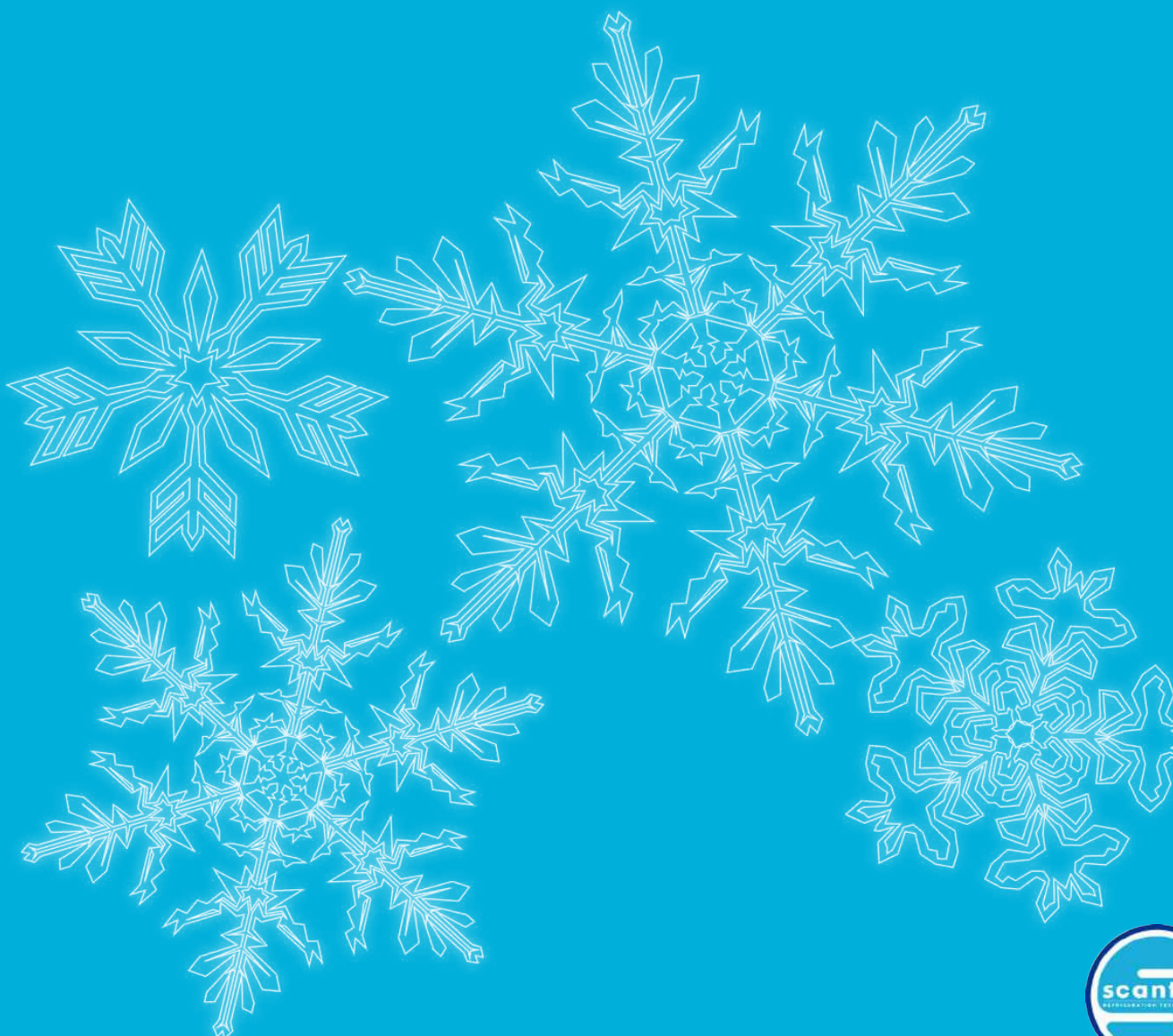


Temperature Controlled Solutions

In China Since 1984



We specialize in the design, supply and installation of complete environmental systems that provide superior control and monitoring capability.

