精星物流设备®

Jingxing Logistics Equipment

精星物流设备

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JINGXING 2023 10 V10

目录 INDITEX

精进日新　　精益求精

DAY AFTER DAY，WE TRY OUR BETTER THAN THE BEST

34年专注发展，超15000座立体仓库，1200座自动化立体仓库

松江工厂11万m^2

精星的前身为上海金星货架厂，公司创建于1989年，是国内最大规模专业从事货架和自动化立体仓库等仓储物流设备的设计、制造、安装、调试的企业之一，是上海市高新技术企业、2016年上海制造业企业100强、上海民营制造业企业50强。公司通过了ISO9001质量管理体系，ISO14001环境管理体系，GB/T 45001 2020/ISO 45001:2018 职业健康安全管理体系及ISO/IEC 27001:2013信息安全管理系统认证，精星商标为上海市著名商标，上海名牌。

公司在上海市级开发区莘庄工业区和松江工业区均设有厂房，总占地面积超过11万平方米，2015年公司在有着“中国物流谷”之称的浙江湖州启动了新的物流设备制造工厂的建设工作，总占地面积超26万平方米。自建厂至今，已在世界各地成功承建了15000余座形式各异的立体仓库，其中自动化立体仓库超过1200座，是物流设备行业内公认的龙头企业。

公司一直重视技术研发，承建了省级研发机构—上海仓储物流设备工程技术研究中心，并长期与东华、同济、浙大等高等院校开展产学研项目的合作。目前公司已拥有13项发明专利，110多项专有专利技术，18项注册商标，主导和参与了多项仓储设备行业及国家标准的起草和制定工作。

Jingxing was established in 1989, known as Shanghai Jingxing Rack Factory, specialized in design, manufacturing, installation and commissioning of racking and AS/RS warehouse and other warehousing equipment, and is one of the biggest manufacturers of AS/RS racking and industrial rack in China. We are honored with various of prizes, such as “Shanghai High-Tech Enterprise”, “2016 Shanghai Top 100 Manufacturing Enterprise”, “2016 Shanghai Top 50 Private Manufacturing Enterprise”. The company was certified ISO9001 and ISO 14001. ISO 45001, ISO/IEC 27001. Jingxing logo is Shanghai Famous Brand and Trademark.

The company has 2 workshops in Shanghai Xinzhuang Industrial Zone and Songjiang Industrial Zone, covering a total area of 110,000m^2. In 2015, we have started our expansion in “ China Logistics Valley”, Huzhou city, Zhengjiang Province, the new manufacturing base will cover total area of over 260,000m^2. Since company setup, Jingxing has successfully built more than 15,000 projects of various logistic racking systems and among which over 1200 projects are AS/RS racking projects. We are known as a leading company in Chinese logistics equipment industry.

The company pays great attention to R&D, has set up a municipal R&D center---Shanghai Storage Logistics Equipment Engineering R&D Center, and built up a long term cooperation with Donghua University, Tongji University, and Zhejiang University in the field of IAR (Industry-Academia-Research). To the date the company has acquired 13 patents for invention, and over 110 patented technologies, 18 registered logo, leading and participating in drafting and constituting several storage equipment industrial and national standards.

湖州工厂26万m^2

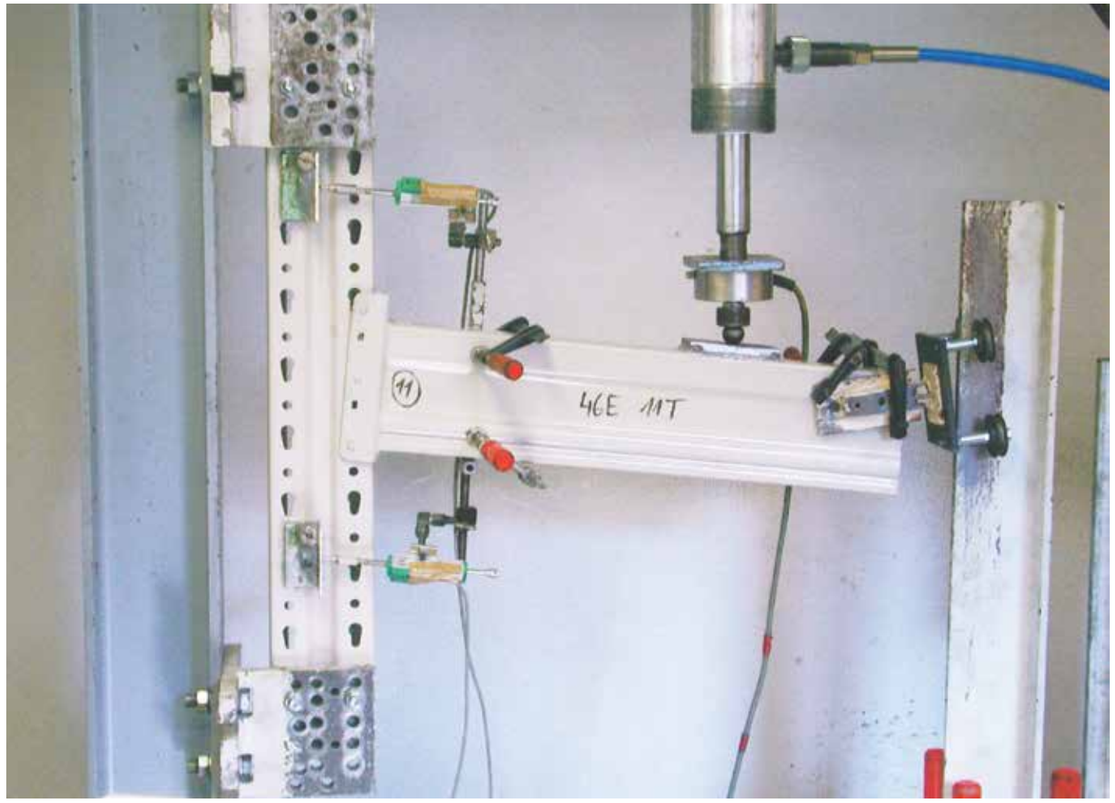
公司销售额一直在同行中遥遥领先，项目遍布全国各地及以东南亚为代表的海外市场，并在各行业内实现了业务覆盖，尤其在电子商务、食品饮料、医药化工、电子、商业、汽车及烟草等领域均处于领先地位。

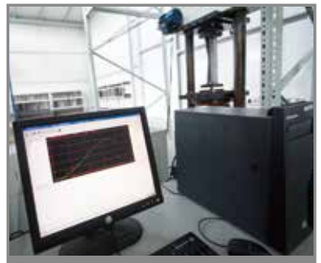
随着中国物流业的迅猛发展，各行各业都对物流系统有了更高的要求，我们将本着“精进日新，精益求精”的理念，努力向着“成为世界一流的专业仓储物流设备制造商”的目标迈进。

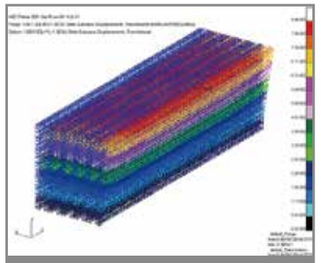
Our sales revenue is growing steadily, our clients are throughout the whole China and South-East Asian region, with all kinds of industries. We have large market shares in E-commerce, food & beverage, pharmaceutical chemicals, electronics, retails, automotives, tobaccos, etc.

The Chinese logistics industry is booming, all the customers are upgrading their logistics solutions. Based on our company philosophy, “day after day, we try our better than best”, we have a vision to be one of “the world-class professional storage and logistics equipment manufacturers. ”

闵行工厂2.6万m^2







有限元分析及结构测试 Finite Element Analysis and Structural Test

有限元分析能建立精确的等比例整体货架模型，建立符合实际工况的边界约束，能更精确的模拟现实中货架的受力情况。不仅可以做到静态分析，更可将复杂的地震、风雨雪等工况在计算机中模拟出来。没有模糊的环节，没有薄弱的构件，确保货架的每一处用材都符合安全规范，客户的每一次使用都放心可靠。

参考欧标EN15512的规定进行了系统的短、长柱测试，梁柱节点刚度测试以及地脚刚度测试。其中短、长柱测试为研究立柱承载力提供事实依据，与理论计算相结合，可以较精确的得知立柱的承载力；梁柱节点刚度测试即挂片刚度测试，该数据是货架研究的核心数据之一，无法通过理论计算得知，只能通过试验获得，该数据广泛用于货架整体稳定性计算以及地震、风雨雪等荷载计算，是完整的计算理论中不可或缺的内容。

测试结果用于有限元分析，结合现行的通用规范以用于金属货架的计算，这可以增强对材料质量、制造流程和安装公差的控制，在安全的基础上，达到最优选型的目的。

Via FEA, a model on equal proportion to the rack itself can be built, with boundary constraints that comply with the actual work conditions, so that the actual load bearing can be simulated in a more accurate way. What can be achieved here is not only the static analysis, but also more complicated work conditions like earthquake, wind, rain and snow.

Systematic tests including short column and long column, beam-column joint and rigidity of jack base have been arranged (by Jingxing) according to EN15512, The short or long column test provides fact upon which the load capacity of upright would be researched. This, along with theoretical calculation, brings about more accurate result of actual load capacity of upright. Beam-column joint test, also known as the test about the rigidity of beam connector, provides one of the most critical data to rack research, which cannot be achieved by theoretical calculation but only by experiment.

The test results will be applied to FEA, in conjunction with existing common standards for mechanical calculation of metal rack, so as to improve the management of material quality, manufacture progress, and installation tolerance, and thus to reach safety and efficiency.

货架行业专用规范

GB/T 39681 立体仓库货架系统设计规范

本规范是货架设计的基础，规定了货架的荷载、荷载组合、设计以及测试方法等；

GB/T 39830 立体仓库钢结构货架抗震设计规范

本规范是货架抗震设计的基础，规定了货架的抗震设计要求、地震作用、分析方法及构造要求等；

JB/T 11270 立体仓库组合式钢结构货架技术条件

本规范是货架应用的基础，规定了货架的制造、安装精度要求以及检验方法等；

JB/T 9018 自动化立体仓库设计规范

本规范是AS/RS系统设计的基础，规定了AS/RS系统的各类设备、仓库要求及入出库能力计算等；

Standards for Rack Industry

GB/T 39681 Racking design code for steel static storage systems

This specification is the basis for rack design, and stipulates the load, load combination, design, and testing methods for racks.

GB/T 39830-2021 Code for seismic design of steel static storage systems.

This specification is the basis for the seismic design of racks, and stipulates the seismic design requirements, seismic effects, analysis methods, and structural requirements for racks.

JB/T 11270 Assembled steel rack structure for high-bay warehouse—Technical requirements

This specification is the basis for the application of racks and stipulates the manufacture of racks, installation accuracy requirements and inspection methods.

JB/T 9018 Automated storage and retrieval system--Design rules

This specification is the basis for the design of the AS/RS system and stipulates the various types of equipment, warehouse requirements and inbound and outbound capacity calculations for the AS/RS system.

建筑通用规范

在使用货架专用规范时，会引用部分建筑通用规范

GB50009 建筑结构荷载规范

本规范是荷载计算的基础，规定了建筑结构的荷载计算及荷载组合等，如库架一体常用的风荷载、雪荷载等；

GB50018 冷弯薄壁型钢结构技术规范

本规范是冷弯薄壁型钢的设计基础，货架作为一种冷弯薄壁型钢，在构件计算时也需参照本规范的计算公式；

GB50011 建筑抗震设计规范

本规范是结构抗震的设计基础，货架在抗震设计时，需要本规范提供的反应谱进行计算；

General Standards for Building

Some of the general building codes are referenced when using rack-specific codes.

