levels into the order picking zone. The utilisation of vertical order pickers is therefore not required.

Operation
Hand pallet trucks and electric fork lift trucks support the order picking process. Chutes or conveyor belts take goods to the ground floor. The racking is fed from the outside with fork lift trucks.

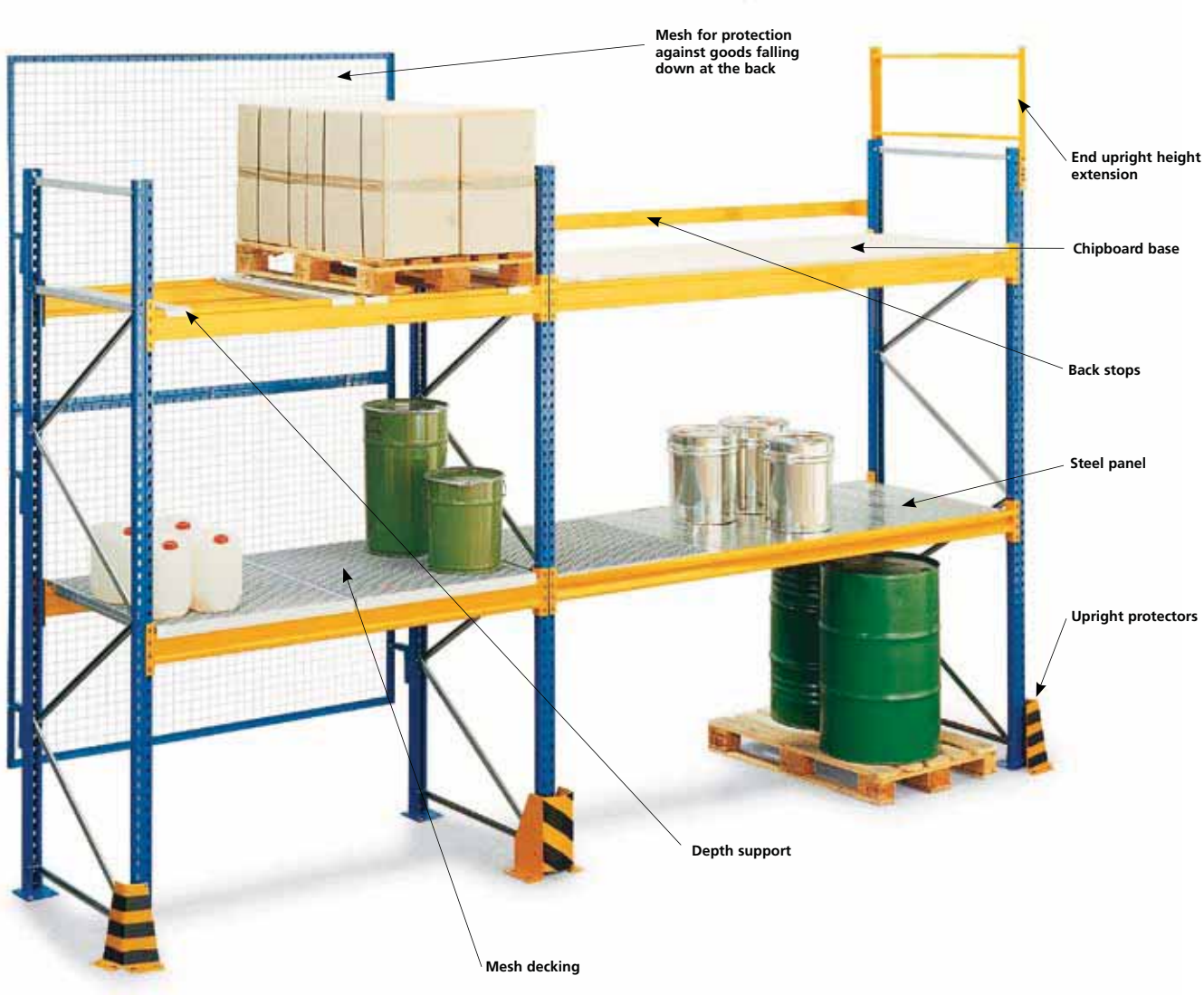
Advantages
- Optimum space utilisation
- Short order picking routes



Racking accessories.