As cold storage experts, we meet a broad range of client needs, including:

- Design Consultancy
- Temperature & Humidity Control
- Air Conditioning
- Cold Storage
- Freezing
- Cascade Systems

As specialists, we are able to cater for a diverse range of industries, including:

- Food & Beverage Manufacturing
- Biopharmaceuticals
- Resource Industries
- Research & Development

Spaceframe is an industry leader in the design and delivery of industrial refrigerated facilities and freezing systems. In 1984, we built our first China-based storage facility in the coastal city of Dalian. Today, we serve a wide variety of industry sectors throughout China, including cold storage, food processing, beverage, pharmaceutical, manufacturing and resource industries.

Global warming has become a near indisputable fact. The emission of man-made greenhouse gases into the atmosphere is a highly contributing factor.

At Spaceframe, we build industrial refrigerated storage facilities that feature state of the art refrigeration and environment control solutions. These refrigeration systems predominantly employ natural refrigerants, such as ammonia (NH₃) and carbon dioxide (CO₂), which, to the greatest extent possible, make them environmentally benign.



Each Spaceframe designed system is built with a mandate for innovation that both serves its purpose and is environmentally responsible for today and tomorrow.

Since the first Cold Store in Dalian, Spaceframe has built upon 30 years of 'in-China' cold storage experience. We have grown into an innovative industry leader specialised in temperature-controlled environments that utilize technologically advanced electronic control and monitoring systems developed in-house. We design and install them, provide a full range of support services and prepare preventative maintenance programs.

Led by a team of dedicated industry specialists from around the world, Spaceframe serves as a genuine one-stop service provider, able to build and commission your entire cold storage facility to the highest international standards.

We listen. We understand. We deliver.

Nils Lundmark
Technical Manager - China





Completed in 2012, the refrigerated warehouse at the \$US400 million Novo Nordisk filling plant in Tianjin is a fully automated ammonia-based refrigeration system for the storage of finished insulin products.

Spaceframe's experience and expertise provided the client with a reliable, cost-efficient system that was vital to the integrity of the product.

One stop shop facility construction

Chinese Construction Qualification

In 2008, following an investment of RMB20 million in registered capital, Spaceframe achieved 100% compliance in China, and was awarded a Class B General Contractors License. This is the highest qualification achieved to date by any international construction company without State Owned Enterprise involvement. The recent approval of the Ministry of Commerce granting Spaceframe a further increase of Registered Capital to RMB40 million provides us with ability to legally complete projects whose value reaches up to RMB200 million.

MEP Class B Construction Qualification

Spaceframe is also licensed to perform the following services:

- Heating
- Ventilation and air-conditioning
- High and low voltage electrical works
- Water services (hot, warm, cold, chilled, steam, drainage, sewer, storm water, trade waste, grey water)
- Fire hydrants, sprinklers and alarms
- Smoke ventilation
- Ammonia and Freon pipe work for refrigeration installations
- Compressed Air, Dirty Vacuum and Process Vacuum

Steel Structure Class B Qualification

Our Class B Construction license permits us to construct buildings of a wide variety of types and sizes. This enables us to better support our local and international clients needs for larger and taller buildings within China, allowing them to adapt to their industries' market demands. Projects upward of 30,000m2 in size and 35m in height are covered under this license category, and may be carried out with the assurance that all necessary Chinese legal requirements have been met.



LEEDing the way to the future

A smarter way to do business

LEED - Leadership in Energy and Environmental Design - is an internationally recognized mark of excellence developed by the U.S. Green Building Council (USGBC) in 2000.

Spaceframe's unyielding commitment to LEED principles has resulted in several of our projects achieving LEED certification, ensuring high performance in key areas of human and environmental health.

