

MODULAR STEEL STORAGE SYSTEMS

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# SUPER 4/5/6

PATENTED MODULAR RACKING

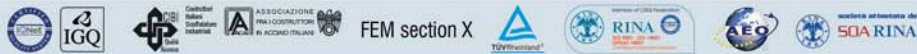


TEMPORARY MODULAR



**METALSISTEM**<sup>®</sup>  
STRUTTURE ED AUTOMAZIONE

MADE IN ITALY 



Our dedication to making a difference: creating **MORE VALUE** with **LESS IMPACT!**  
**METALSISTEM** is proud to adopt **ECO-EFFICIENCY** concepts in its business model.  
**ZERO** emission and **ZERO** ecological impact thanks to a **UNIQUE MANUFACTURING PROCESS!**  
**METALSISTEM** has achieved energy self-sufficiency through the use of renewable resources.

# METALSISTEM®

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more information  
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## PRODUZIONE / PRODUCTION



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## THE GROUP



Founded in 1968, METALSISTEM commenced its activities specialising in the design and production of machinery for the cold profiling of metals.

The experience gathered, numerous highly innovative patents resulting from intense research and development and the considerable market success of the first range of cold form zinc coated profiles quickly channelled METALSISTEM into the production of the latter of its activities.

Today the METALSISTEM Group is an articulated network of companies with its head office and main production facility in Rovereto, Italy.

The Group has consolidated its position as one of the major industries within the Material Handling Sector. Through products and services aimed at providing complete assistance for all warehousing, product showcasing and retail sales requirements, the companies of the METALSISTEM Group are able to offer their customers a wide range of products of the highest quality, highly competitively priced, with very rapid delivery times and a first class back up service, as well as tailor made solutions providing efficient and rational use of internal storage areas and material handling environments.

Lightness, strength and modular form, coupled with the ease of integrating and expanding already existing structures are but a few of the successful features of the METALSISTEM storage and shelving systems.

The success of the METALSISTEM Group is the result of a precise managerial choice based on research of new production technologies and continuous development and innovation of its product range. A direction which has produced numerous international patents (testament to the uniqueness of the METALSISTEM product), continuing improvements in safety, quality and versatility.

METALSISTEM's company strategy is to offer products of the highest quality, very competitively

priced, with rapid delivery times backed up by a first class service.

The numerous product lines are conceived and designed by METALSISTEM's internal Research and Development Centre, as are the profiling lines and equipment required for their manufacture.

The automated production facilities for the cold profiling of metals have enabled METALSISTEM to achieve one of the highest levels of productivity in the world, today.

Rigorous laboratory tests are conducted on the raw material entering production, and on the final product, thus ensuring the continuing evolution of efficiency and quality standards.

All products have elevated structural characteristics and ensure high quality standards recognised by the most important European certification bodies, such as Germany's TÜV Product Service GmbH, Austria's Ö-NORM, Rome's I.S.P.E.S.L., ACAI/CISI (Associazione Costruttori Acciaio Italiani - Sezione Costruttori Italiani di Scaffalatura Industriale), the latter of which METALSISTEM has membership, and others.

The company's ISO 9001 quality assurance system as well as its environmental management system ISO14001 and the health and safety BS OHSAS 18001, are certified by RINA.

With an annual turnover of exceeding 260 Million Euro, the METALSISTEM Group premises occupy a total area of 230.000 m<sup>2</sup>, 125.000 of which are dedicated to production.

The METALSISTEM Group affiliated companies and distributors provide a world wide commercial network, able to satisfy the most demanding needs. We value greatly the high level of trust that is placed in us by our customers and feel that it is proof of the quality and reliability of our products.





## SAFETY STANDARDS AND CALCULATION ASSUMPTIONS

The correct use of a product, distinguishes both the Customer and the Manufacturer.

METALSISTEM recommends that Customers make use of their product in strict conformity with the design characteristics given and standards of best practice.

The design and assembly of the racking systems must be carried out by qualified personnel.

METALSISTEM is not responsible for any improper or inappropriate use of its product.

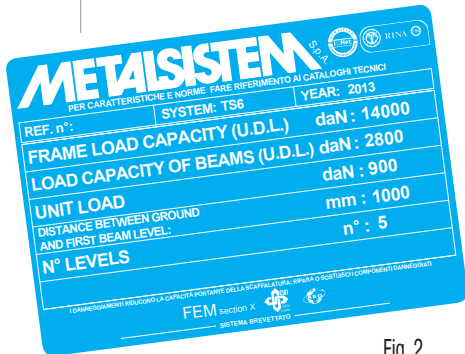


Fig. 2

### a) Tolerances, deformations and clearances

The Metalsistem documentation considers class 400 (wide and narrow aisle without automation) and class 300 (very narrow aisle without automation) pallet racking installations as defined by the UNI EN 15620 standards. Installations of classes other than these require more stringent structural and deformation characteristics which require the intervention of the Metalsistem Technical Office.

#### a1) Suitability of the floor

Before commencing a project the suitability, or adequacy of the pavement or floor slab to support the installation loads must be confirmed. The client must supply the necessary technical data for this evaluation. Unless otherwise expressly mentioned, the floor tolerances shall be in accordance with the UNI EN 15620 Standard.

#### a2) Clearances

The minimum clearance of the installation from the building and its fixtures must be agreed with the client, using the UNI EN 15620 standard as reference.

### b) Assembly

The rack assembly must be carried out by specialized personnel in conformity with national occupational

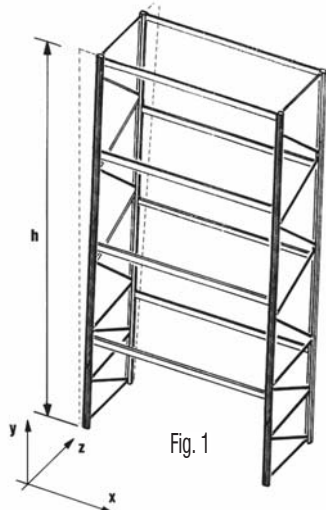


Fig. 1

and safety laws and the information contained in the Technical Manual. Particular attention must be taken to ensure that all frame bracing components are tightly bolted and that all safety apparel has been properly assembled (Refer also to the "Pallet Racking Operating and Maintenance Manual code MUM01").

### c) Rack alignment

The vertical plumb of the pallet racking frames must be checked along both the depth (Z) and length (X) directions. The UNI EN 15620 standard states that, unless more restrictive tolerances have been specified, the maximum permissible deviation off both directions must not exceed H/350 for class 400 installations and H/500 for class 300 installations, where H represents the height of the uprights expressed in millimeters. Refer to the "Pallet Racking Operating and Maintenance Manual MUM01" for a more detailed tolerance explanation.

### d) Safety signage and load bearing capacity plaques

Refer to National legislation for the application of safety signage to the installation. In Europe, the 92/58/EEC directive and its amendments provide the minimum acceptable level of safety and/or health signage at work.

The minimum level of safety signage that must be placed on every installation includes:

- Generic warning plaque (consisting in an exclamation mark) (Italian legislative decree 81/08, attachment XXV);
- Load bearing capacity plaque formatted as an information sign. These must be placed in clearly visible locations showing year of assembly, frame series and load bearing capacity, beam pair load or shelf load bearing capacity (uniformly distributed load), load unit, height of the first beam from ground and the number of levels (Fig. 2);

It is also advisable to provide:

- Clearly marked emergency exits, prohibited dangerous areas.

### e) Racking safety standards

Frames must always be fixed to the floor slab with two (2) M10x80 anchor bolts per upright.

In applications where the frame height is greater than 5 times the frame depth for single entry rows or 10 times a single frame depth for double entry rows, the racking must be accessorized with portal beams or wall ties. Note that wall ties are possible only after confirmation of the wall structural adequacy which must be confirmed by the property owner. It is strictly prohibited to tie to walls in seismic areas.

Double sided frames are defined as a pair of frames placed one behind the other and connected by pairs of adequately dimensioned spacer bars placed at the connection points of the frame diagonal spacer bars however never more than 1500mm apart.

The use of portal beams may be avoided in single entry runs if the following instructions are applied.

For frame base to height ratios:

Up to 1:5

: Standard frame bracing;

Between 1:5 and 1:6

: Frame with 8 short diagonal spacer bars;

Between 1:6 and 1:7

: Frame with 8 short diagonal spacer bars;

: Maximum bay length of 2700mm with;

: 20% reduction in the admissible frame load bearing capacity for unbraced bays;

: 10% reduction in the admissible frame load bearing capacity for braced bays.

Upright protection must be provided to all frames subjected to the risk of collision by material handling equipment (refer to "Pallet Racking Accessories Manual", code MT07).

### f) Reference standards

The structural calculation reference standards are:

- UNI EN 15620:2009 "Steel static storage systems - Adjustable pallet racking - Tolerances, deformations and clearances";
- UNI EN 1993-1-3:2007 "Eurocode 3 - Design of steel structures - Part 1-3: General rules - Supplementary rules for cold-formed members and sheeting".

Materials reference standards:

- UNI EN 10346:2009 "Continuously hot-dip coated steel flat products - Technical delivery conditions";
- UNI EN 10149-1:1997 "Hot-rolled flat products made of high yield strength steels for cold forming. General delivery conditions";
- UNI EN 10149-2:1997 "Hot-rolled flat products made of high yield strength steels for cold forming. Delivery conditions for thermomechanically rolled steels";
- UNI EN 10204:2005 "Metallic products - Types of inspection documents (3.1 certificate)".