GB50009 Code of structural loading of buildings

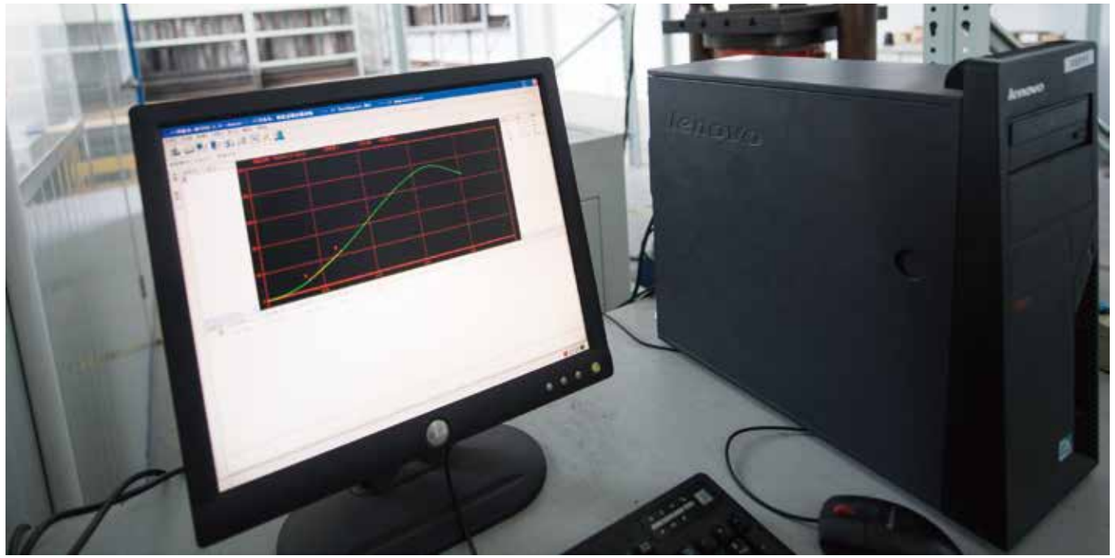
This specification is the basis for load calculations and stipulates for the calculation of loads and load combinations for building structures, such as wind loads and snow loads commonly used in the rack-clad warehouse;

GB50018 Technical code of cold-formed thin-walled steel structures

This specification is the design basis for cold-formed thin-walled steel. As a cold-formed thin-walled steel, the rack also needs to refer to the calculation formula in this specification when calculating the components.

GB50011 Code for seismic design of buildings

This specification is the design basis for structural seismic resistance. When designing the seismic resistance of the rack, it is necessary to use the response spectrum provided by this specification for calculation.



欧美货架规范

EN15512
本规范是欧洲货架设计的基础，规定了货架的荷载、荷载组合、设计以及测试方法等，与 FEM10.2.02 基本等同;

EN16681
本规范是欧洲货架抗震设计的基础，规定了货架的抗震设计要求、地震作用、分析方法及构造要求等，与 FEM10.2.08 基本等同；

EN15620
本规范是欧洲货架安装精度、变形及公差要求规范，规定了横梁式货架、VNA 货架、悬臂式货架及驶入式货架的各项相关要求；

FEM9.831
本规范是欧洲堆垛机托盘式 AS/RS 系统货架的精度、变形及公差要求规范，规定了横梁式自动库货架的各项相关要求；

FEM9.832
本规范是欧洲堆垛机料箱式 AS/RS 系统货架的精度、变形及公差要求规范，规定了牛腿梁式、横梁式料箱自动库货架的各项相关要求；

ANSI MH16.1
本规范是美国货架设计的基础，规定了货架的荷载、荷载组合、设计以及测试方法等。

European and American Rack Standards

EN15512 Steel static storage systems-Adjustable pallet racking systems-Principles for structural design.

EN15512: Basis for European rack design, stipulates the load, load combination, design, and testing methods for racks; equivalent to FEM10.2.02.

EN16681 Steel static storage systems-Adjustable pallet racking systems-Principles for seismic design.

EN16681: Basis for the European rack seismic design, stipulates the seismic design requirements, effects, analysis methods, and structural requirements, equivalent to 10.2.08

EN15620 Steel static storage systems -Adjustable pallet racking -Tolerances,deformations and clearances.

EN15620: European specification for accuracy, deformation and tolerances in racking installations and stipulates the requirements for selective pallet rack .

FEM9.831 Basis of calculations for Storage and Retrieval machines, tolerances deformations and clearances in the high-bay warehouse.

FEM9.831: European pallet AS/RS system racks accuracy for deformation, and tolerance requirements and stipulates various related requirements.

FEM9.832 Basis of calculations for storage and retrieval machines—Tolerances, deformations and clearances in automatic small parts warehouses.

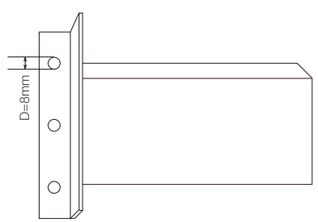
FEM9.832: European stacker AS/RS system for the accuracy, deformation and tolerance requirements specification, stipulates the relevant requirements

ANSI MH16.1 Specification for the Design, Testing and Utilization of Industrial Steel Storage Racks.

ANSI MH16.1: Basis for rack design in the United States and stipulates loads, load combinations, design and test methods.

精星主要采用铆钉式的挂爪，这种挂爪形式大大提高了货架整体的安全性和耐用度。

- 8毫米直径的铆钉挂爪采用特种高强度钢材制作，保证其强度在整个连接系统里是最高的，不会因为铆钉强度问题而发生挂片损坏。
- 铆钉连接为柔性连接，圆形的铆钉在圆形的立柱孔中具有足够的柔性，连接处的应力集中可被有效的消化掉，不会产生残余变形和残留应力，可保护挂片，防止发生撕裂。
- 铆钉式挂爪的最大优势在于其优异的抗震性能，在地震发生时，剧烈的震动会在梁、柱连接处产生巨大的应力集中，如果这个应力集中不能被有效的消化掉，就会破坏掉挂片的挂爪，导致横梁脱落，严重的会使整个货架系统坍塌，而铆钉柔性连接专为此设计，稳定性完全可以满足抗震要求。
- 铆式结构的挂爪非是从挂片上直接冲制而成，这可以保证挂爪强度不受挂片钢材材质的影响，且挂片钢材的物理性能不会发生显著的变化。



For the majority of the racking, Jingxing utilizes rivet beam connectors which largely enhance the general safety and lifespan of the rack.

- 8mm-diameter rivet beam connector is made out of high-strength steel, making it the most the strengthen component in the entire system full of connection.
- Rivet connection is flexible. The adequate amount of flexibility of the joint between circular rivet and teardrop upright hole digests the stress concentration effectively, so there is no residential deformation or residential stress.
- The biggest advantage of rivet beam connector is its advanced anti-seism performance. Flexible connection of rivet structure is designed to prevent this and the system will be stable enough to be earthquake-proof.
- Rivet structures are not punch-formed directly from the connector itself, which ensures that the strength of the connector will not be affected by the steel material.

全自动连冲连轧货架立柱冷弯成型生产线 Rolling Mil

四条德国全进口，是目前世界上最先进的全自动连冲连轧货架立柱冷弯成型生产线。这条生产线有着自动化程度高、速度快、精度高、累积误差小、安全性好等特点。

- 自动化程度高，多面连冲连轧，也可多面断续冲孔，程序自由设定；
- 每分钟平均速度34米，最大程度的保证了高峰期的产能；
- 使立柱多达21个面的成型更精确，极大提高了立柱的钢性和承载能力；
- 无可比拟的精度优势，充分保证高位货架最后的安装精度，整根立柱累差精度比国内成型机提高一倍多；
- 高速切割保证了立柱端面的高平整度和光洁度，为整个货架的垂直精度和水平一致性打下良好基础；
- 能实现高精度的多面断续冲孔，为特殊需求立柱轧制提供可能；
- 可轧制镀锌板立柱，且不破坏表面锌层。

In Chinese rack industry, Jingxing is the first enterprise to import four entire set of Germany cold-forming line for racking system.

- Highly automatic line allows for multi-facet continuous punching and continuous roll-forming, as well as intermittent punching which can be programmed at will.
- The speed of roll-forming is 34 meters per minute, so the manufacture capacity at peaks is ensured to the largest extent.
- Upright possesses 21 facets at most, largely strengthening the stability after being formed, enhancing the rigidity and load capacity of it as well.
- Unparalleled manufacture accuracy ensures the final installation accuracy of high-bay AS/RS. The accumulated tolerance of an entire upright is more than twice as high as that of those formed by domestic rolling mill.
- High-speed cutting ensures the high evenness and smoothness for the cross section of the upright, laying off a solid foundation for the vertical and horizontal accuracy of the entire rack.
- The line is capable of intermittently punching multiple facets accurately, producing specifically requested uprights. It is also capable of roll-forming uprights out of galvanized plate without scratching the zinc coating.

喷涂设备 Coating Equipment

精星选用的静电粉末喷涂设备，是全套瑞士金马的进口设备，喷涂质量有别于主件进口而其余国内组装的喷涂设备，更远胜于仅仅采用进口喷枪的设备。其特点为：

- 在喷涂过程中，剩余的粉末不会离开箱体，被设备的大旋风直接回收过滤后利用；
- 设备能满足复杂工件的工艺需求和平面要求；
- 设备采用的是数字化阀门控制技术，精确地连续地粉末传输，从而得到均匀的高质量的表面涂层；
- 快速魔术换粉，速度快、时间短，节能效果优异；
- 大旋风回收力强，粉末不外溢、过滤速度快，有效地将过滤后的粉末输送到供粉中心；
- 操作工人所处的工作环境安全环保，最大程度降低职业病危害。

The static powder coating equipment introduced by Jingxing from GEMA Switzerland is different from those ones which are assembled or those where only the coating guns are imported, in terms of quality.

- The equipment is environment-friendly and powders will be absorbed by huge fan before spilling out.
- GEMA powder coating equipment combines the process requirements together with surface demands of complexly-structured components, bringing about a much higher quality of coating for the complexly-structured components.
- GEMA coating equipment applies numerical control technology of valves and is able to accurately and continuously transfer powders, achieving a uniform and high-quality surface coating.
- The rapid magic powder switch is so effective that it's energy-saving.
- Highly absorbent big fan prevents powders from spilling out and filters quickly, effectively transferring the filtered powders to powder supply center.
- To sum up, the work condition is much more advanced than that of the domestically produced powder coating lines.

库架合一 Rack Clad Silo

库架合一，顾名思义，是一种仓库+货架的整体结构，其常规结构由内部的货架及搭建于货架上的外墙及屋顶组成，货架是整个仓库的主支撑结构。细分来说，主要分为由货架主体、抗风结构、屋架、围护结构等组成的结构体系以及结构体系以外的排水、消防、维护和风机制冷设备等。精星已经为客户建设了30余座库架合一的仓库。

Clad-rack warehouse is an integral structure of warehouse and rack, Its conventional design consists of internal racks, wall cladding and roof that is constructed on top of the racks. The racks serve as the main support structure of the entire warehouse. In more detail, it mainly comprises a structural system consisting of rack, wind-resistant structures, roof trusses, and enclosure structures. Furthermore, the facilities for drainage, fire prevention, maintenance, and wind-powered refrigeration, which are external to the structural system, are also included. Jingxing has built more than 30 Rack-clads for customers,

优势

库架合一的优势体现在以下几个维度：

成本，与常规仓库+货架的造价对比，成本高低不可一概而论，但通常来说，项目规模越大，库架合一的优势越明显。

工期，库架合一有较大的优势的，传统的仓库+货架，是分开施工的，先做好仓库，这需要至少数个月的工期，然后货架进入库内施工，由于受到仓库空间的限制，很多大型设备是无法使用的，施工进度必然受到一定影响，货架施工基本又需要数月时间；而库架合一露天施工，不受施工设备限制，可以使用超高吊机模块化吊装作业，而且外围结构与货架是同步进行的，货架装完了，整个库房也就接近完工了，这使得库架合一具有很大的工期优势。

空间，从库区空间利用率来说，库架合一也有较大的优势，库架合一的内部空间基本是完全利用的，而传统的货架+仓库，库区内会有大量的建筑钢柱，货架距离仓库的侧、顶边界也都有较大的距离，势必无法做到完全利用。库架合一的空间利用率更高，对一些特殊行业，如冷链物流，对空间能耗十分敏感，会比传统仓库更节能，也算是一种优势了。

Advantage

The advantages of the RACK-CLAD are reflected：

In terms of cost, it's not always the case that the higher the cost is better. Generally, the larger the project scale, the more obvious the advantage of rack-clad becomes.