We actively pursue the principles of sustainable site development, water conservation, energy efficiency, intelligent design, and material selection to improved indoor environmental quality.

LEED-certified buildings are designed to:

- Lower operating costs and increase asset value
- Reduce waste sent to landfills
- Conserve energy and water
- Be healthier and safer for occupants
- Reduce harmful greenhouse gas emissions

As an enterprise, Spaceframe takes a progressive approach to green solutions, encouraging our workforce and clients to adopt the underlying principles of sustainability on the way to creating a better environment for all to enjoy.





Why we use natural refrigerants

Natural refrigerants are a great solution for industrial refrigeration systems of all sizes

There are only five natural refrigerants: ammonia (NH_3), carbon dioxide (CO_2), hydrocarbons, slurry ice and water. Spaceframe is able to both assist in the conversion of existing hydrofluorocarbon (HFC) based systems to natural refrigerants as well as offer natural refrigerant based solutions for most new refrigeration and air conditioning needs of varying sizes.



Natural refrigerants:

- Ensure minimization of energy costs
- Have minimal impact on the environment
- Are future-proof and do not warrant environmental levies such as the carbon equivalent HFC refrigerant levy
- Are readily available and inexpensive
- Are technically superb in vapour compression cycles as a result of favourable thermophysical and transport properties

Modern design and monitoring techniques and equipment have dramatically reduced the risks associated with the use of natural working fluids. Worldwide experiences with natural refrigerants over at least a century demonstrate that these refrigerants can be safely and cost effectively applied with immediate benefits for your bottom line.



The way of the future

Natural, as opposed to manufactured refrigerants, are not only good for the environment, but also good for your business

Spaceframe cares about the environment and the impact human activity has on the planet. For clients who share this concern and at the same time would like to cultivate an environmentally friendly image as they meet their business objectives, we offer a number of intelligent solutions.

Natural refrigerants such as ammonia (NH_3) and carbon dioxide (CO_2) ensure minimization of your energy costs, while also having zero impact on the ozone layer, as well as minimal global warming impact. In a word, their deployment reduces your carbon footprint.

What's more, these natural fluids are future-proof, and protected from national and international environmental legislation relating to their manufacture, consumption and release. So rather than risk being adversely effected by ever-changing legislative measures, choose a natural direction, and choose the way of the future.





Solutions that meet business objectives

Spaceframe's mandate is to provide cold storage solutions that meet your enterprise needs in an effective, sustainable, cost sensitive way. In serving this mandate, we listen to your needs and leverage our professional expertise in industrial refrigeration, environment control and electronics in ways that help position you to achieve your business objective.

Environmental consciousness that serves your bottom line

Preserving the environment, and limiting the impact we make on the earth's natural resources, is important to all of us. At Spaceframe, we believe environmentally acceptable solutions must go hand in hand with a company's business objective. Not only are we able to assist you in establishing an environmentally conscious approach to your business and its brand image, but we also provide solutions that make good business sense and serve your bottom line.

Vastly more efficient

Our immaculate, aesthetically pleasing machinery rooms offer both superior function and energy efficiency that contribute to the profitability of your business in more ways than one. In large-scale food processing and preservation facilities, energy consumption of the refrigeration plant may well exceed 50% of the total energy consumption. That said, a 30% improvement in energy efficiency is sure to have a dramatic effect on the bottom line. Spaceframe delivers this level of efficiency.

Carefully controlled freezing

Only three factors influence the way a product freezes: time, temperature and surface heat transfer. We help you achieve your refrigeration objectives by manipulating these physical factors regardless of the type of freezing process deployed – batch or in-line, submersion, air blast or contact freezing.

Leveraging innovation in ways that matter

Smart and intelligent electronic control and monitoring are the way of the future in cold storage. Electronics have greatly enhanced mechanical and thermodynamic efficiencies that improve plant operability. We do not believe in separating the mechanical, thermodynamic and electrical engineering disciplines; we combine them so that they may complement each other. The results of this approach are truly unique, and something Spaceframe can demonstrate to you in relation to your business.