Other reference standards:

- UNI EN 15635:2009 "Steel static storage systems - Application and maintenance of storage equipment";
- ACAI-CISI testo unico del 11/05/2004: "Technical standards for pallet racking";
- ACAI-CISI testo unico del 26/02/2004: "Self certification regulations".

### g) Structural component testing

The structural engineering calculations are based on results derived from laboratory testing conducted by the Engineering Faculty of the University of Trento and by the laboratories of the Metalsistem Research Centre.

### h) Structural calculations

The structural calculations have been made using the finite element method with the ANSYS, STRAUS7 and IT.RACKS!.

### i) Beam pair load bearing capacities

The beam pair load bearing capacities have been calculated using the following assumptions:

- uniformly distributed load;
- beam pair collapse safety coefficient minimum of 2;
- maximum deflection of 1/200 of the beam length;
- the mandatory installation of safety pins to beams.

The load bearing capacities of the beams are based on the use of Euro pallets in a good state of repair.

### j) Frame load bearing capacities

The tables contained in the manual are used to find the frame series that match the load demands of a pallet racking installation as a function of the height from ground of the first pair of beams (first loading level), the beam series, the length of the beam pair and of the height of the frame.

These tables are applicable to pallet racking with:

- A distance between levels equal to or less than







the height of the first beam from ground;

- An equal load acting on all levels;
- Every upright anchored to ground with at least two (2) anchor bolts.

Given that the frame load bearing capacity is also dependent from other factors (center distance between the levels greater than the first, frame base to height ratio, seismicity of the area, environmental factors such as vibrations, atmospheric conditions, etc), contact the Metalsistem Technical Offices regarding doubts concerning non-standard applications, large or complex installations requiring optimization, or structural controls on specific solutions.

#### **k) Installation environment, use and maintenance of the product**

The load bearing capacities and the material finish assume that the product is assembled in dry internal environments. Applications in external or highly aggressive environments forfeits the guarantee of the surface treatment. Contact the Metalsistem Technical Department for structural verification of outdoor applications.

For guidelines regarding use of installation and the programmed inspections of components, required by the UNI EN 15635 standards, refer to the "Pallet Racking Operating and Maintenance Manual MUM01".

#### **l) Bracing**

The bracing system, made up of a bracing tower or by cross bracing, its frame connection accessories and horizontal cross bracing components, is a structural element which limit the movement of the racking. This system is designed to absorb the horizontal forces caused by the plumb errors and by the placement of the merchandise as defined by the UNI EN 15635 standards.

#### **m) Raw material**

The 3.1 certificate (UNI EN 10204 standards) guarantees the mechanical properties of the high tensile structural steels used by Metalsistem production.

The mechanical properties of the structural steel may vary from between S315 to S355 for pickled steels and between S350 and S400 for galvanized steels (UNI EN 10346 and UNI EN 10149) depending on the components structural application.

The surface treatment of the structural steels may either be hot dip galvanized using the SENDZIMIR process or powder coated pickled steel.

#### **n) Fire protection**

Refer to the "Pallet Racking Operating and Maintenance Manual MUM01" document for information regarding standard applications, reaction and resistance to fire. It is the duty of the racking installation designer to check if the client requires the installation to have allowances for the integration of fire protection measures.

#### **o) Controls**

The raw material entering production sustains ongoing testing by Metalsistem internal quality control. The tests confirm the mechanical properties (elongation, yield, rupture), dimensional characteristics (gauge and width) surface finish (absence of defects, uniformity, resistance of coating). Metalsistem has its own internal testing

facilities able to conduct SIT (Servizio di Taratura in Italia) certified tensile tests (approx. 1000 per year) and dimensional tests. Saline mist, scratch resistance and other tests are conducted by external facilities.

Testing of finished products is conducted by both the internal Metalsistem Quality Control Office and externally by the product certifying agency TÜV. The system certifying agency RINA guarantees consistent product quality.

#### **p) Certifications**

Metalsistem production has been certified by the following international standards:

- Centro di Trasformazione - Italian metal fabricator certificate No. 7537/10;
- Environmental Management System ISO 14001;
- Quality Management Standard - ISO 9001;
- TÜV;
- ACAI CISI - quality and safety
- AEO FULL - authorized economic operator;
- UNI EN ISO 3834 - qualified welding processes.

#### **q) Customized applications**

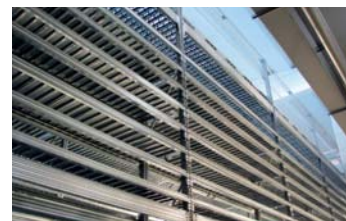
Contact the Metalsistem Technical Office for solutions and / or calculations of non-standard applications.

Metalsistem reserves the right to modify the technical characteristics of its products at any time it sees fit.

Technical data, dimensions and characteristics given in this document are indicative only.

#### **r) Safety apparel**

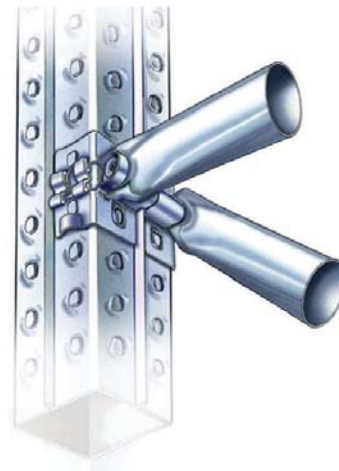
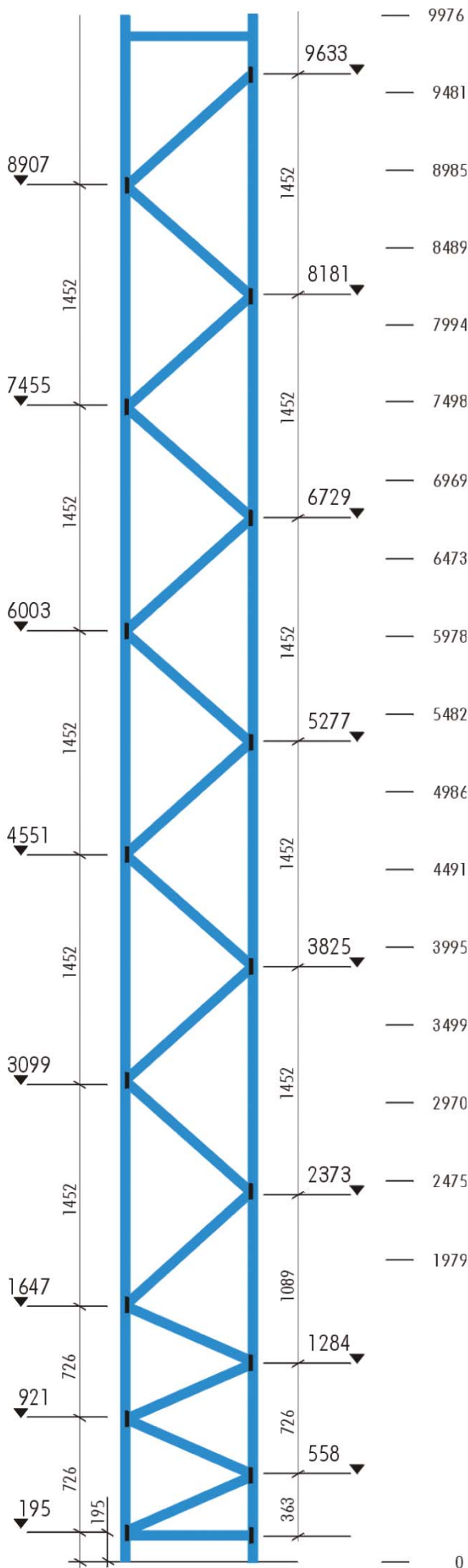
The installation designer, in consultation with the client, must review the type, locations, and needs of the safety apparel to be fitted to the installation (e.g.: upright and frame protection, floor guide rails, safety netting, walkway protection and covers, seismic design) in accordance with the risk and use of the areas under examination.





# ASSEMBLY DIAGRAM SUPER 4-5-6 Frames

Frame depth: from 600 to 1500 mm



The union between the uprights and the frame bracing components is made via the frame bracket coupling.

The frame must always be closed at the top and bottom with a horizontal spacer bar. The bottom area of the frame is made from 4 short diagonal spacer bars and long diagonal spacer bars to follow, up to the top. The bracing elements are sandwiched between the TS bracket coupling (code 08004.95) which come as right and left components.

These are always to be assembled in pairs and lock into position via the tightening of a centrally located bolt M8x70.

The upright face with the seaming must always be oriented towards the centre of the frame.



The joint buttons of the upright have a vertical orientation. The wider portion of the joint buttons must be positioned towards the base of the upright.





SUPER 4-5-6 is made from certified 3.1 steel according to EN 10204 and carries the approval mark of TÜV PRODUCT SAFETY.