In terms of construction, there are significant advantages to rack-clad. The traditional approach of building the warehouse and racks separately, with the warehouse built first, requires a construction period of at least several months. This approach is followed by the construction of the racks, which typically takes several months due to the limitations of warehouse space, making many large-scale equipment unusable, consequently affecting the progress of construction. The outdoor construction of the rack-clad is not constrained by construction equipment, allowing for modular lifting operations with ultra-high cranes. Furthermore, the peripheral structure and the racks are constructed simultaneously. Once the racks are installed, the entire warehouse is almost completed. This significantly enhances the project timeline.

In terms of space utilization, from the utilization of space in the warehouse area, the rack-clad has a greater advantage, the internal space is basically completely utilized, Conversely, in traditional storage facilities, there are numerous structural steel columns within the area, and the distance between the racks and the warehouse's lateral and vertical boundaries is considerable, inevitably limiting the space utilization. It allows for a higher space utilization, which can be an advantage for special industries, such as cold chain logistics, where space energy efficiency is crucial.





技术难点

库架合一在设计及建造上比一般货架难度大很多。

从设计来说，除了常规要考虑的地震等外部因素，还要考虑当地的风、雨、雪等外部荷载，以及积灰和设备等各种常规货架中遇不到的荷载，这相当于传统的货架制造商除了要精通设备，还要精通建筑、钢结构荷载及设计等。库架合一不仅要保证安全，还应能保证货架在这么多外部荷载作用之下，仍然能满足自动化设备的运行要求，这就给货架结构设计人员提出了更高的要求。以我们公司自己的角度来说，从以下三个方面着手解决：

理论，我公司精通中、美、欧三地的货架、钢结构及荷载规范，解决设计问题；

生产，引进德国最先进的生产线，可制作超高强度、超高精度的主型材，从产品上保证强度及设计精度；

结构，通过与知名高校合作，与结构行业的知名专家合作，并吸收学习海外成功项目经验，从结构上保证了库架合一的合理性。

从建造来说，与其他单位交叉施工贯穿整个项目，且施工环境恶劣，强日光、风、雨、雪等因素会严重干扰正常施工，且库架合一目前来说一般都是超高、超大项目，基本都面临着多段立柱对接，冷弯薄壁型钢与热轧型钢对接等安装难题，使得货架要满足安装精度要求比常规项目更困难。

通过多个大型案例的实装经验，整理总结了一整套现场施工的关键点，对交叉施工管理、施工设备、人员装备、大型吊具、现场监控、天气影响等一系列方面都提出了专项要求，使得库架合一的安装最终实现设计目标。

Technological Difficulty

Rack-clad poses a significantly greater challenge than traditional racking in terms of design and construction.

Firstly, in terms of design, in addition to the typical external factors like earthquakes, consideration must also be given to local wind, rain, snow and other external loads, as well as dust accumulation and equipment, all of which are not encountered in traditional racks. This means that traditional racking manufacturers must not only be adept at equipment design, but also at architecture, steel structure loads and design. The rack-clad not only with the aim to ensure safety, but also with the aim to ensure that the rack can still meet the operational requirements of automated equipment under such external loads, sets higher demands on the rack design personnel. From our own perspective, we approach the problem in three ways as below:

In terms of theory, Jingxing is proficient in racks, steel structure and load specifications in China, the United States and Europe to solve design problems:

In terms of producing, the introduction of Germany's most advanced production line allows for the creation of main profiles with high strength and precision, ensuring stability and design accuracy from the product.

In terms of structure, by collaborating with renowned universities and structural experts, and absorbing the experience from successful overseas projects, the rationality of rack-clad is structurally ensured.

In terms of construction, cross-construction is required throughout the entire project, and the environment is harsh, with factors like sunlight, wind, rain, and snow severely disrupting normal operations. Moreover, rack-clad currently tend to be applied to extremely high or large projects, often facing difficulties during installation, such as multiple sections of upright connection, and matching cold formed thin-walled steel with hot-rolled steel, making it more challenging to meet the precision requirements for installation than conventional projects.

Through the installation experience of several cases, Jingxing has summarized a set of key points for on-site construction, and has put forward special requirements for a series of aspects such as cross-construction management, construction equipment, personnel equipment, large sling, on-site monitoring, weather influence, etc., so that the installation of the rack-clad will finally achieve the design goal.

其他特殊要求

库架合一在使用上其实与常规的仓库+货架系统并没有本质的区别，不过综合考虑成本、设计及安装难度之后，库架合一项目更适用于大型的自动化项目，即占地大，建设高度高，储位多的全自动无人仓项目。

库架合一与传统的仓库+货架相比，最大的不同还是体现在极端风速情况下设备的使用上，由于受到风力影响，库架合一是会“随风摆动”的，视风力大小摆动程度不同，如果摆动幅度过大，会影响堆垛机等库内设备的运行。通常我们会按照EN15620的指标来要求库架合一的变形，基本上是可以满足堆垛机等设备的运行的，但如果库架合一内有对货架变形特别敏感的设备，那我们可以根据业主提出的变形要求来进行抗风的性能化设计，相应的，极端风速下设备不停机几率的要求越高，库架合一整体造价成本越高。

Other Special Requirement

There's no substantial difference in usage when compared to a conventional warehouse+ rack system. However, after considering factors like cost, design, and installation complexity, the rack-clad is more suitable for large-scale automated projects, specifically for those large-area, high-rise, multi-level storage areas requiring a fully automated unmanned operation.

Compared to traditional warehouses and storage racks, the most significant difference lies in how the equipment is used under extreme wind speed conditions. Due to the influence of wind, rack-clad warehouse can experience wind-induced swaying. The degree of sway varies depending on the wind speed. If the sway amplitude gets too large, it might affect the operation of internal equipment, such as stackers.

Generally, Jingxing will evaluate the deformation of the rack-clad according to the EN15620, which should be able to satisfy the operations of stackers and other equipment. However, if there are devices within the rack-clad that are highly sensitive to rack-deformation, Jingxing can conduct a performance-based design for wind resistance according to the deformation requirements proposed by the owner. Consequently, the higher the requirement for the probability of equipment non-stop under extreme wind speeds, the higher the over all cost.

规划建设流程

库架合一在海内外的实施，基本都有以下角色参与：业主、咨询公司、设计院/总包、土建、墙板公司、货架供应商、系统供应商、消防、审查公司及现场监理等，当然前述角色中的几个由同一家公司兼任的情况也很多。

设计阶段基本流程大致如下：

- 业主提出需求；
- 咨询商提供全方面的政策、流程、消防及审批建议等；
- 设计院/总包负责项目工期控制、整体规划、设计，出具所有图纸等；
- 土建负责地勘及整体桩基设计；
- 系统供应商负责自动化系统的物流规划及软、硬件设计等；
- 墙板公司确定墙板结构、保温性能及安装方式等；
- 货架供应商提供货架结构设计，需给设计院、土建、墙板供应商、系统供应商及消防等提供接口图纸，以进行配合。

建设阶段基本流程大致如下：

- 监理全程在场；
- 土建完工；
- 货架进场开始安装，在货架安装周期内，其他设备陆续进场；
- 消防及通风等附属设备与货架同期进场，配合货架同时安装；
- 货架完工约30%-40%，墙板供应商进场安装墙板及屋顶板，然后在装好墙板的区域内，系统供应商的设备进场安装；
- 货架、设备、消防及墙板同步安装，互相配合协调至项目封顶；
- 设备联调，项目验收。

Planning and Construction Process

The rack-clad is implemented both domestically and internationally, generally with the involvement of the following roles: the owner, consulting company, design institutes/general contractors, civil engineers, wall panel companies, storage racking suppliers, system suppliers, fire protection companies, auditing firms, and on-site supervisors. However, it is not uncommon for the same company to fulfill several of the aforementioned roles.

The basic process of the design phase is roughly as follows.

- The owner presents the requirements.
- The consultant provides comprehensive advice on policies, processes, fire prevention, and approvals.
- The design institute/general contractor is responsible for project timing control, overall planning, design, and producing all the drawings;
- The civil engineering company is responsible for geological exploration and overall pile foundation design.
- The system provider is responsible for the logistics planning and the design of software and hardware for the automation system.
- The wall panel company determines the wallboard structure, insulation performance and installation methods.
- The rack supplier provides the rack structure design and needs to provide interface drawings to the design institution, civil construction, wall panel supplier, system supplier and fire protection, etc. for cooperation.

The basic process of the construction phase is roughly as follows.

- The supervisor is present throughout the entire process.
- Civil engineering is completed.
- The racks are mobilized and installed, with other equipment during the rack installation period.
- Firefighting and ventilation equipment, along with other accessories, are to be mobilized and installed concurrently with the racks.
- Racks are completed by about 30%-40%, wall panel suppliers enter the site to install wall cladding and roof, then in the area where the wall cladding is installed, equipment from system suppliers enter the site for installation.
- Simultaneous installation of racks, equipment, fire protection and wall claddings, coordinated with each other until project complete.
- Equipment joint interconnection and project acceptance.

自动化立体仓库 Automatic Storage and Retrieval System (AS/RS system)

长期以来，以堆垛机位存取设备，以托盘为单位的自动化立体仓库一直是精星最关键的也是最专业的领域之一。自建厂至今，我们在托盘立体库方面积累了超过30年的经验，为用户建造了数千做高度从10米到35米的自动化仓库。这么多经验，是的我们可以为您提供符合当地市场最有效的建议和解决方案，是您的仓库的存储效率及进出库频率都大大提高。

由于仓库建造的地区不同，每一座仓库的建造条件也都不一样。 我们需要评估包括地震，地质结构，仓库类型等诸多应为为您提供合理的解决方案。

坚固，合理，耐用，安全，以及为将来的扩展的可能性这些都是精星能为你的货架带来的优秀的品质。

我们的售前工程师将会和您一起讨论方案，为您的存储选项提供最优的方案和附加值。他们会参与整个阶段，在每一个阶段都提供技术支持。

同时我们专业的售后队伍也会为您的提供安全检查并出具报告。

For a long time, by using S/R Machine as material handling equipment and pallet as storage unit, Automated Storage and Retrieval Systems have always been the most essential and professional field of Jingxing.

Since the establishment, Jingxing has accumulated more than 30 years' expeaavrience in the field of AS/RS warehouses, and has built thousands of AS/RS warehouses with height from 10 meters to 35.