From "upright protectors" for the protection of racking to numbering the entire racking installation, Jungheinrich provides you with everything you require for optimum interface of truck and racking: signage for racking rows, racking aisles and racking positions, warning signs, information signs, directional and prohibiting signs, load guards, mesh and chipboard bases. Accessories we are unable to offer will have to be invented first!

Jungheinrich warehouse signs: numbering is the first step for getting a warehouse under control. Organisational numbering from Jungheinrich is also the basis for manual and IT-supported management systems.



Rack inspection.

Essential safety in the warehouse.

For safety reasons the owner of the warehouse is obliged to inspect or have inspected all warehouse equipment – including powered and static racks – systematically and at regular intervals. EN 15635, valid throughout Europe, lays down the procedure and scope of these checks:

Regular checks and inspections in accordance with EN 15635:

- Visual inspections (e.g. weekly). This can be performed by the employer's safety officer.
- Detailed inspections (at least annually). These must be performed by an expert. "Expert" means that the inspector
  a) knows the legislation, regulations and decrees of the trade associations as well as European standards, and
  b) has detailed technical and static knowledge of the specific warehouse setup / rack.

In-house trained rack inspectors

Jungheinrich offers rack inspections carried out by in-house trained inspectors. Jungheinrich personnel with many years' experience in racking attain the title of "Industry approved rack inspector" after days of practical training in approved institutes and passing an exam.

Inspections are carried out during normal warehouse operation. In this case the Jungheinrich rack inspector carries out a visual inspection. The checks include:

- Visually identifiable defects (e.g. bent or damaged racks)
- Compliance with manufacturer's load specifications
- Compliance with regulations and safety measures

The inspection is carried out systematically on the basis of a standard inspection checklist. The inspection is then officially documented with a test plate that can be attached to each rack. This ensures efficiency and transparency for each inspection. And even after the inspection, Jungheinrich is there for you: If you discover any damage or deficiencies, the Jungheinrich rack team can of course rectify the situation. Ensuring your rack system meets all your requirements.

The advantages of inspection

- Early identification of damage and its causes
- Prevent serious accidents
- Prevent consequential damage
- Reduce repair costs
- Greater safety for man, machine and stored goods

For every warehouse a suitable rack.
For every rack a suitable truck.

Pallet trucks

Hand pallet truck,
AM 22/30
travel distance: short
max. capacity: 3000 kg

Electric pedestrian
fork lift truck,
EME 114
travel distance: short
capacity: 1400 kg

Electric pedestrian
fork lift truck,
EJE 116–120
travel distance: short
max. capacity: 2000 kg

Electric pedestrian
fork lift truck,
EJE C20
travel distance: short
capacity: 2000 kg

Electric pedestrian
fork lift truck,
EJE 220–235
travel distance: short
max. capacity: 3500 kg

Electric pedestrian
fork lift truck with operator
stand-on platform,
ERE 120
travel distance: medium
capacity: 2000 kg

Electric pedestrian
fork lift truck with operator
stand-on platform,
ERE 225
travel distance: medium
capacity: 2500 kg

Electric stand-on/
seat fork lift truck,
ESE 120
travel distance: medium/long
capacity: 2000 kg

Electric sideways seat
fork lift truck,
ESE 220–533
travel distance: long
max. capacity: 3300 kg

Pallet stackers

Electric hand stacker,
HC 110
max. lift height: 3000 mm
capacity: 1000 kg

Electric pedestrian stacker,
EMC 110
max. lift height: 2000 mm
capacity: 1000 kg

Electric pedestrian stacker,
EJC 110–112
max. lift height: 3600 mm
max. capacity: 1200 kg

Electric pedestrian stacker,
EJC 212–220
max. lift height: 5350 mm
max. capacity: 2000 kg