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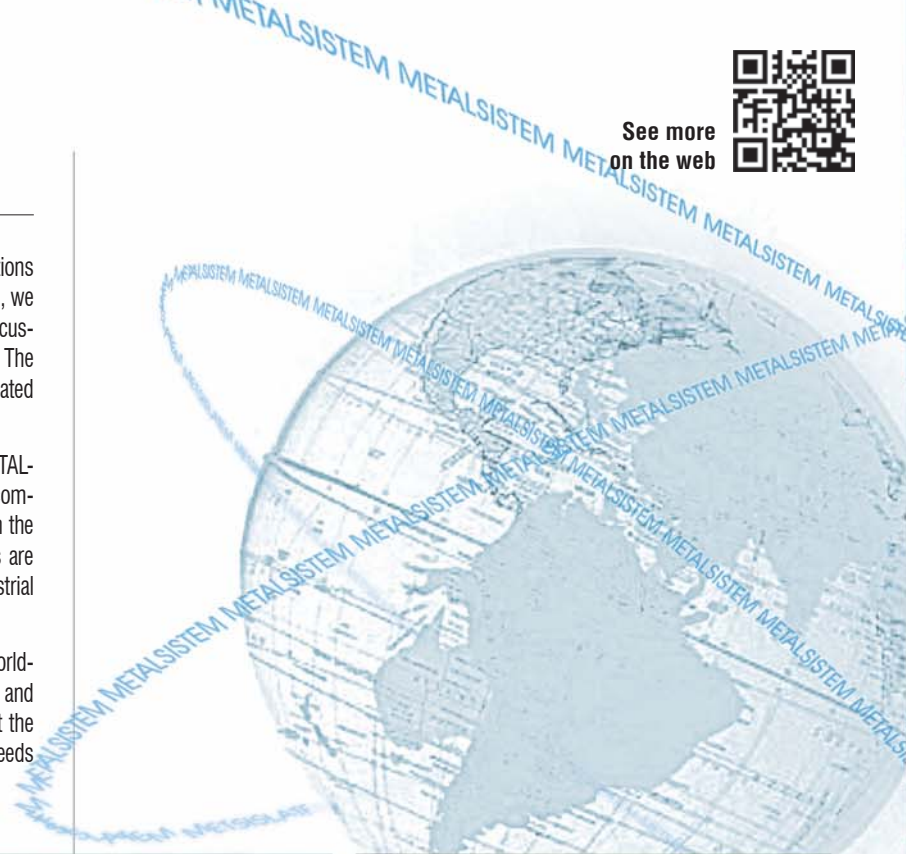


## THE COMPANY TODAY

METALSISTEM products are now in use in many installations throughout the world, and after more than 45 years production, we value greatly the high level of trust that is placed in us by our customers and feel that it is proof of the quality of our products. The shelving and racking components are produced on fully automated production lines.

The folding and cold processing techniques developed by METALSISTEM are designed to obtain light and extremely strong components. Lightness, strength and modular form, coupled with the ease of integrating and expanding already existing structures are but a few of the successful features of the METALSISTEM Industrial Storage Systems.

Ideal storage solutions for a whole host of products supplied worldwide are created here thanks to a total commitment to research and development. The METALSISTEM Technical Department is at the complete disposal of its customers, to study their individual needs and to propose the most effective solutions.







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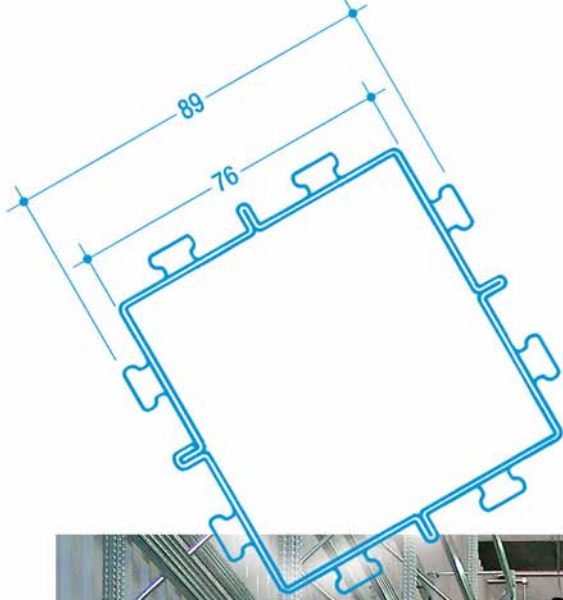












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## THE PRODUCT

The versatility of METALSISTEM installations make them suitable for a wide range of applications not illustrated here.

METALSISTEM offers innovative products of the highest quality, providing highly technical solutions to the most important racking problems, such as rapid assembly, extreme stability and strength and utmost cost efficiency.





## MAIN STRUCTURAL COMPONENTS

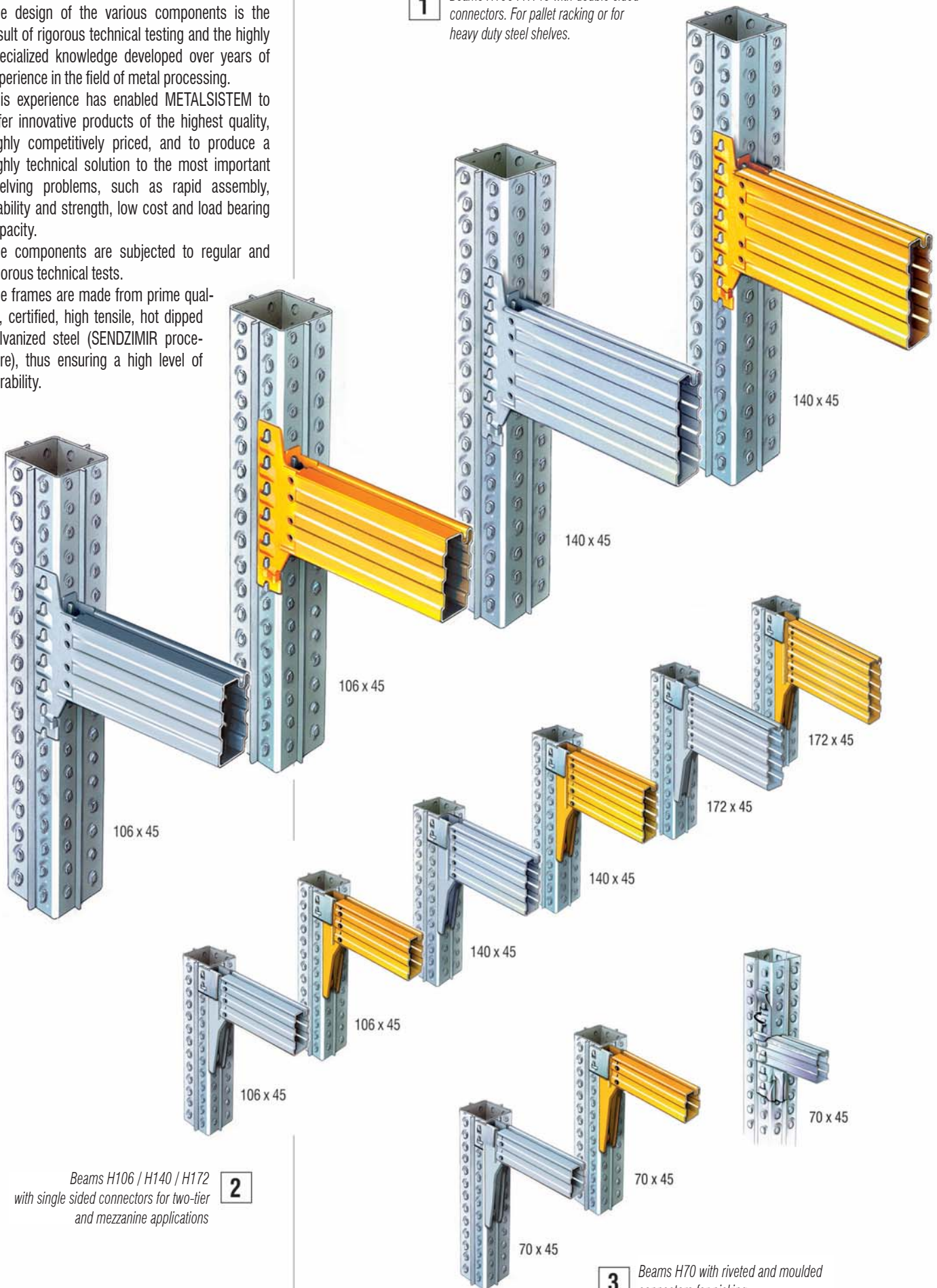
The design of the various components is the result of rigorous technical testing and the highly specialized knowledge developed over years of experience in the field of metal processing.

This experience has enabled METALSISTEM to offer innovative products of the highest quality, highly competitively priced, and to produce a highly technical solution to the most important shelving problems, such as rapid assembly, stability and strength, low cost and load bearing capacity.

The components are subjected to regular and rigorous technical tests.

The frames are made from prime quality, certified, high tensile, hot dipped galvanized steel (SENDZIMIR procedure), thus ensuring a high level of durability.