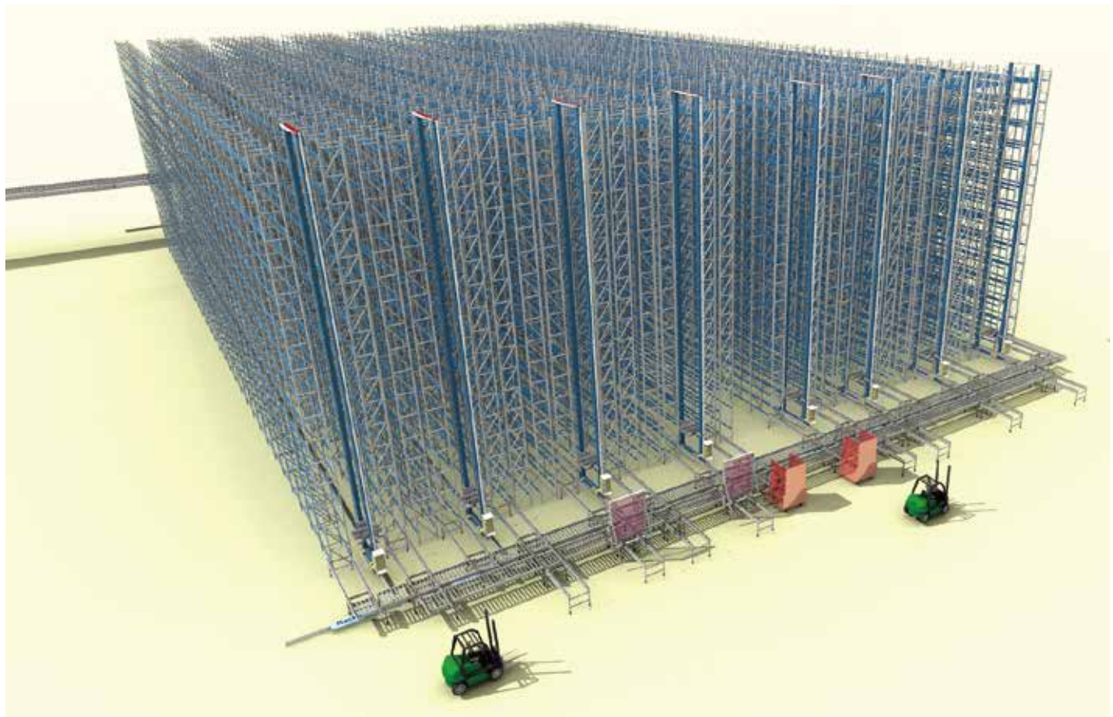
With years of experience, Jingxing could provide you with the most effective suggestions and solutions that align with the local market, greatly improving the storage utilization and overturn rate.

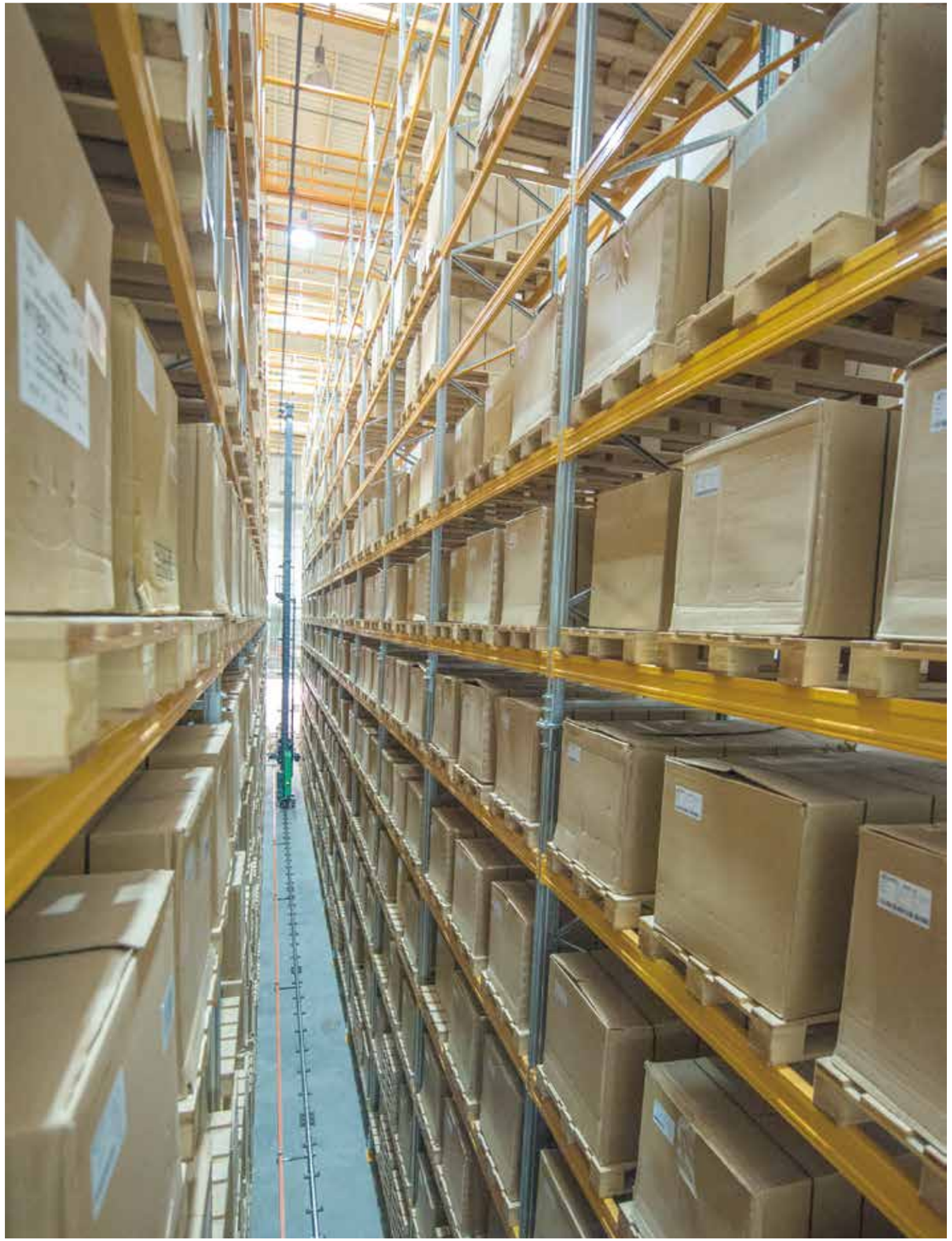
As the different regions and the construction environments, we need to evaluate various factors including earth-quakes, geological structures, racking types, etc for each warehouse. Then we could calculate the best solution.

Robustness, rationality, durability, safety, and the possibility of future expansion are all excellent qualities that Jingxing could bring to you.

Our pre-sales engineers will discuss with you in order to find the best solution. They will follow up during the entire stage and give technical support at each stage.

At the same time, our professional after-sales team will also provide you with safety inspections and issue reports.





托盘双深位自动化立体库货架

直到今天， 双深位的自动化立体仓库仍然是最经济的存储方式之一，他提供了一种介于传统横梁式（选择式）结构和密集型结构的质检的存储系统

优点是，他仍然是一个高效的系统，易于组装和调整负载水平。 它既保留了横梁式（选择式）托盘的相当程度的便利性，又可以完美提高了库存容量。

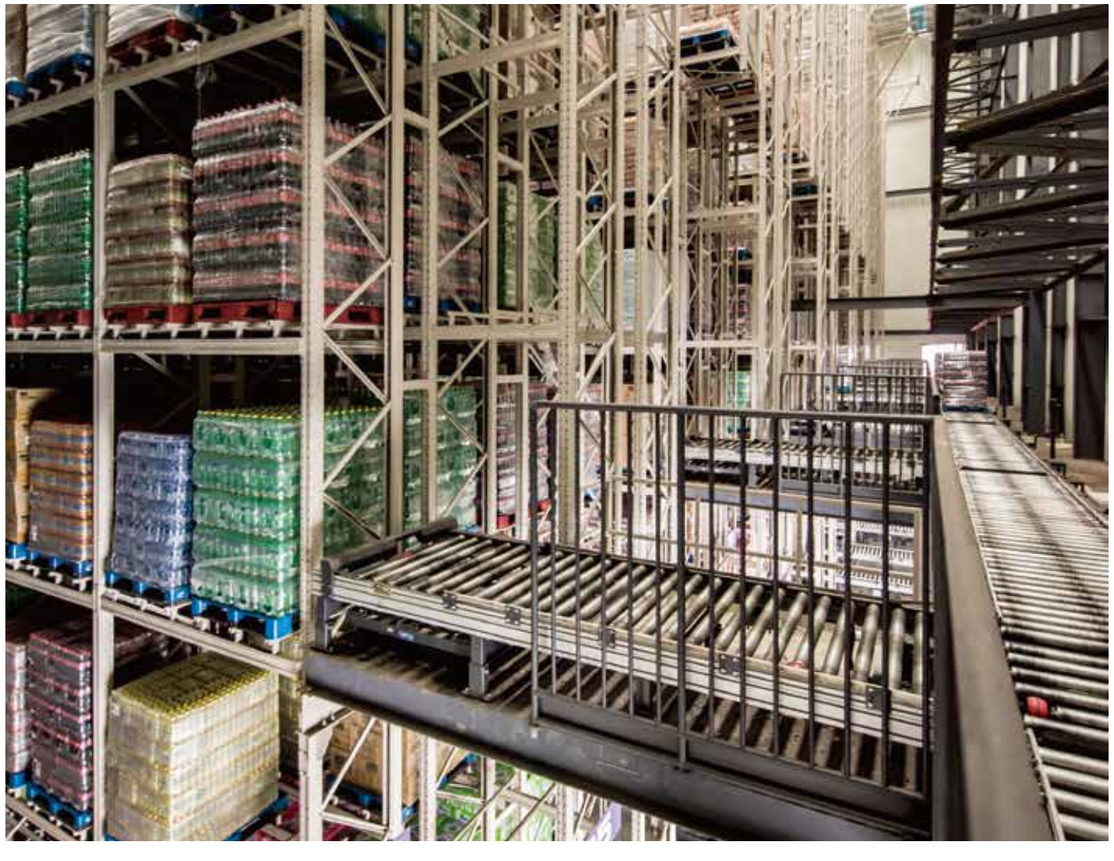
精星在双深位，大载荷项目中有着领先的优势。 由于要在横梁上焊接附件以满足存取的条件， 我们有诸多的附件可供选择。 并且在安全结构设计方面有着丰富的经验。

Automatic Storage and Retrieval System (AS/RS system)

Since today double deep AR/RS is still one of the most economical storage systems.It provides a storage system of which the utilization is between the traditional pallet racking and the dense storage.

It is still an efficient storage system, with the advantages of easy installation and load capacity adjustment. It not only retains the convenience of traditional pallet racking, but also increases load capacity.

Jingxing has a leading advantage in double deep and heavy load AR/RS projects. By welding accessories on the beam, we have many options to improve the safety.



托盘穿梭车与堆垛机立体库货架

AS/RS与托盘穿梭车（即堆垛机与托盘穿梭机的配对）是物流中心的最新的且非常成功组合。它加快了运营速度，提高了仓库吞吐量，并大大增加了存储容量。

穿梭车依赖运行的导轨是精星最核心的产品之一。不仅和全球领先的穿梭车制造厂家有着紧密的合作，和可以匹配国内各种型号的穿梭车。有多条柔性的轧机生产线，使着一切都有最佳的质量保证。

Pallet Shuttle and S/R Machine

The combinations between AS/RS and pallet shuttle system(the combinations between S/R Machines and Pallet shuttles) are the latest successful application in logistics centers.