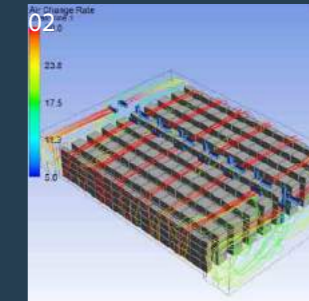
Small parts play a big role

"It's the way of the world", is a cliché frequently bantered about when things go wrong, machinery malfunctions, parts break down and businesses suffer. For Spaceframe, this is not the way of the world. We know that at times, the most important part of your business is the mechanical part you need right now. Therefore, we are deeply committed to going the distance to provide you with the spare parts you need and deliver the service you depend on, any time, anywhere.

Some of the customers we proudly serve



01 Design
02 CFD Modeling
03 SCADA & PLC

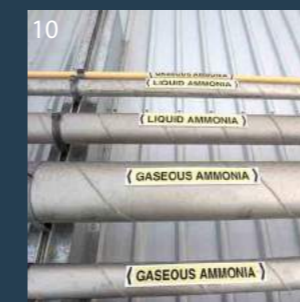


04 Penthouse Units
05 Alcove Units
06 Penthouse units during erection

Our Product Range

Spaceframe is a world leader in the design, construction and commissioning of energy efficient refrigeration systems. We offer a comprehensive range of environmentally friendly refrigeration products and services that cater for a broad range of business needs across mainland China.

07 Freezing Systems
08 Scanpac Containerized plantroom
09 Compressors



10 External Piping for Safety
11 Ammonia Plant in Scanpac Execution
12 Auto Defrost Doors



Thinking outside the box

Utilising state of the art technology and modular solutions



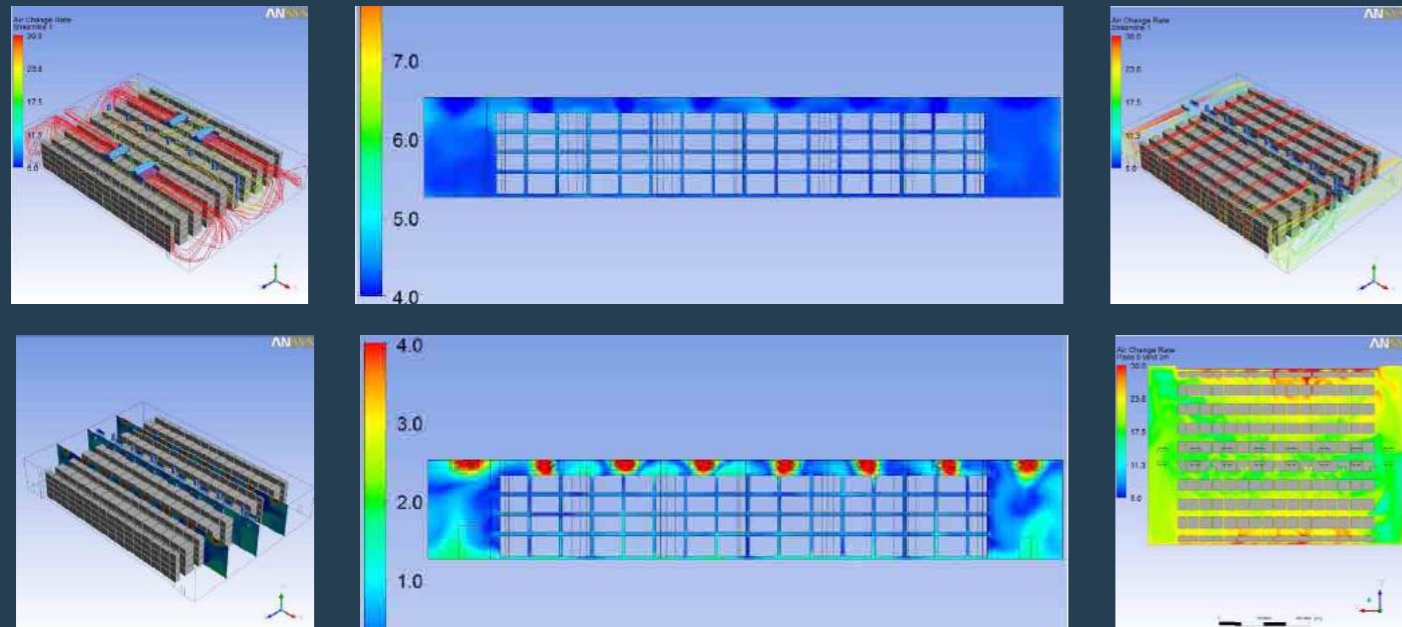
While CO₂ is only beginning to be utilised in larger refrigeration plants in China, ammonia remains the refrigerant of choice for large industrial refrigeration installations. However, the vast majority of small-to-midsize refrigeration systems are synthetic refrigerant-based, largely due to the comparatively low cost of such systems. Partly as a result of the exaggerated focus on low capital cost, the power consumption of synthetic refrigerant-based systems is significantly higher than the power and energy consumption of natural refrigerant based systems. What's more, synthetic refrigerant-based systems are harmful to the environment, significantly adding to the greenhouse effect and therefore a contributor to global warming.