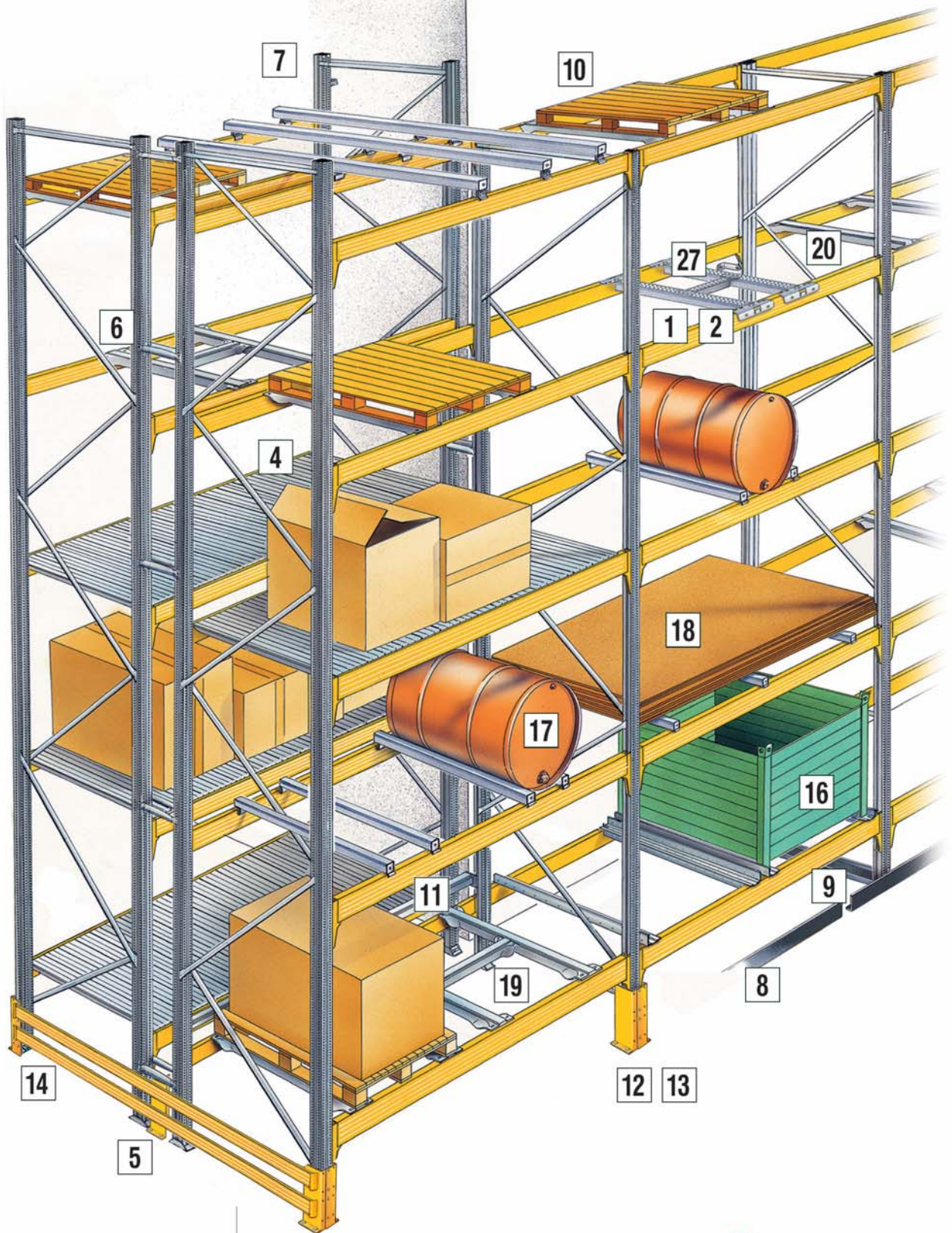
**1** Beams H106 / H140 with double sided connectors. For pallet racking or for heavy duty steel shelves.



**2** Beams H106 / H140 / H172 with single sided connectors for two-tier and mezzanine applications

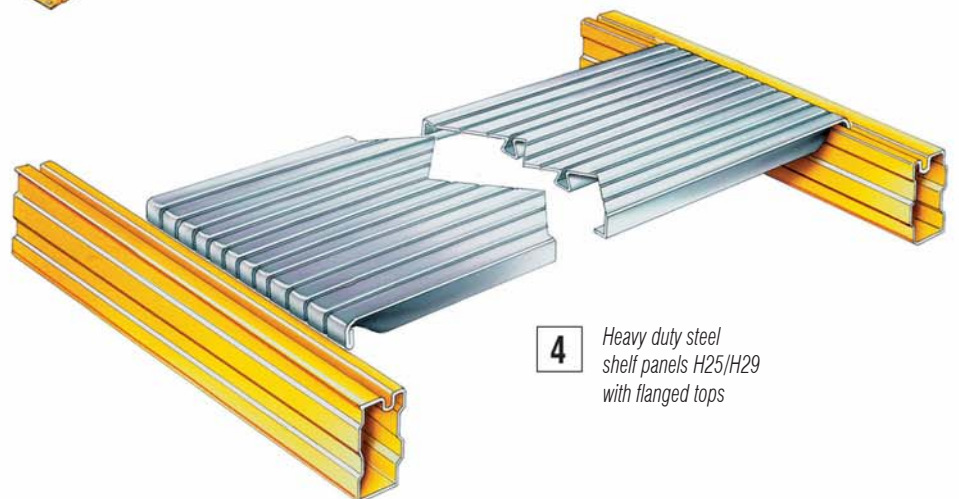
**3** Beams H70 with riveted and moulded connectors for picking





**POWDER COATING FINISH OF THE BEAMS**  
**Standard colour: yellow, RAL 1004.**

- Hot wash degreasing and iron phosphate pre treatment.
- Application of thermosetting powder paint.
- Curing at a temperature of approx. 240°C in a force ventilated air circulation oven.



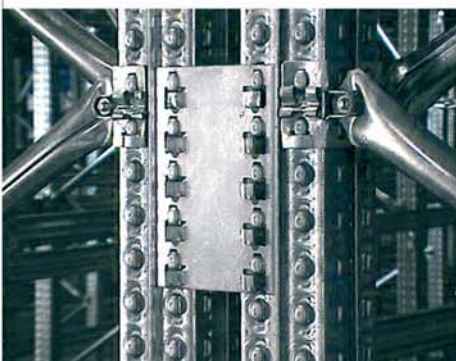
**4** Heavy duty steel shelf panels H25/H29 with flanged tops



All the structural components are made from high tensile steel, certified according to EN 10204 3.1. The beams are profiled sections with quadruple flange thickness at points of maximum stress for high loading capability. The grooves on top of the beams are used to locate modular heavy duty steel shelf panels, pallet support bars and drum cradles for the storage of non palletized or special goods.

The uprights are closed boxed sections, without holes or cut-outs. They provide eight location points on four sides for connecting unidirectional beams or bracing elements.

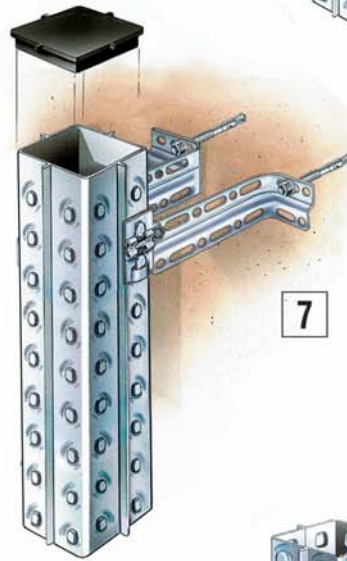
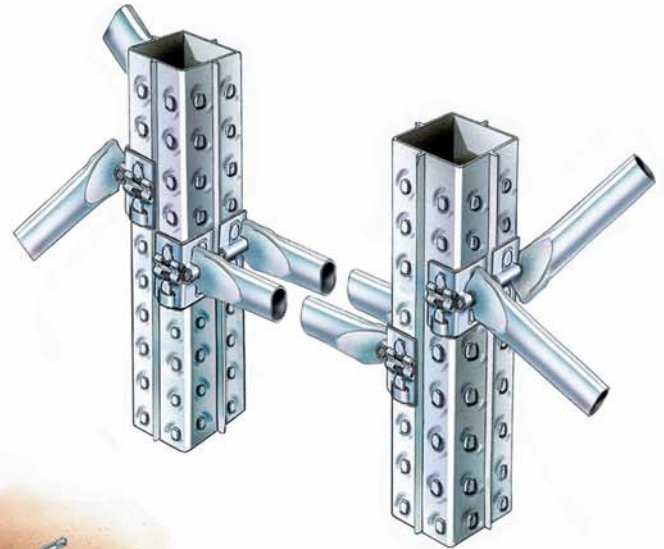
Technical characteristics available in the Super 4-5-6 Technical Manual.



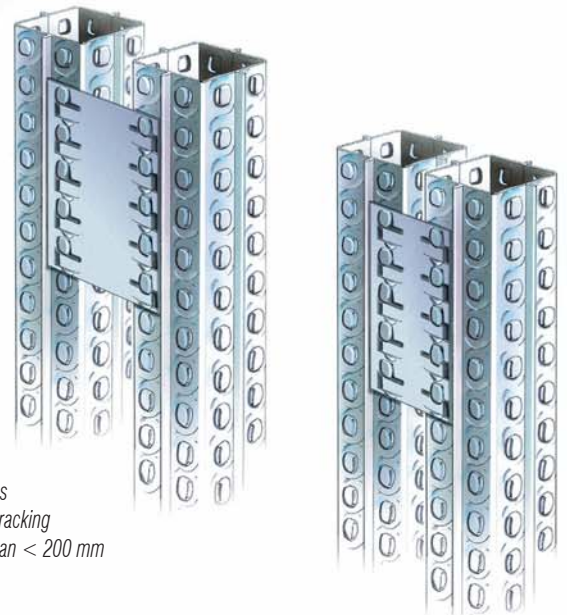
**5** Heavy duty metal base plate



**6** Row spacers

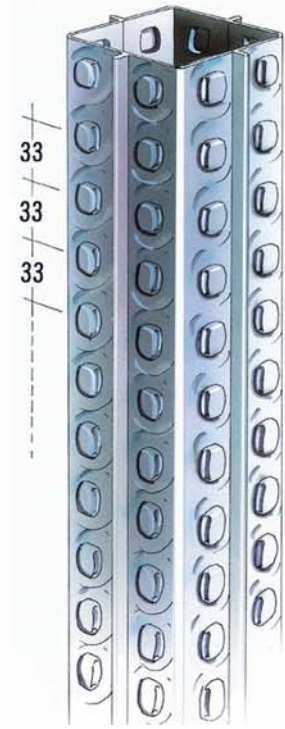


**7** Wall ties



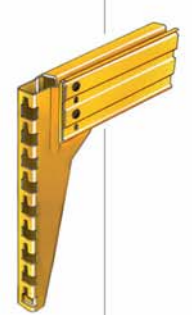
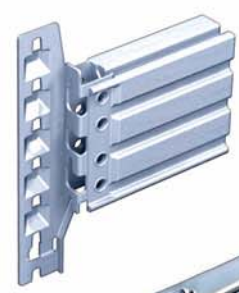
**6a** Row spacer plates for double sided racking  
50 mm < net span < 200 mm





Frames allow four beams to be fitted in parallel, at the same height. This extraordinary versatility enables the product to be highly suitable for the easy construction of both platforms and pallet racking.