It accelerates operational efficiency, increases throughput, and improves storage capacity of warehouse. The guide rails that shuttles travels on are one of Jingxing's key products. The guide rails could use for leading global shuttle manufacturers, also for various domestic shuttle suppliers. Because Jingxing established several flexible guide rails rolling mills to guarantee the best quality

小型负载系统 Miniload

Miniload是最近发展最快，应用广泛的货架系统。满足您的所有存储任务。 在商业，零售，轮胎， 玩具，文件存储，汽车行业，无论您的仓库存储的类型，精星都能根据您的要求开发了灵活且高质量的货架系统。

精星有多条专门为小型负载系统专用的立柱，导轨，支撑等轧机线。在客精星都能根据您的要求开发了灵活且高质量的货架系统。

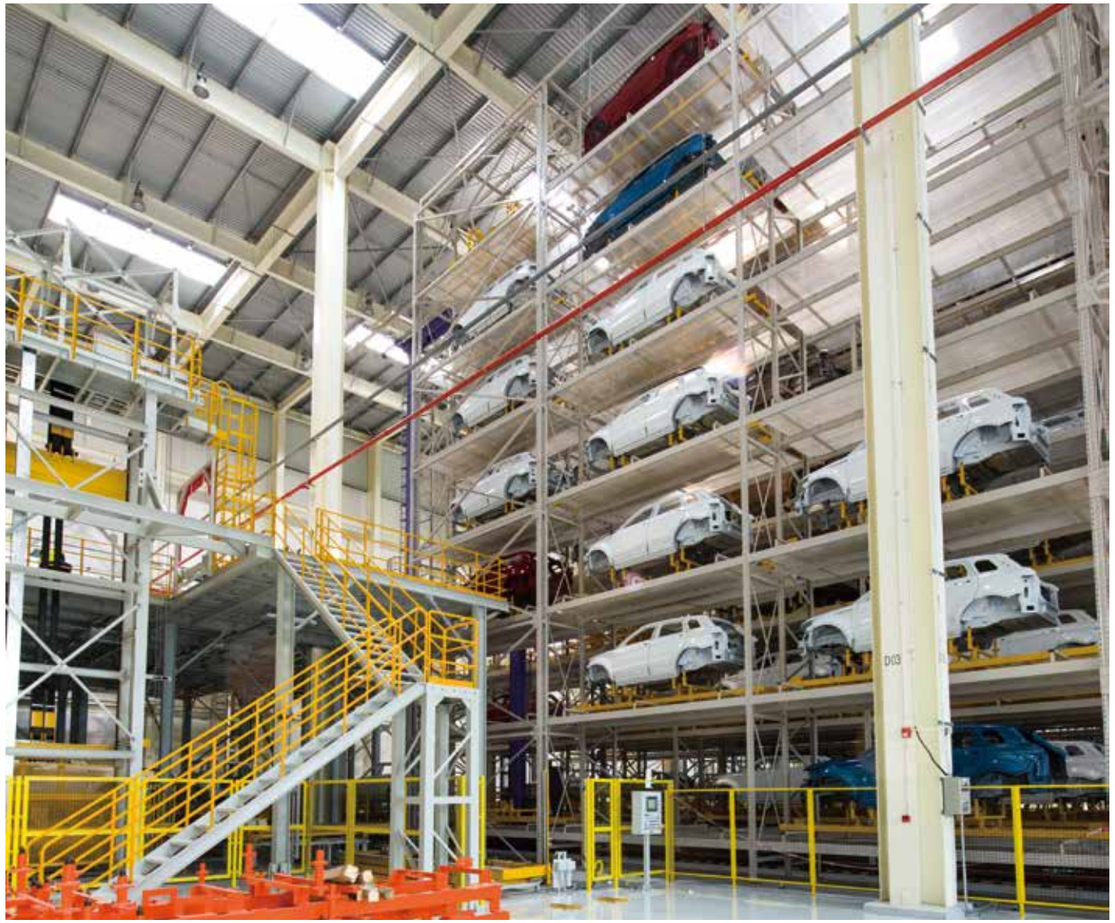
户中享有非常高的声誉。并且成功建造了高达40米的Miniload仓库。

高质量、模块化的组装、和快速的生产是我们Miniload货架系统的主要特点。同时精星还为所有系统提供种类繁多的配件。

Small Parts Load System Miniload

Miniload is the fastest developing and widely used racking system. It could meet all your storage requirements in commercial bossiness, retail trade, tire industry, toy industry, file storage, automotive industry, regardless of the type of warehouse storage. According to your specific requirements, Jingxing could develop flexible and high-quality racking systems.

Jingxing has established specific rolling mills for miniload systems, such as upright, guide rails, and bracing. Jingxing could develop flexible and high-quality racking systems based on customer's specific requirements.



其他货架形式

精星强大的设计和生产的能力，使得您的想法总能得到实现。

设计生产过单托盘10吨以上的货架系统。

这一切都请你和我们的售前技术专家联系， 他们可以给您更多的选择的方案。

Other Types of Rackings

With Jingxing's powerful design and production capabilities, we could assist you to realize your ideas.

With designed and produced ability, we could produce racking system which unit pallet load over 10 tons.

Please contact our pre-sales technical engineers, and they can provide you with more options.

无线穿梭车 Radioshuttle System

无线穿梭车/子母穿梭车系统是一种先进的空间使用方案。这个方案可以高效的利用仓库的高度和容量，可以适用于先进先出和先进后出的操作方式。具体的实施过程为：叉车会将穿梭车和货物放置到需要的作业通道，通过遥控器，穿梭车会独立的完成对货物提升和行驶动作，将托盘搬运到指定的位置，通过传感器识别已存储托盘的位置。在托盘存取过程中，托盘之间不会接触。尤其适合食品饮料，冷库，快速消费品和第三方物流等行业。

Radioshuttle is an advanced solution that offers the the most effective use of space. By using the full height and volume of the warehouse, on this solution Shuttle system is suitable for both first-in first-out (FIFO), and first-in lastout (FILO) operations. The specific procedures are as follows: The trucks transfer the shuttle and goods into the active tunnels. With radio transmitter the operators keep the shuttle to lift and transport goods to correct pallet locations. The sensors control the shuttle to identify the storage location.There is no crash between the pallets in loading and retrieving goods. The shuttle system is fit for the food and beverage industry, coldstore, FMCG and Third Party Logistics etc.

托盘穿梭式货架+平台

利用底层结构作为缓冲区/拣选区，既增大了存储的容量，又保留的了拣选的面积，平台下的照明保证了工作的环境。

精星为多家用户设计制造的穿梭车+平台的结构， 极大的提升了客户的空间利用率。

Pallet Shuttle Racking + Platform

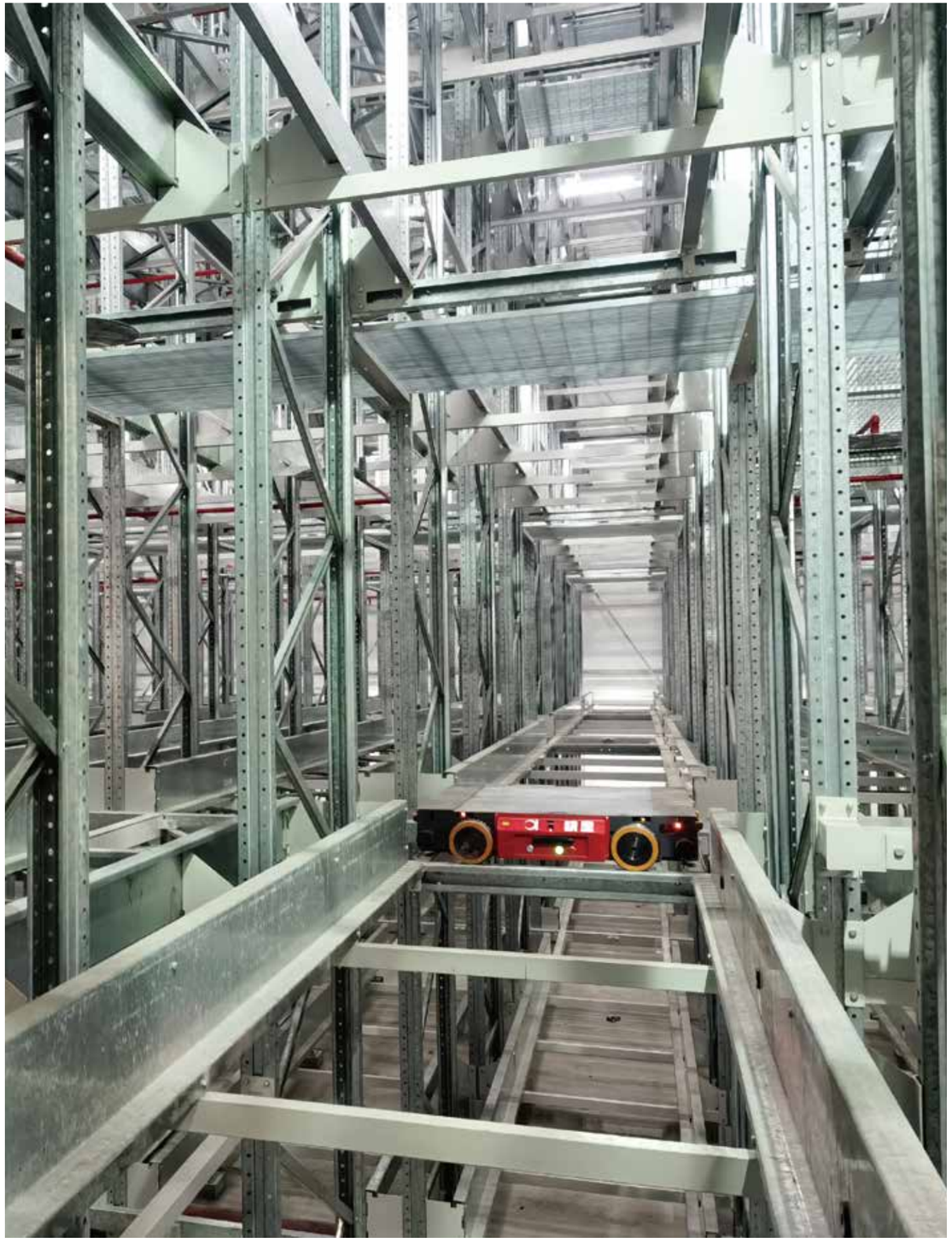
Using the underlying structure as a buffer/picking area, This not only increases the storage capacity but also the picking area, The lighting under the platform ensures a working environment.

Jingxing has designed and manufactured many shuttle systems with platforms for customers,which greatly improving their warehouse space utilization.

托盘四向穿梭车和子母车系统
Four Way Shuttle Racking and Shuttle Carrier Racking

这两种系统都是托盘密集存储中自动化程度较高的方案。
由于存储设备四向车需要在货架内两个方向行驶， 对货架的要求远高于传统货架。
货架结构的稳定性决定了整个系统的效率。
子轨母轨的配合精度要求很高。
精星有多种规格的导轨可供选择。
有20米左右高度的项目的成功案例。
有单体超过30000个托盘位的项目的成功案例。

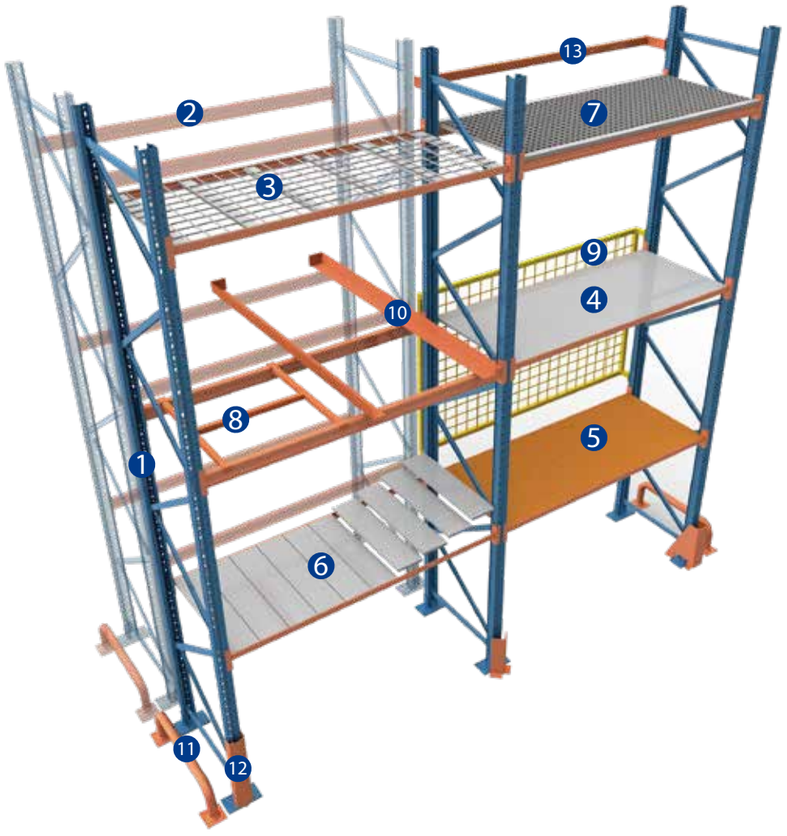
Both of the systems are highly automated dense capacity storage options.
Four way shuttle travels in four directions in the racking, so the requirements of racking system are much higher than traditional racking.
The stability of the racking structure determines the efficiency of the entire system.
The precision matchness of main carrier guide rails and shuttle guide rails requires very high.
Jingxing has various guide rails options.
Successful project with a height of 20 meters.
Successful project with a load capacity over 30 thousands pallets.