In response to market demand for the replacement of chemical refrigerants with natural working fluids also in the medium capacity range, the ScanPAC concept has been developed. These modular plant rooms use ammonia and/or CO₂, and are both environmentally friendly and extremely energy efficient in serving small-to-medium size cold stores and production facilities. ScanPACs also have a number of additional uses, among them housing reticulated chilled water type air conditioning systems water air conditioning systems. Further adding to their value, as ScanPACs are containerized, they retain significant second hand value as a result of easy site relocation capability.

ScanPac is the versatile solution for today's varying refrigeration needs.

Suspended or Penthouse Units?

CFD allows us to model heat load transfer, and best demonstrate that our design and applied loads are the most efficient possible for the given project dynamics, its needs and operational behaviour.



Space-saving refrigerant system.

Delivered on site as a stand-alone modular unit

ScanPAC Refrigeration Systems feature an innovative, space-saving, container design that offers flexible placement. They are energy-efficient refrigeration modules with easy connections and installation options. Fully fledged systems, they operate utilising complete internal piping and wiring, a central control unit and all components necessary for the smooth operation of your cooling system.



Quick and easy installation.

Superior to and more cost-effective than on-site assembly, ScanPAC container units are factory built and ready to go. Delivered as a completely pre-mounted plant package, they easily connect to your store's piping and wiring.

ScanPAC
self-contained refrigerant system



Tailored to your specific needs

Units are available in different sizes and versions.

We'll work with you closely to select a ScanPAC unit that is perfect for your needs. You can choose from a range of cooling capacities that can be further optimized to fit your plant.

Site Installation

Owing to its compact design, ScanPACs can be placed directly behind the cold store or when necessary on the roof for short piping runs and in order to save useable space.

Advantages:

- Delivered ready for connection
- Fast and economical installation
- Require minimal on site floor space
- Designed to meet your specific requirements for refrigeration installations



Contact us for ScanPAC specification sheets

Designs to mitigate risks to workers and the public



Safe Operation and Worst Case Planning



Spaceframe follow the international and local standards regarding ammonia safety.