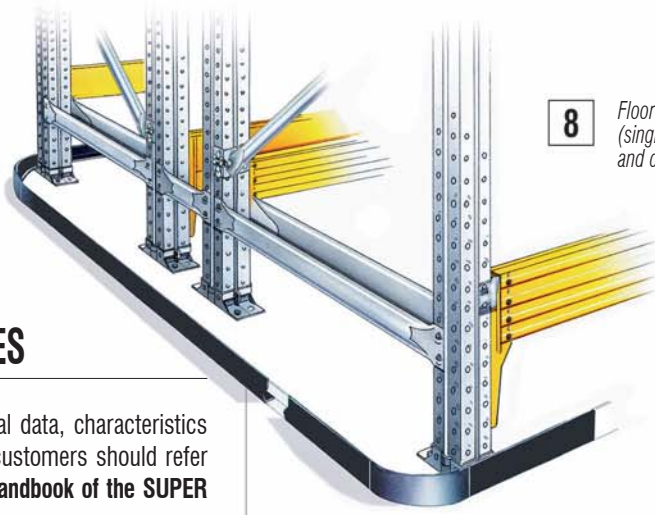
The safety and the quality of the product have always been a primary aim of METALSISTEM and are recognized by TÜV PRODUCT SERVICE in Munich, one of the most rigorous E.C. commissions in the field of quality and safety certification.





## ACCESSORIES

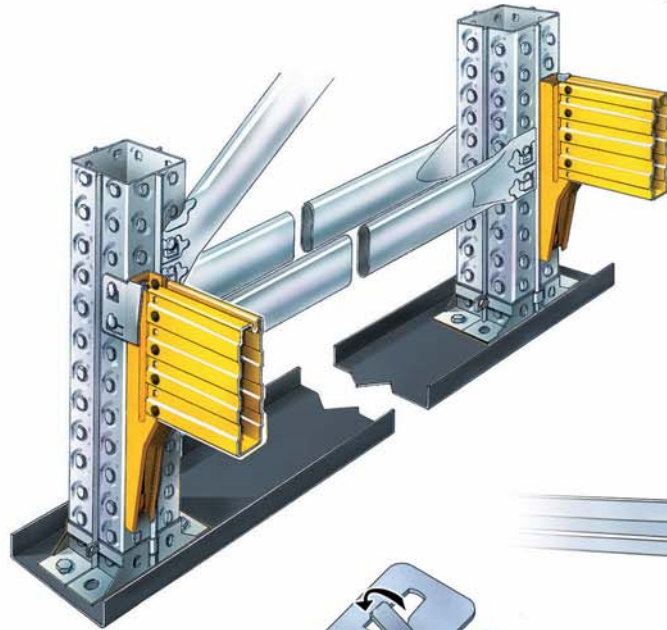
Regarding technical data, characteristics and dimensions, customers should refer to the **Technical Handbook of the SUPER 4-5-6** series.



**8** Floor mounted guide rail  
(single-sided  
and double-sided)



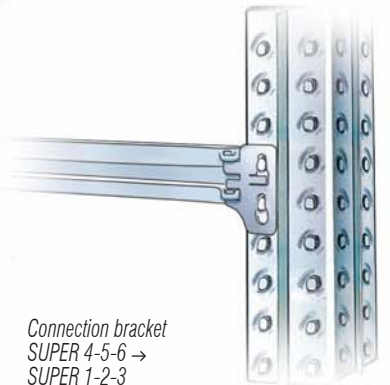
**9** Load distribution plate



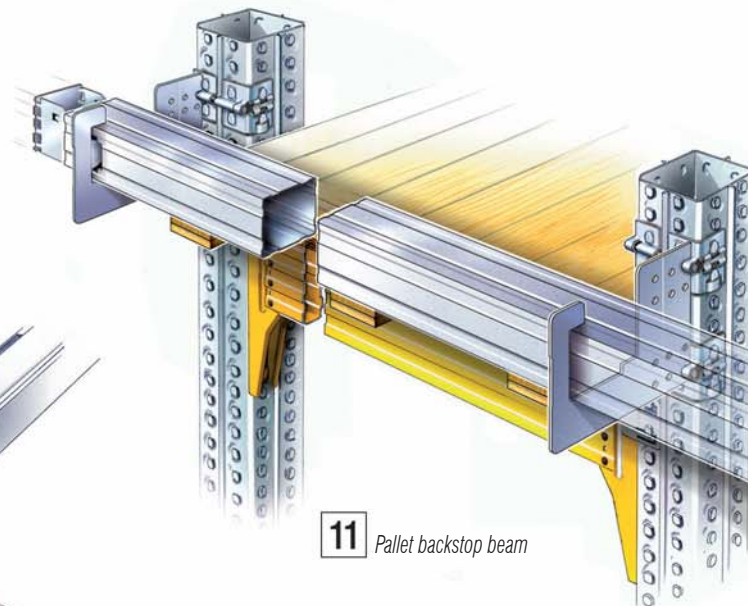
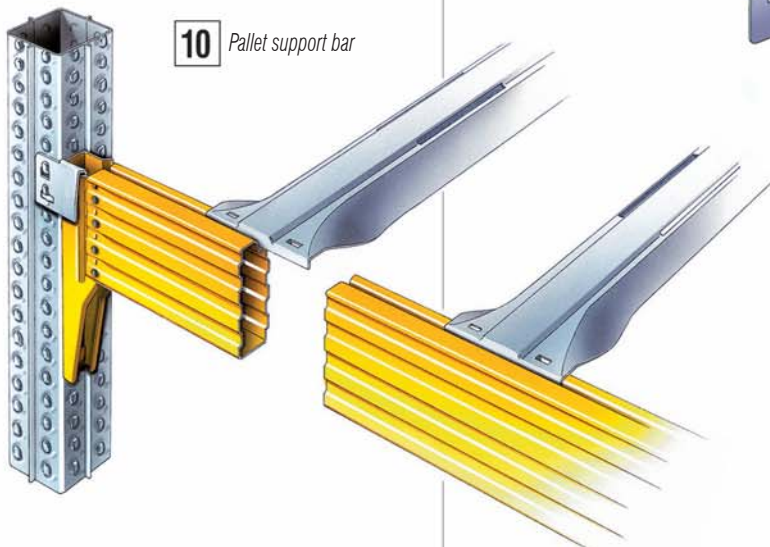
**10** Pallet support bar



Connection bracket  
SUPER 4-5-6 →  
SUPER 1-2-3

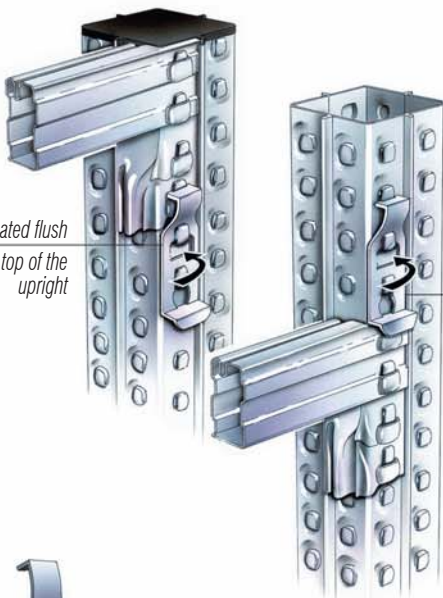


**11** Pallet backstop beam





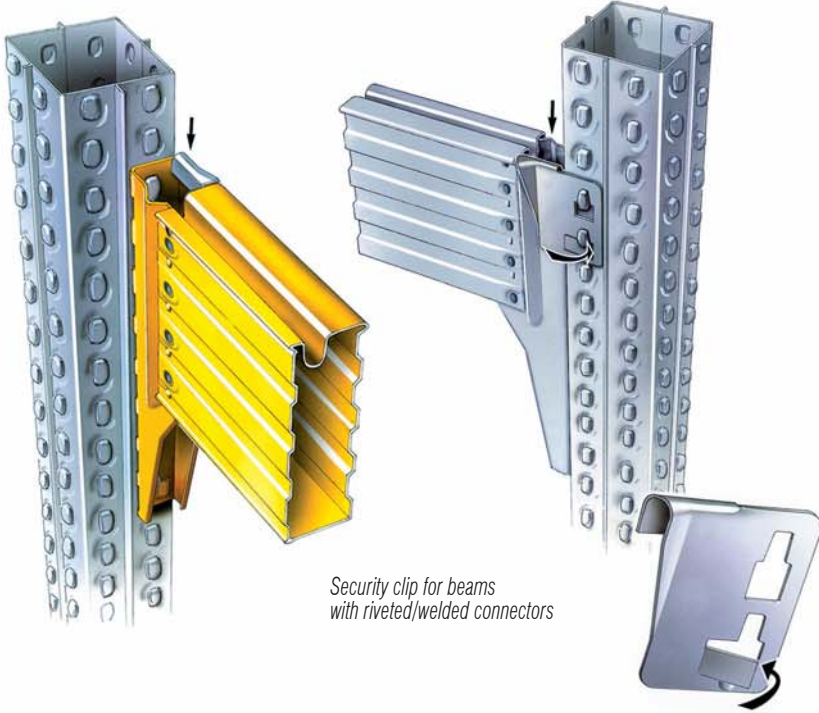
*Beam located flush with the top of the upright*