横梁式货架 Selective Pallet Racking

横梁式货架又称拣选式托盘货架，一般以托盘单元方式储存，适合各种仓库，是最广泛使用的货架形式。对物料搬运设备的要求低，货架的造价也最低。拣选式货架是使用最广泛的托盘类货物存储系统，通用性较强。每个托盘货物都可以100%单独存取，方便快捷。使用后仍可以随意调节横梁的高度，增加横梁层数，灵活性很强，特别适合托盘货架的尺寸经常变化的用户。

Selective Racking is the most cost effective storage system with the lowest equipment and capital investment. It provides 100% accessibility of palletized storage and good inventory rotation. Pallets can be located, accessed and moved individually, providing rapid handling of palletised goods. It provides easy beam adjustment and accommodates variable pallet heights. Lower level pallets can be located on the floor for picking purposes. This lowers structure costs. Alternatively additional beams can be added for lower level picking. Infinitely adjustable and offering a wide range of options and components to accommodate specialized load types.

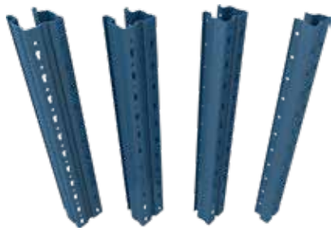


1. 货架片 Upright frame
2. 横梁 Beam
3. 层网 Welded-wire rack deck
4. 钢搁板 Steel shelf
5. 木搁板 Wooden shelf
6. 宽型拼接搁板 Wide spliced shelf
7. 网格栅板 Steel grating
8. 工字型搁档 Pallet support
9. 有框背网 Back mesh with frame
10. 双深位导向 Double depth pallet guide rail
11. 防撞栏 Barrier
12. 防撞柱 Upright protector
13. 后档 Back stop

货架片/Upright frame

一种将垂直和水平荷载传递到地面的结构组件。通常由两根立柱和平斜撑组成。货架的横梁连接到货架片的立柱上，并将荷载传递到立柱上。

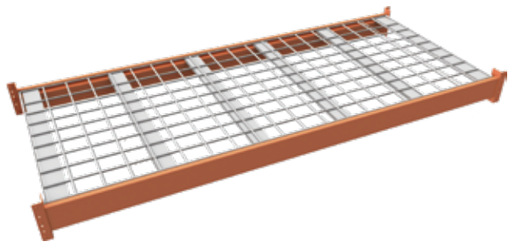
Structural assembly that transfers the vertical and horizontal loads to the floor ,usually made up of two columns, bracing members between the columns, and base plates on the bottom of the columns, where beams of the rack are attached to the columns of the frames and transfer the loads to the columns.



层网/Welded-wire rack deck

一种由焊接金属丝网制成，通常以槽钢或加强筋的形式进行加固。其主要目的在于为储存材料提供额外支撑，并确保不稳定货物的安全性。

A decking system used on pallet rack, fabricated from welded-wire mesh and reinforcements in the form of channels or support wires , intended to provide additional support for stored material and acting as a safety net for unstable loads.



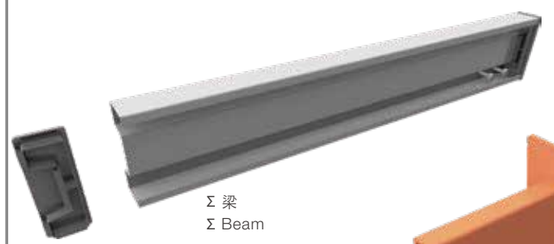
横梁/Beam

一种承载货物重量并将货物转移到立柱片上的前后货架构件。

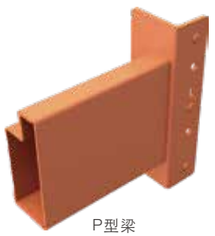
The front and back storage level members that bear the weight of the load and transfer the load to the upright frames.

矩形管梁
Rectangle tube beam

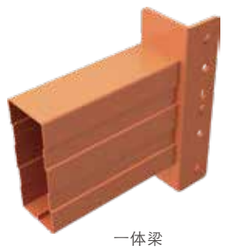
抱合梁
Double C beam



Σ 梁
Σ Beam



P型梁
Step beam

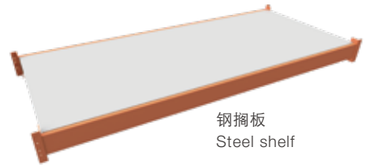


一体梁
Single C beam

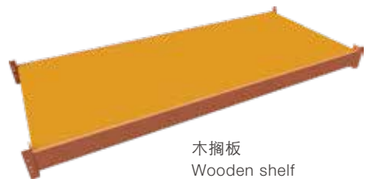
搁板/Shelf panel

一种用于存放货物的平台或货架的构件，通常由木材或钢材制成，可直接放置在货架上。

A member that is a platform or rack for storing goods, usually made of wood or steel, designed to be placed directly on racks.

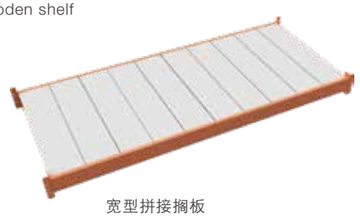


钢搁板
Steel shelf



木搁板
Wooden shelf

钢格栅
Steel grating



宽型拼接搁板
Wide spliced shelf

有框背网/Back mesh with frame

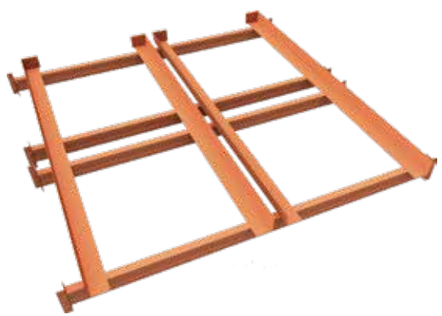
一种保护设备，保护工人和设备不受掉落物品的伤害。可直接安装在现有托盘货架立柱的背面，在存储物品和地面之间形成一道坚固的屏障。

A protective equipment that protects workers and equipment from falling items with back guards for pallet racks. and directly install to the back of your existing pallet rack uprights creating a sturdy barrier between stored items and the ground below.

双深位导向/Double depth pallet guide rail

一种货架配件，用于双深度货架系统中，以优化货物存取效率和空间利用率。

A member for use in a double depth racking system to optimize goods access efficiency and space utilization.



搁挡/Pallet support

一种延伸至货架横梁之间的构件，位于存储货物下方的特定高度，有助于支撑该货物。

A member that extends between the storage level beams at a given level underneath the stored load that aids in the support of that load

搁挡
Pallet support

H型搁挡
H support

圆筒状物搁挡
Drum support

防冲撞保护栏,保护柱/Crash barrier & protection column

防撞保护栏和保护柱有很多种,用于保护车间及仓库内叉车作业时由于操作不当产生对货架的损坏。可根据客户要求定制。

There are different modules of crash barriers and protection posts. It prevents the possible damages to the racking from mal-handling of the forklift operators. Models and sizes can be made according to the specified requirement.

常用地脚连接结构/Commonly used foot fixing structure

可调地脚
Adjustable foot

螺栓
Bolts

组合式底座
Bolted baseplate

焊接底板
Welded baseplate

常用地脚固定方法/Commonly used foot fixing method

化学螺栓
Chemical bolts

膨胀螺栓
Expansion bolts

化学锚栓

定义：由化学药剂与金属杆体组成，它通过特制的化学粘接剂将螺杆胶结固定于混凝土基材钻孔中，实现对固定件的锚固。

货架应用场景：主要用于固定高度数十米，考虑抗震抗风设计的货架柱脚，以确保货架的稳定性和安全性。

特性：该产品具有强大的锚固力和无膨胀能力，在边距和间距较小的情况下使用非常合适，尤其适用于仓库、工厂等场所的货架安装。

Chemical bolts

DEFINITION:It consists of chemical agent and metal rod body, it is fixed in the concrete substrate drilling holes through the special chemical bonding agent to cement the screw, to achieve the anchoring of the fixed parts.

RACK APPLICATION:Mainly used for fixing the height of tens of metres, considering the seismic and wind-resistant design of the column feet, to ensure the stability and safety.

FEATURE:Strong anchoring force and non-expansion ability, very suitable to be used in the case of small margins and spacing, especially suitable for the installation of rack in warehouses, factories and other places.

膨胀螺栓

定义：主要包括尾部带锥形的螺杆、尾部开口的套管和螺母三部分组成。

货架应用场景：主要用于较低高度的平库，只考虑货架的静态存放货情况，防止货架柱脚发生移位，从而保证货架的稳定性。

特性：固定方式简单可靠，使得安装过程更加快捷方便。

Expansion bolts

DEFINITION: It mainly consists of three parts: a screw with a tapered end, a sleeve with an open end and a nut

RACK APPLICATION:Mainly used for lower height warehouse, considering the static storage, to prevent the displacement to ensure the stability.

FEATURE: Simple and reliable fixing method, making the installation faster and more convenient.

窄巷道横梁式货架 VNA Rack

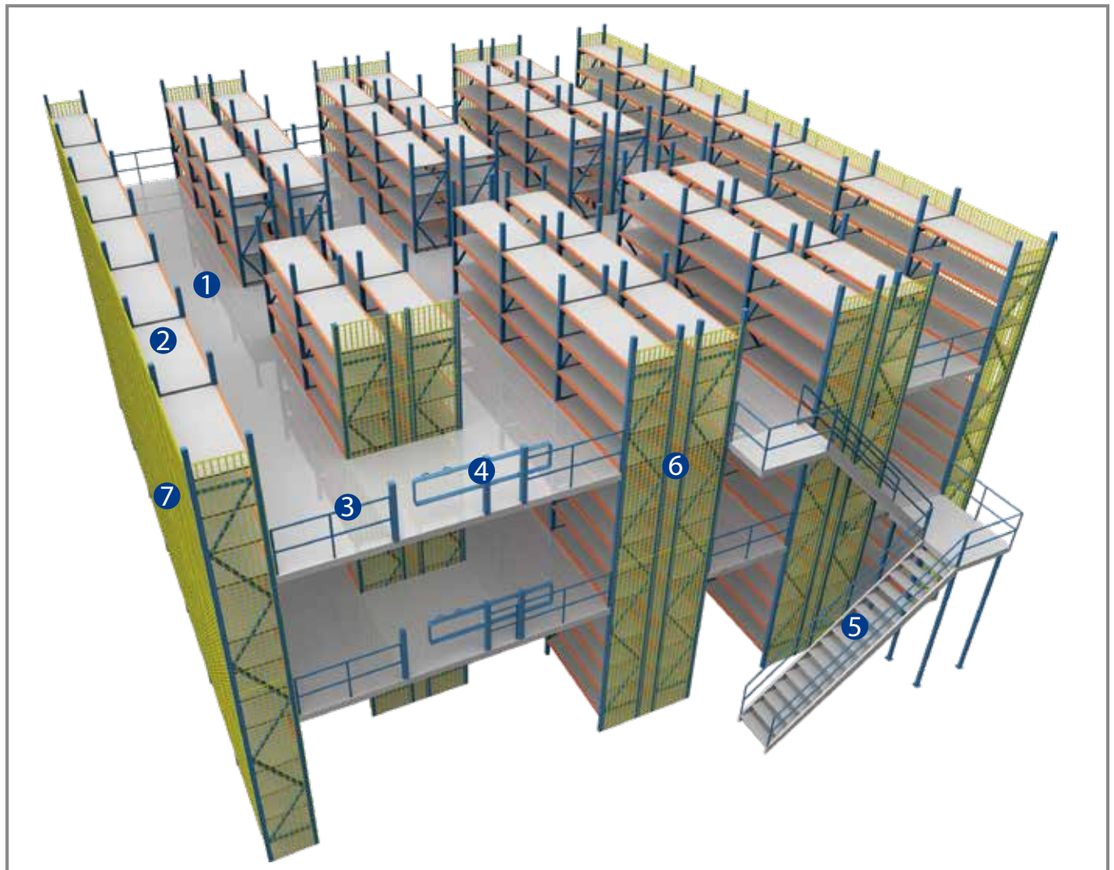
窄巷道横梁式货架又称VNA货架，专指配套使用的叉车形式为高效的三向堆垛叉车的普通横梁式货架，其与普通横梁式货架的最大差异是取货通道的尺寸大幅减小，一般为1.6～2.0米，空间利用率比普通横式货架提高20%左右。

Narrow aisle beam shelf, also known as VNA shelf, refers to the ordinary beam type shelf used in the form of efficient three-way stacking forklift, the biggest difference between it and the ordinary beam shelf is that the size of the pickup channel is greatly reduced, generally 1.6~2.0 meters, and the space utilization rate is about 20% higher than that of ordinary cross shelf.