Electric pedestrian stacker
with operator stand-on
platform,
ERC 212–216
max. lift height: 5350 mm
max. capacity: 1600 kg

Electric sideways seat stacker,
ESC 214–316
max. lift height: 5350 mm
max. capacity: 1600 kg

Electric pedestrian
lift truck/stacker for
double deck loading,
EJD 220
max. lift height: 2560 mm
capacity: 2000 kg

Electric pedestrian
lift truck/stacker with
operator platform for
double deck loading,
ERD 220
max. lift height: 2560 mm
capacity: 2000 kg

Counterbalance trucks

Electric 3-wheel
counterbalance truck
with rear wheel drive,
EFG 110–115
max. lift height: 6500 mm
max. capacity: 1500 kg

Electric 3-wheel
counterbalance truck
with front wheel drive,
EFG 213–220
max. lift height: 6500 mm
max. capacity: 2000 kg

Electric 4-wheel
counterbalance truck,
EFG 316–320
max. lift height: 6500 mm
max. capacity: 2000 kg

Electric 4-wheel 3-phase AC
counterbalance truck,
EFG 425–430
EFG 535–550
max. lift height: 7175 mm
max. capacity: 5000 kg

Diesel/LPG stacker
DFG/TFG 316s–435s
hydrostatic
max. lift height: 7000 mm
max. capacity: 3500 kg

Diesel/LPG stacker
DFG/TFG 316–550
hydrodynamic
max. lift height: 6775 mm
max. capacity: 5000 kg

Diesel/LPG stacker
DFG/TFG 660–690
max. lift height: 8000 mm
max. capacity: 9000 kg

Reach trucks

Reach truck Range 1,
ETV 110/112/114/116
max. lift height: 9020 mm
max. capacity: 1600 kg

Reach truck Range 2,
ETM/ETV 214/216
max. lift height: 10,250 mm
max. capacity: 1600 kg

Reach truck Range 3,
ETM/ETV 320/325
max. lift height: 12,020 mm
max. capacity: 2500 kg

Reach truck Range C,
ETV C16/C20
max. lift height: 7400 mm
max. capacity: 2000 kg

Multi-way reach truck
Range Q,
ETV Q20/Q25
max. lift height: 10,700 mm
max. capacity: 2500 kg

Range 1 to 3 can also be
fitted with cold store cabs.

Order pickers

Low level order picker,
ECE 118
max. picking height:
1st level
capacity: 1800 kg

Low level order picker,
ECE 220/225
max. picking height:
2nd level
max. capacity: 2500 kg

Horizontal order picker,
ECE 310/320
max. picking height:
2nd level
max. capacity: 2000 kg

Vertical order picker,
EKS 110
max. picking height:
4600 mm
capacity: 1000 kg

Vertical order picker,
EKS 210/312
max. picking height:
11,345 mm
max. capacity: 1200 kg

Tow tractors

Tow tractor,
EZS 010
tractive power: 1000 kg

Tow tractor,
EZS 130
tractive power: 3000 kg

Tow tractor,
EZS C40
tractive power: 4000 kg

Tow tractor,
EZS 350
tractive power: 5000 kg

Tow tractor,
EZS 570
tractive power: 7000 kg

Tow tractor,
EZS 6250
tractive power: 25,000 kg

High rack stackers

Order picker/tri-lateral stacker,
EKX 410
max. lift height: 7750 mm
max. capacity: 1000 kg

Order picker/tri-lateral stacker,
EKX 513–515
max. lift height: 16,500 mm
max. capacity:
1500 kg

Tri-lateral stacker,
EFX 410–413
max. lift height: 7000 mm
max. capacity:
1250 kg

Tri-lateral stacker,
ETX 513–515
max. lift height: 13,000 mm
max. capacity: 1500 kg

Jungheinrich
Plants, Sales and
Services Europe
ISO 9001/ISO 14001

Jungheinrich trucks
conform to the European
Safety Requirements.

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