*Beam located at mid height*

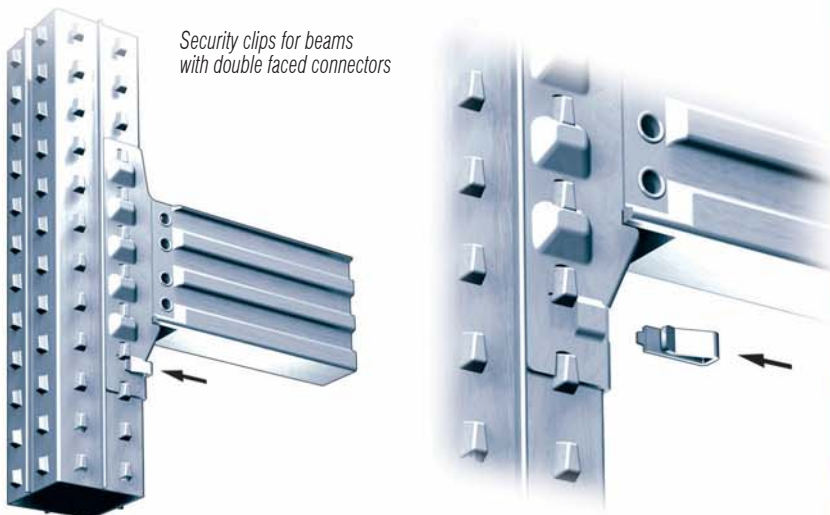


*Security clip for beams with folded connectors*

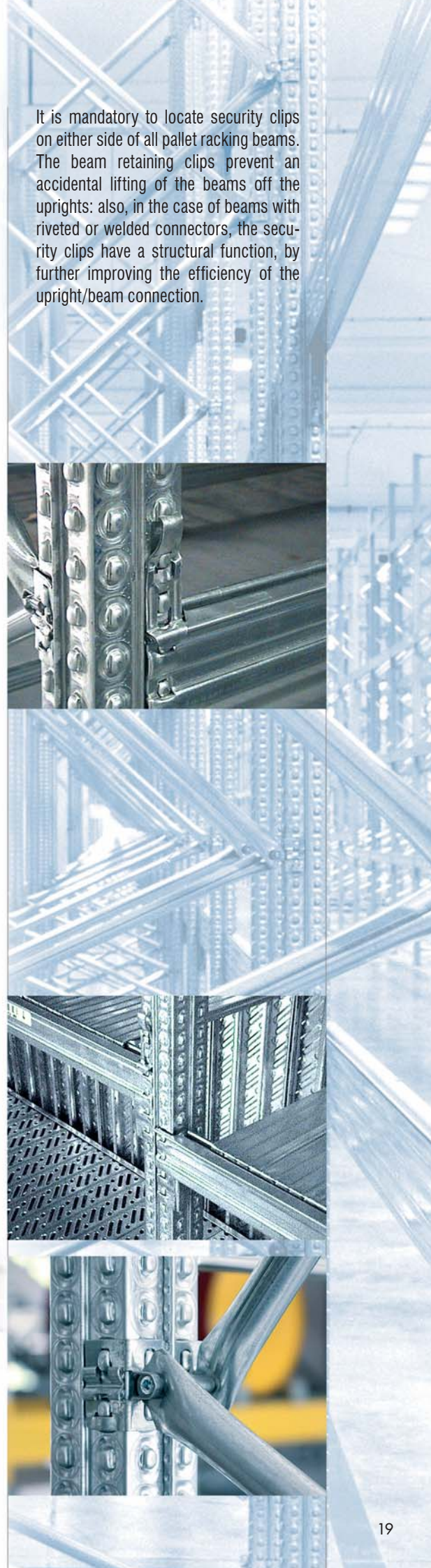


*Security clip for beams with riveted/welded connectors*

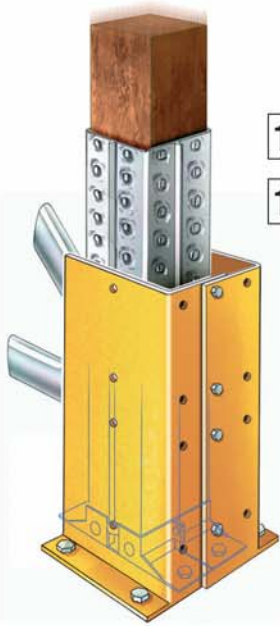
*Security clips for beams with double faced connectors*



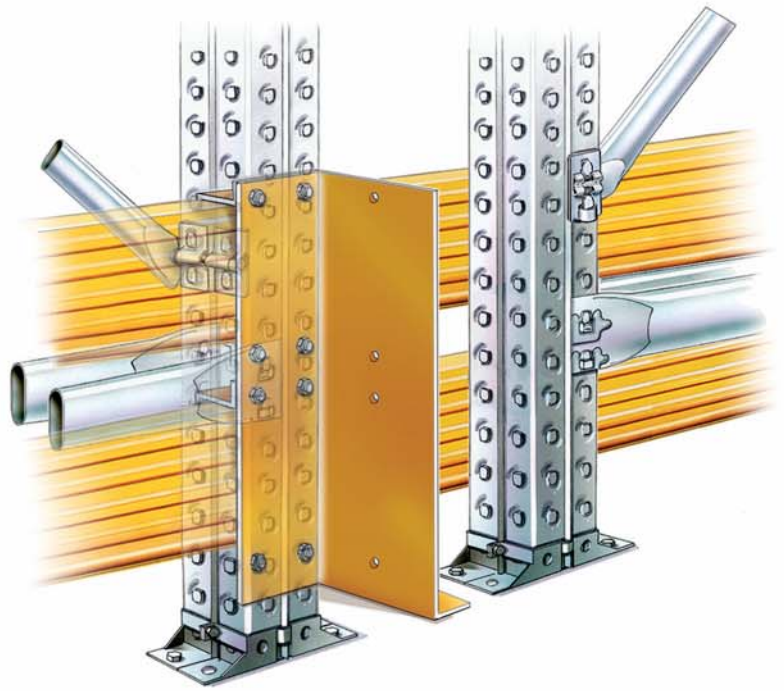
It is mandatory to locate security clips on either side of all pallet racking beams. The beam retaining clips prevent an accidental lifting of the beams off the uprights: also, in the case of beams with riveted or welded connectors, the security clips have a structural function, by further improving the efficiency of the upright/beam connection.