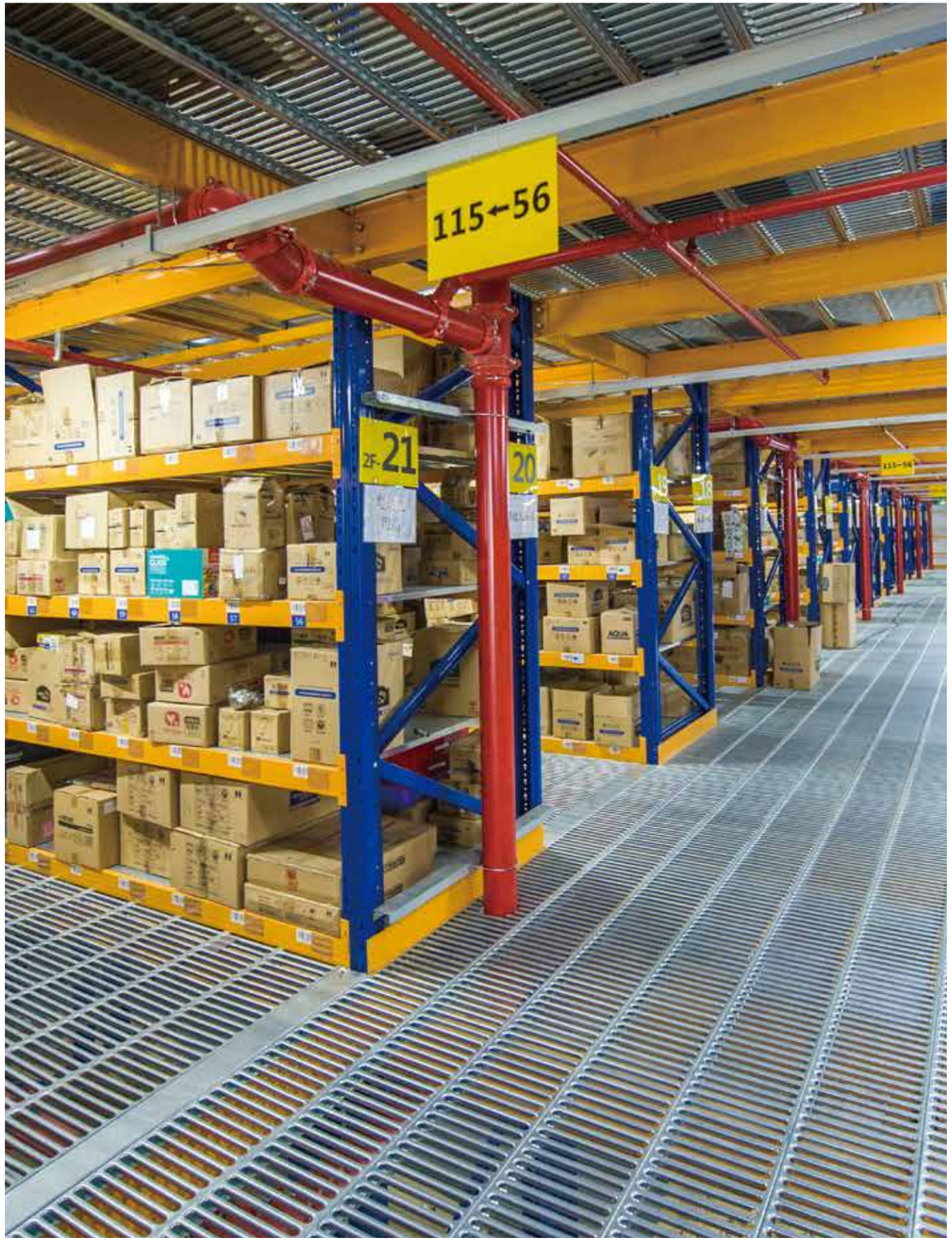
阁楼式货架 Multi-Tier Rack

阁楼式货架采用多层搁板式货架结构，提高了空间的存储利用率，同时保持了搁板式货架的特点。阁楼式货架的做法可以是钢平台上每层装货架，也可以是货架本身是承重结构，一般可设计成多层楼层(通常2-3层)，配有人行楼梯、扶手和货物上货门等。阁楼式货架适用于库房较高、货物较轻、人工存取、储货品类多、数量大的情况，也适用于现有旧仓库的技术改造，可提高仓库的空间利用率。

The multi-tier racking has multi-tiers of long-span shelving racks, it multiplies the utility of the warehouse storage space and keeping the same features of the long-span shelving. The multi-tier racking can be made either by steel structure platforms and long span racking self-supported, normally it can be several tiers (commonly 2-3 tiers), with walking stairs, handrails and loading gates, etc. it is best for the high-bay warehouse with small goods, manual picking and big storage capacity with many different types, also good for old warehouse renewal, it can improve the storage capacity.

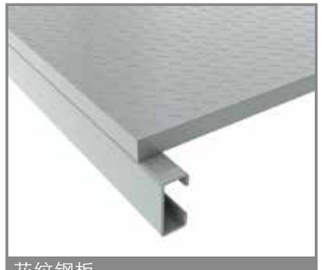


1. 楼板 Flooring deck
2. 货架 Rack
3. 栏杆 Handrail
4. 推拉门 Sliding doors
5. 楼梯 Staircase
6. 侧网 Side mesh
7. 背网 Back mesh



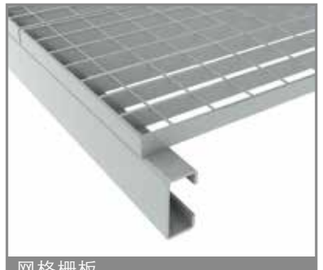
钢平台 Mezzanine

1. 楼板 Flooring deck
2. 型钢立柱 Steel column
3. 型钢托梁 Support beam
4. 楼梯 Staircase
5. 提升机 Lift
6. 翻转门 Pallet safety gate
7. 推拉门 Sliding doors



花纹钢板
Patterned steel decking

长孔楼板
Punched metal decking



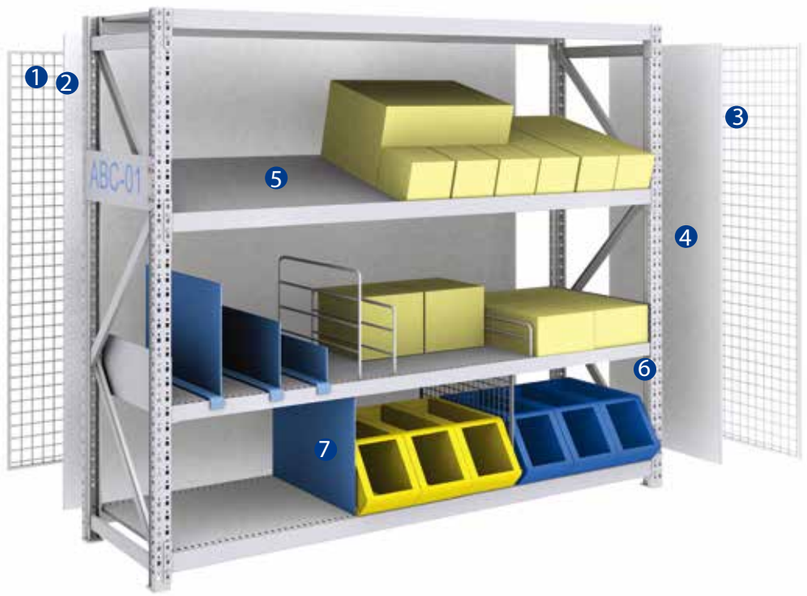
网格栅板
Mezzanine grid decking

搁板式货架 Long Span Shelving Rack

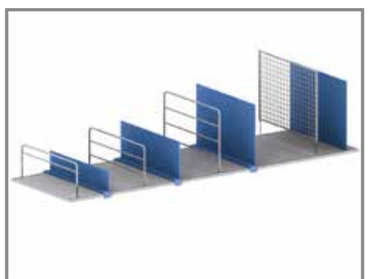
搁板式货架对于储存人工存取的箱型尤为理想，造价低且拆装方便，仓库搬迁后仍可重复使用，可自由增减层数及列数，根据仓库的不同高低位置可设计不同的层楼和高度，使空间利用率最大化。特别适合于量小，但种类多，进出库频繁的货物存储，各种配件可供选择，使其使用范围适用于各种大小尺寸的货物存取。

Long span shelving rack is an ideal solution for carton type storage with manual handling, cost effective and easy to assemble and dismantle. After you moved your warehouse, the shelving can be moved together. Also it enables to add or remove levels of shelves and number of units, and according to the difference height in different locations of same warehouse, the shelving height can be designed with different height, it will provide max. utility of the warehouse space. It is specially practical for the storage of lots of SKUs and little quantity and frequent logistics flow. A variety of accessories available for all kinds of applications with different storage unit dimensions.

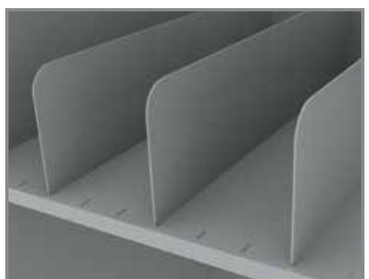
1. 背网 Back mesh
2. 背封板 Back panel
3. 侧网 Side mesh
4. 侧封板 Side panel
5. 搁板 Shelf
6. 立柱 Upright
7. 分隔板 Divider