- Ammonia detectors are installed at all prescribed locations and where potential leaks may occur.
- Our philosophy is to install valves and valve stations in locations well away from confined spaces ensuring escape routes comply with prescribed safety standards.
- To maximize occupant safety, secondary refrigerants are employed in all areas classified as work areas by international standards such as ASHRAE 15, ISO 5149 and EN378
- Alternatives to traditional ammonia liquid overfeed systems have the capacity to reduce charges in air coolers by 30 to 50 times - let us tell you how
- We conduct thorough testing including x-ray, pressure & leak testing before a plant is taken into operation. All Tests comply to local standards



- Our training sessions with the local personnel and our operation and bi-lingual maintenance manuals provide detailed information about ammonia safety and what to do in case of an emergency.
- On request, we conduct site safety inspections and provide reports regarding the current status and recommendations for safety improvements.
- We believe accidents with Ammonia are completely avoidable

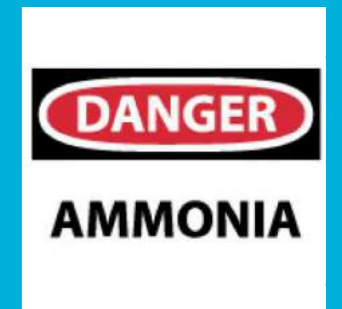


Partners in One-Stop Industrial Refrigeration Solutions



Operator Knowledge and Safety Procedures

Staff Training and Third Party Monitoring



Total integration of systems

SCADA provides you advanced monitoring 24 hours a day

Spaceframe design supply, install and service automated monitoring systems for all types of refrigeration plants and associated equipment. In-house control system developed by our own team of electrical/electronics engineers and programmers ensures seamless interaction between the mechanical and electrical elements of our systems. This results in fully integrated project co-ordination, commissioning and ongoing technical support.

The flexibility of our PLC (Programmable Logic Controller) based control systems allows us to tailor your system's controls to meet your particular needs. When combined with our SCADA, all operator interface systems, plant

SCADA

supervisory control and data acquisition

variables and diagnostic information can be displayed, recorded and reported on a personal computer or smart phone.

The SCADA operator interface also allows us to proactively monitor and, if you choose so, operate your plant from our office, regardless of its location. This enables any operational issues to be diagnosed and corrected before they reach the point of equipment failure. In the event of an alarm and/or warning, the interface can be configured for automatic dial-out to our service department for immediate response.