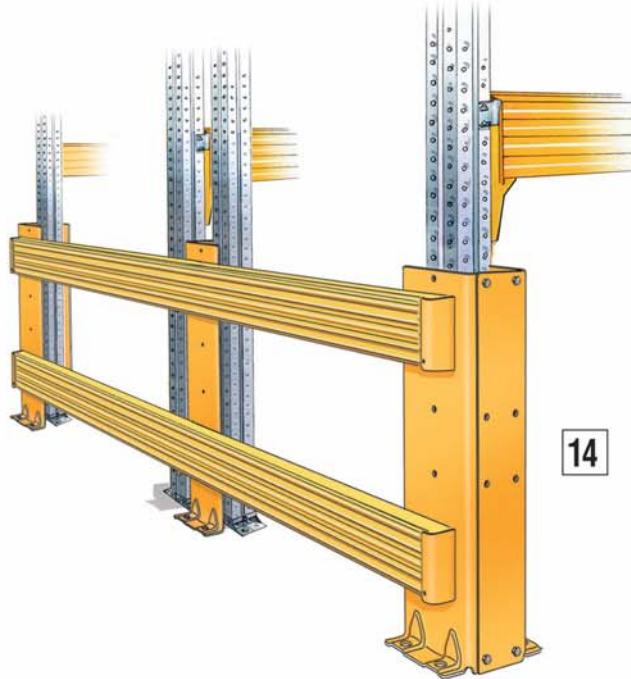




**12** Column protector  
**13** Internal wooden impact dampener

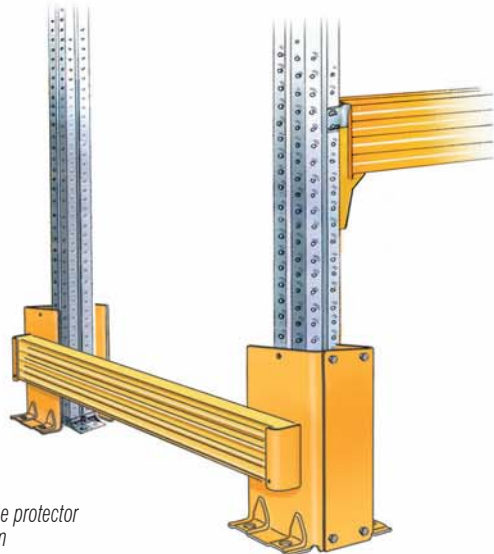
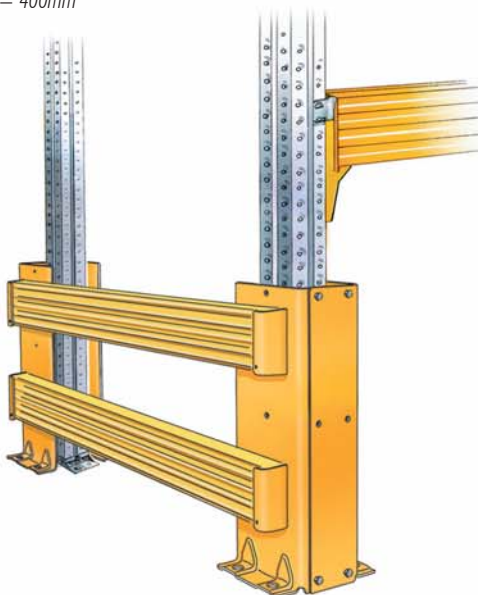


**15** External steel impact dampener



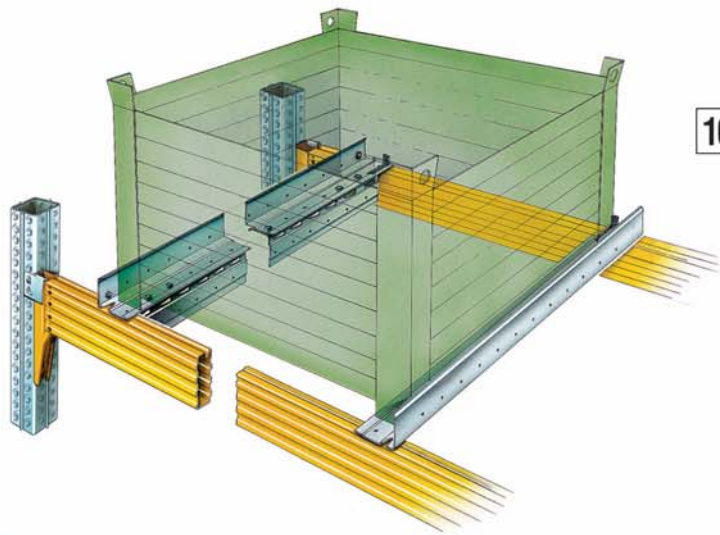
**14** Double frame protector  
 H = 600mm

**14** Double frame protector  
 H = 400mm

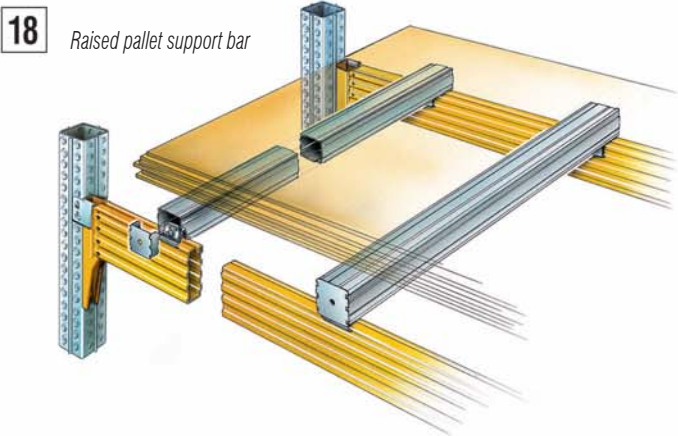


**14** Double frame protector  
 H = 300mm

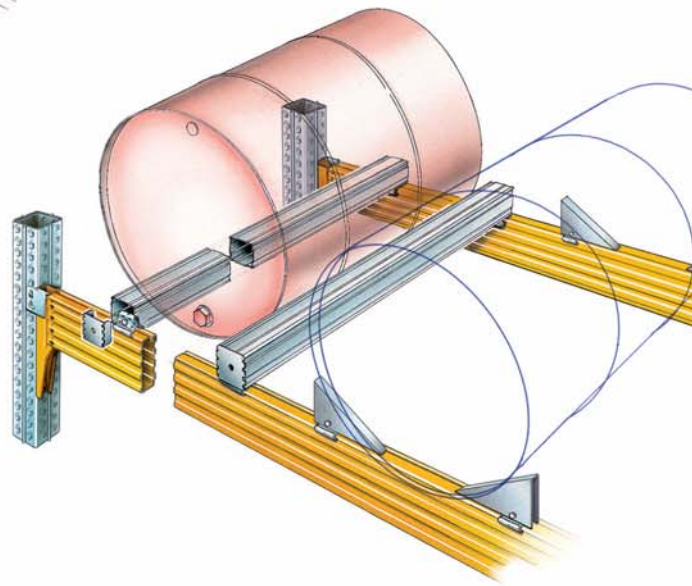




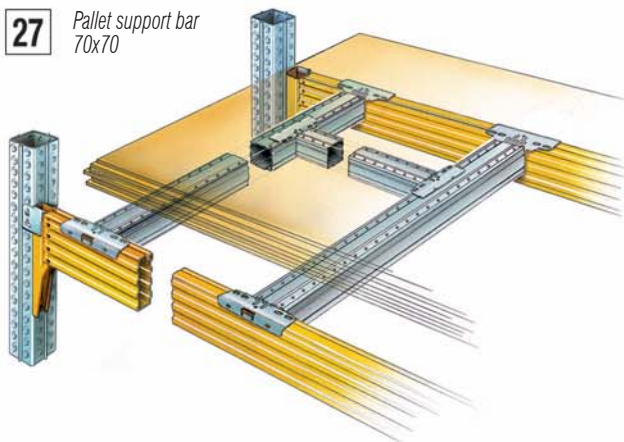
**16** Bin cradle



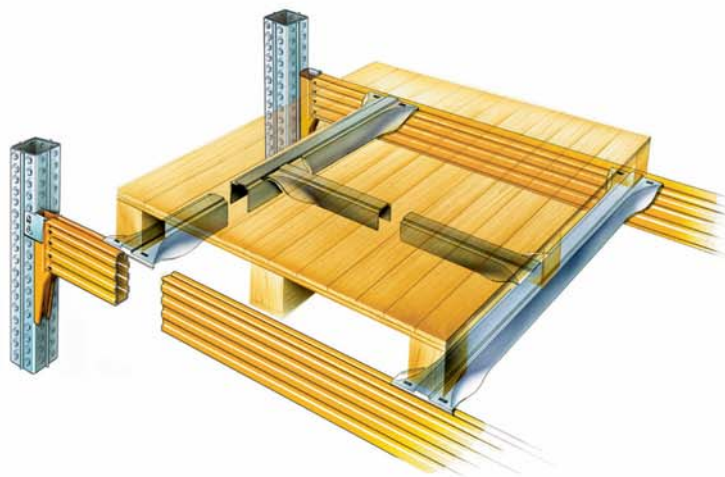
**18** Raised pallet support bar



**17** Drum cradle



**27** Pallet support bar 70x70



**19** Combined pallet support bar



**20** Lightened secondary beams  
(for use in installations equipped  
with sprinkler system  
(shelf surface with coverage <50%))



## DRIVE-IN

The DRIVE-IN racking system allows the maximum use of space and volume, due to the elimination of access aisles.

The storage volume is therefore more than doubled compared with standard pallet racking.

Two kinds of installations are possible: DRIVE-IN or DRIVE-THROUGH.

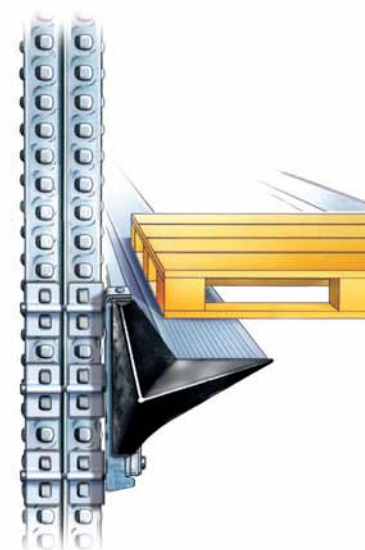
For a correct assembly of DRIVE-IN structures, customers should always refer to the assembly instructions of the SUPER 4-5-6 Technical Handbook.