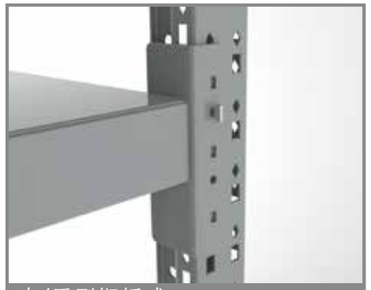
搁板直接放到P型横梁上
Shelf drop in the P beam



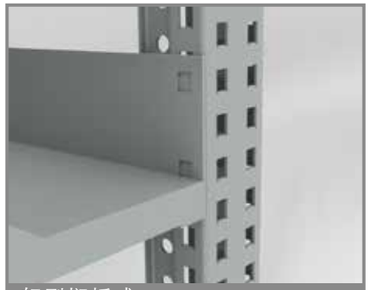
各种类型的分隔板
All types of divider



可插式分隔板，方便自由调节间距
Clip in divider, easy to adjust the space



中/重型搁板式
Medium/Heavy duty shelving



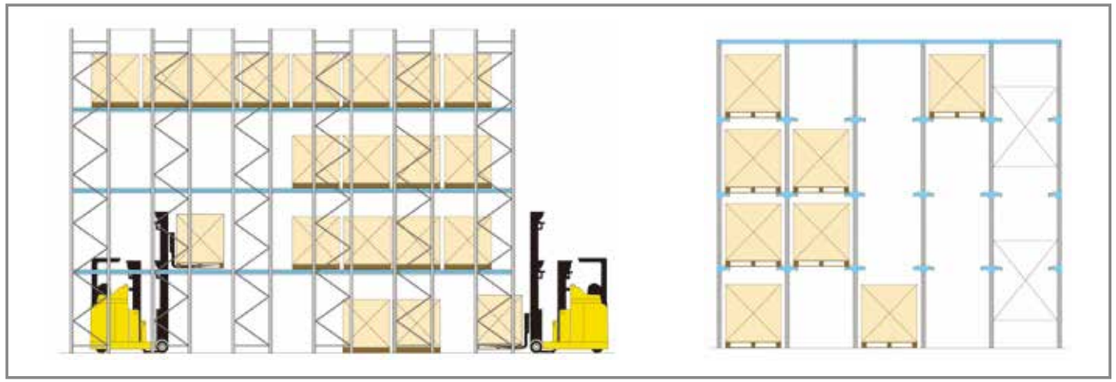
轻型搁板式
Light duty shelving

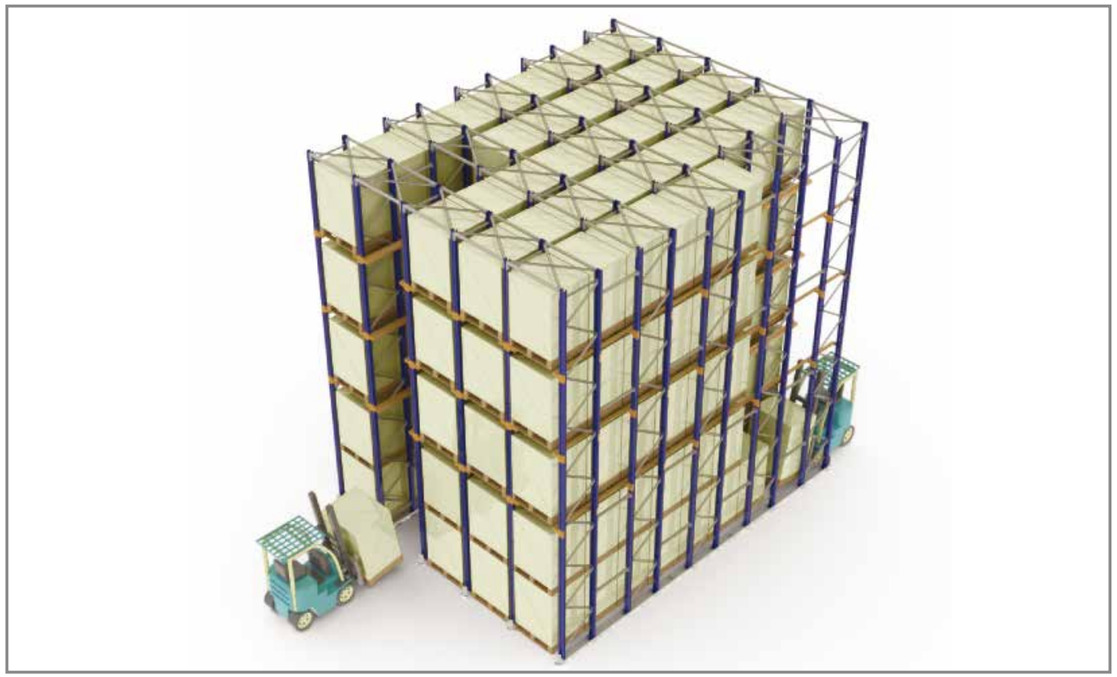
保险销
Safety lock

驶入式货架 Drive-in(Drive-through) Racking

驶入(通廊)式货架的仓库利用率高，由叉车驶入货架的深度方向的货物巷道内操作，驶入式货架是一端封闭，另一端进出货物，通廊式货架是两端均可存取货架。货物存取从货架同一侧进出，“先存后取，后存先取”。通廊式货架适用于品种较少、出入库量较大的货物存放。常用来储存大批相同类型货物。由于其存储密度大，且对地面空间利用率较高，较多应用于冷库等存储空间成本较高的食品仓库。

The drive-in (drive-through) racking is a space saving application, the forklift can drive in the depth of the storage aisles. Drive-in racking means one end closed and the handling only can be done from another side, while the drive-through racking can be operated in both ends. The goods will be stored and retrieved from the same end, the storage principle is “First in, Last out” . This type is suitable for very large quantities of the same product. For cost-effective, high-density storage, Drive-In / Drive-Thru pallet racking is often the best choice for the cold storage warehouse.





重力式货架 Pallet Live Storage Rack

重力式货架利用货物的重力由入库端自动滑到出库端，达到入出库的柔性联结，采用的是“先进先出”的存取原则。尤其适合于有时间要求的货架存储。此类货架采用叉车取货，叉车不需开入货架区内，拣选和补货分离，托盘从一端入库，从另一端出库，减少了收货区的两次操作。

Live storage pallets stored on inclined gravity rollers from input side to output side, thus following FIRST IN, FIRST OUT principle, particularly suitable for goods having few SKU's and time limit of storage. This kind of racking is normally serviced by forklift trucks. Fork trucks never enter the rack. Picking and Replenishment sides are separate. Pallets are fed in from one side, and retrieved from the opposite side eliminating double handling from the receiving area.

自滑式货架 Carton Flow Rack

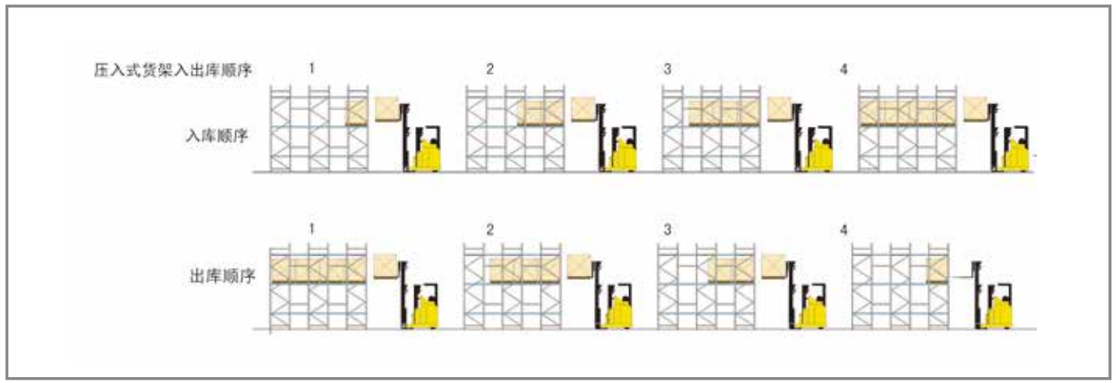
自滑式货架又称流力式货架，多用于配送中心的箱式小件拣选和生产装配过程中的配件暂存区。自滑式货架的存取原理和重力式货架相同，但存储的货物为料箱，适用于人工存取。一端用于补货，另一端作为拣货区，箱子通过货架倾斜平台上的流力条从补货一端向取货一端滑动，从而达到先进先出的货物流动，提高拣选的效率。

The carton flow rack is also called roller rack, it is commonly used in the order-picking of Distribution Centers and production online order picking as a buffer storage. The working principle is the same as pallet live storage racking, but the storage types are bins or cartons with manual handling. One side is for replenishment and another side is picking. The carton will flow from the replenishment side to the picking side through the rollers on the inclined rolling bed, and with the FIFO principle, the picking efficiency is increased.

压入式货架 Push Back Rack

压入式货架又称“后推式货架”，利用台车承担货物在导轨上向后推存放，存第二个货物时把第一个货物向深度方向推入，取货时将第一个货位的货架取出是通过导轨的前倾角度使后面的货物向前滑动，采用的是“先进后出”的存取原则。压入式货架的存放空间利用率与驶入式货架类似，但是叉车不需要开到货架区内取货，从而大大提高了工作效率。但存储货位的深度相对较少。

The push-back racking works by cart, the pallet on the cart can be pushed sliding on the guide rails, the 2nd pallet can push the 1st pallet in the depth of the guide rail in storing, and taking the 1st pallet out, the 2nd pallet will slide forward to the 1st pallet postion by gravity. It is with “First In, Last Out” storage principle. The storage capacity of push-back rack is similar with drive-in rack, but the forklift no need to go inside the racking, it offers higher working efficiency, but the depth of storage is relatively less.



不同的台车可采用不同的颜色，方便操作

Carts in different colors to identify the depth

台车和导轨

Cart and guide rail

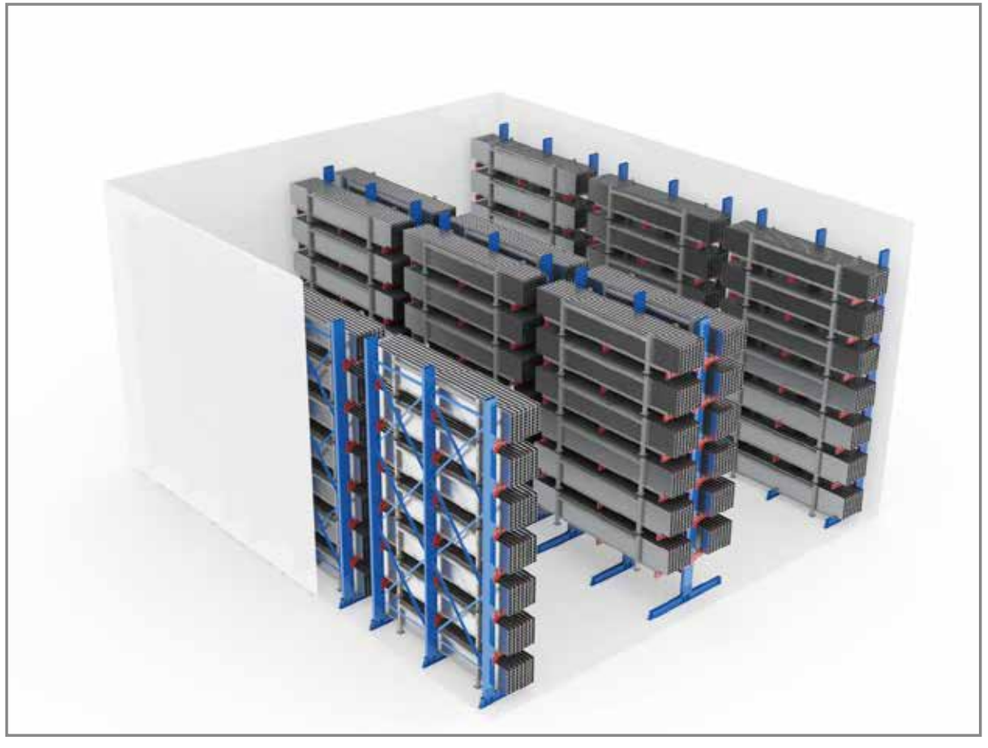
前端横梁用螺栓连接

Bolted front beam

悬臂式货架 Cantilever Rack

悬臂式货架的特点是前伸的悬臂结构轻巧，载重能力好，对存放不规则或是长度较为特殊的物料时，能大幅度提高仓库的利用率和工作效率。悬臂可是单面或双面。增加了搁板后,特别适合空间小、密度低的库房，管理方便，视野宽阔。与普通搁板式货架相比空间利用效率更高，且存取的货物更方便、快速，对货物的存放更加一目了然。

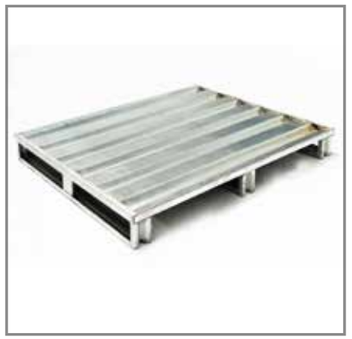
With the cantilever beam, the cantilever rack has simple structure and high load capacity, especially suitable for effective storage and handing of items such as long pipes, bars or other similar long-length items.
Using cantilever also puts hard-to-store materials into an orderly storage system where they are more accessible and easier to track. Product and inventory control becomes easily accessible for forklift loading and retrieval. Stored items are presented in a highly visible manner, expediting inventory control.



重型密集架
Heavy-duty Mobile Shelving Rack

服装吊挂系统
Garments On Hangers

巧固架
Stacking Frame



钢托盘
Steel Pallet

围网
Mesh Partition

托盘码分机
Pallet Extension

自动化货柜
Automated Container

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