See more  
on the web

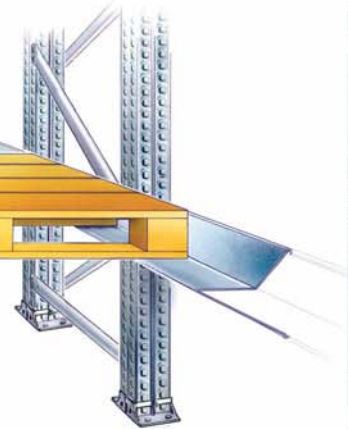
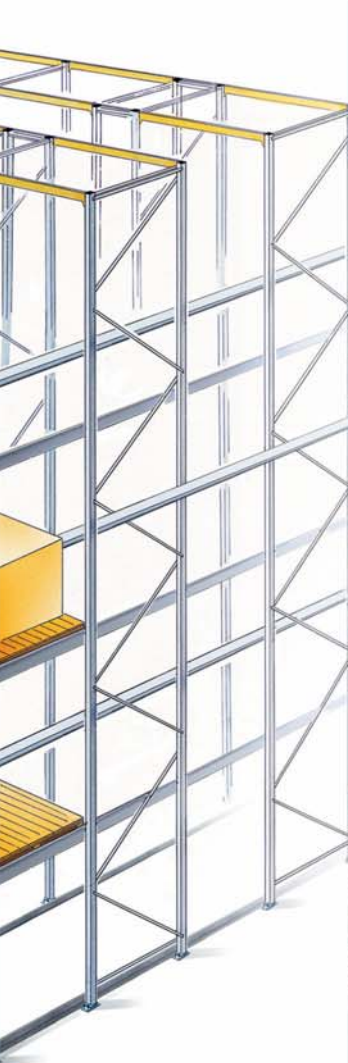


**21** Entrance crescent  
for DRIVE-IN guide rails



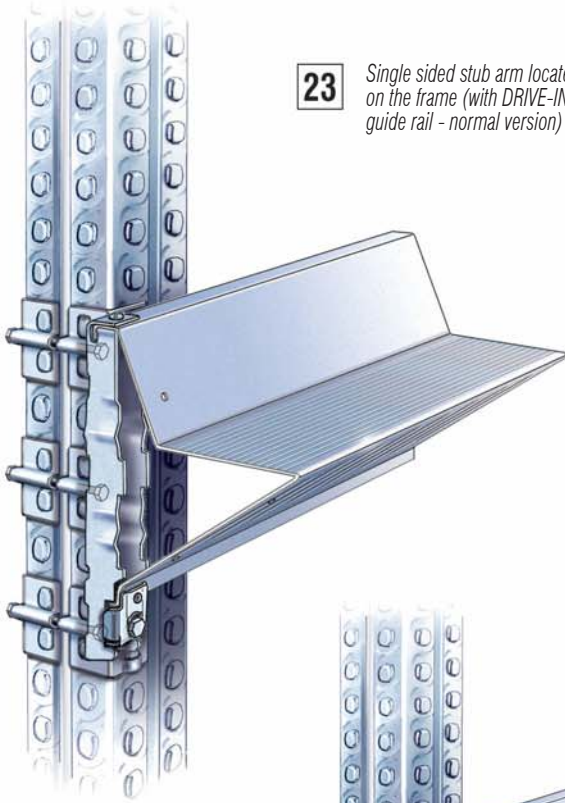
**22** Pallet located  
on the guide rail / stub arms



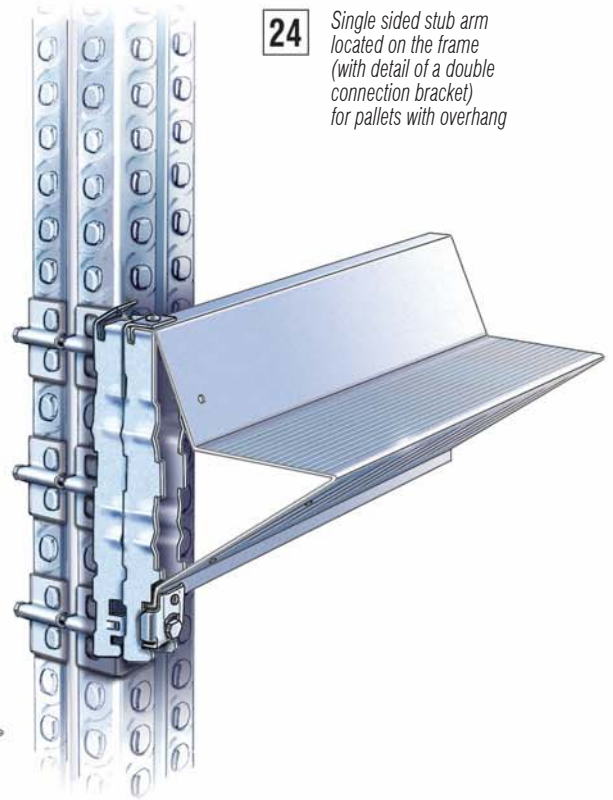




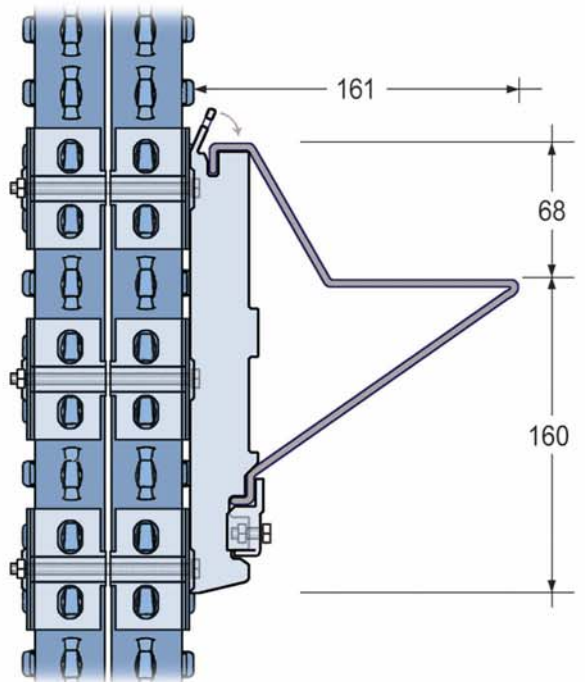
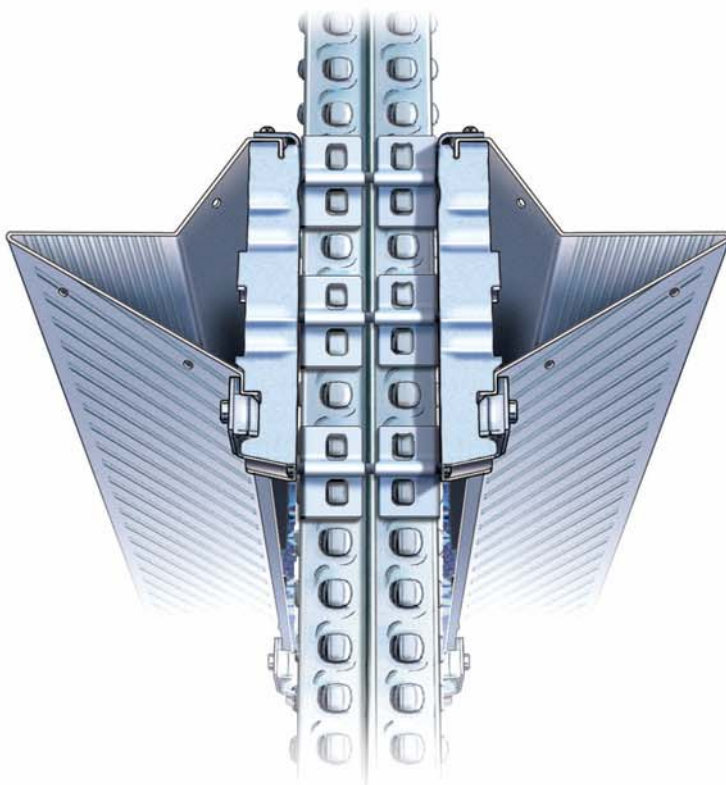
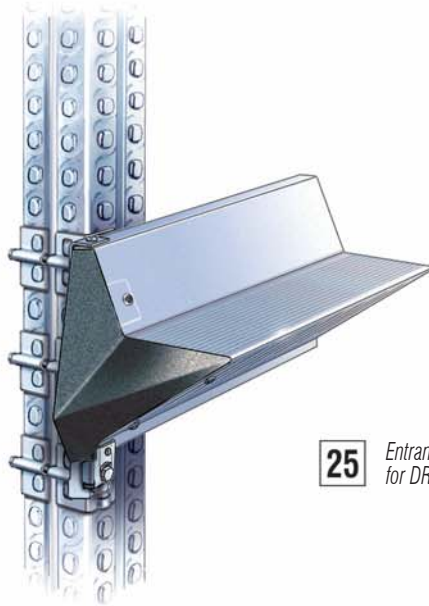
**23** Single sided stub arm located on the frame (with DRIVE-IN guide rail - normal version)



**24** Single sided stub arm located on the frame (with detail of a double connection bracket) for pallets with overhang



**25** Entrance crescent for DRIVE-IN guide rail (detail)



**26** Double sided stub arms located on the frame









**Thanks to its attractive high-tech design,** SUPER 4-5-6 racking is pleasing to the eye and can provide excellent solutions for the retail and shopping sector. It is ideally suited for both the food and non-food areas within large sales surfaces.





See more  
on the web





See more  
on the web



Due to the 4-sided upright design with 8 connection points along its four faces, the SUPER-6 series is ideally suited for the construction of platforms, two-tier and multi-tier installations, providing additional storage surface. SUPER-6 installations are accessorised modular structures that can be tailored to the specific requirements of the customers.















# METALSISTEM®



FEM section X



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METALSISTEM is proud to adopt **ECO-EFFICIENCY** concepts in its business model.  
ZERO emission and ZERO ecological impact thanks to a **UNIQUE MANUFACTURING PROCESS!**  
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