Saving time and money

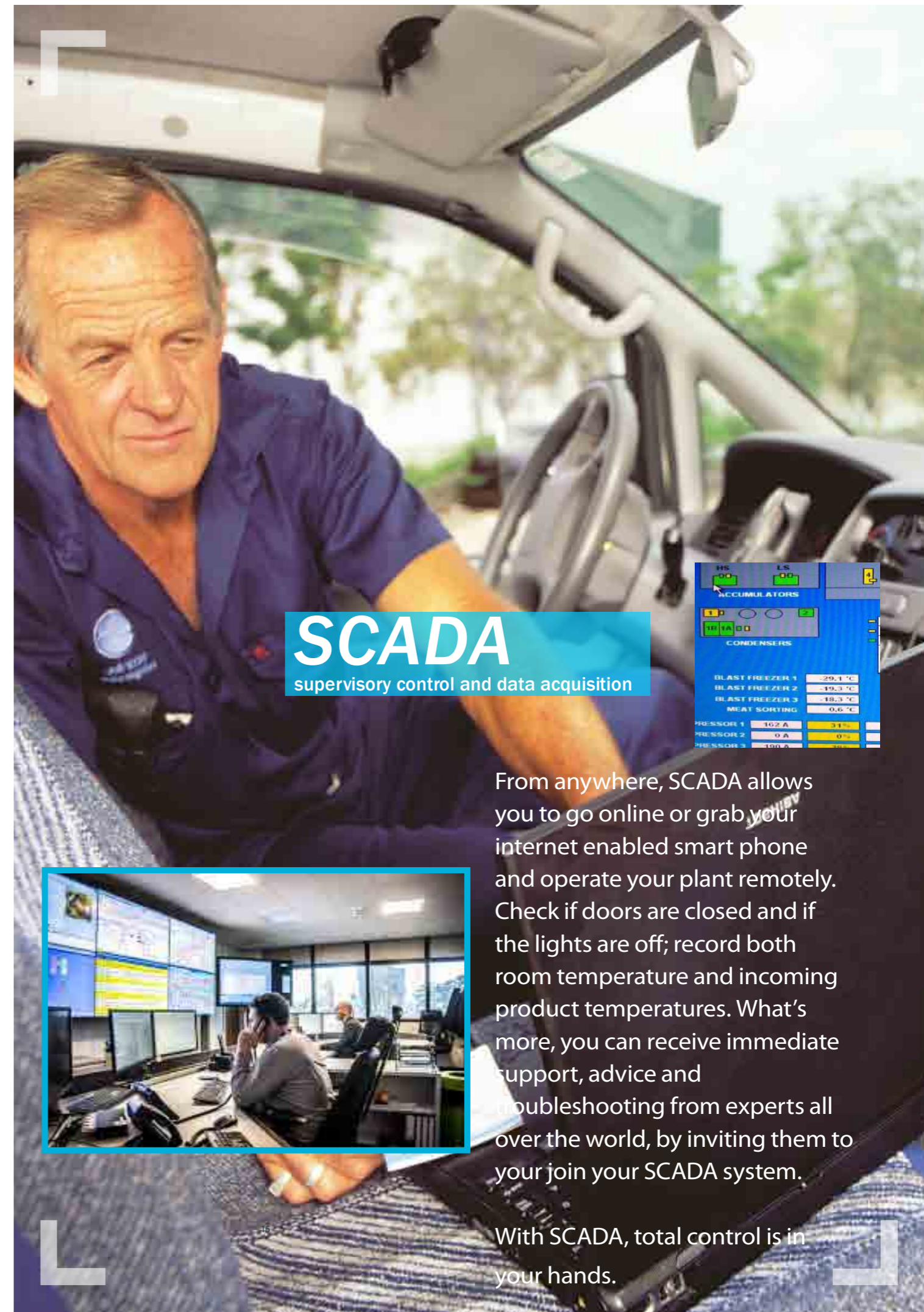
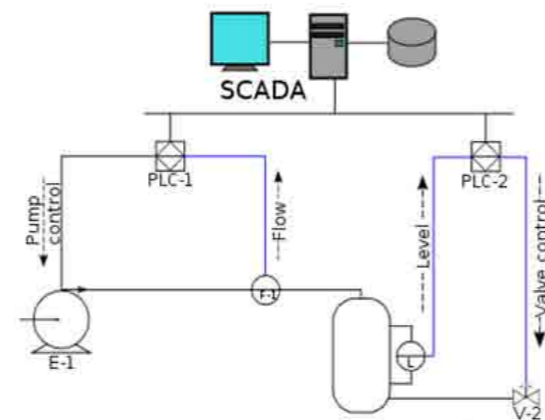
Our solutions make the difference

In food manufacturing, food processing and food preservation facilities, food hygiene is of the utmost importance. From a business operator's perspective, productivity and operating costs are of equal magnitude. However, all too often, factors influencing the success of your business conflict with one another.

Spaceframe has your overall business interest at heart. Through our extensive knowledge of equipment and techniques, we are able to propose optimum solutions. An example is the minimization of carcass chilling weight loss whilst simultaneously eliminating condensation problems. Here, in-house air cooler modelling software and state of the art air distribution techniques are

integrated to form a unique solution that serves your particular application.

Every application has its own particular, detailed purpose. We apply our proprietary, in-house performance rating software to all refrigeration plant elements in order to derive the optimal combination of components to suit your particular needs. This allows us to eliminate the time consuming effects of site-based trial and error adjustments. What you receive is on time plant delivery, on time commissioning, on budget.



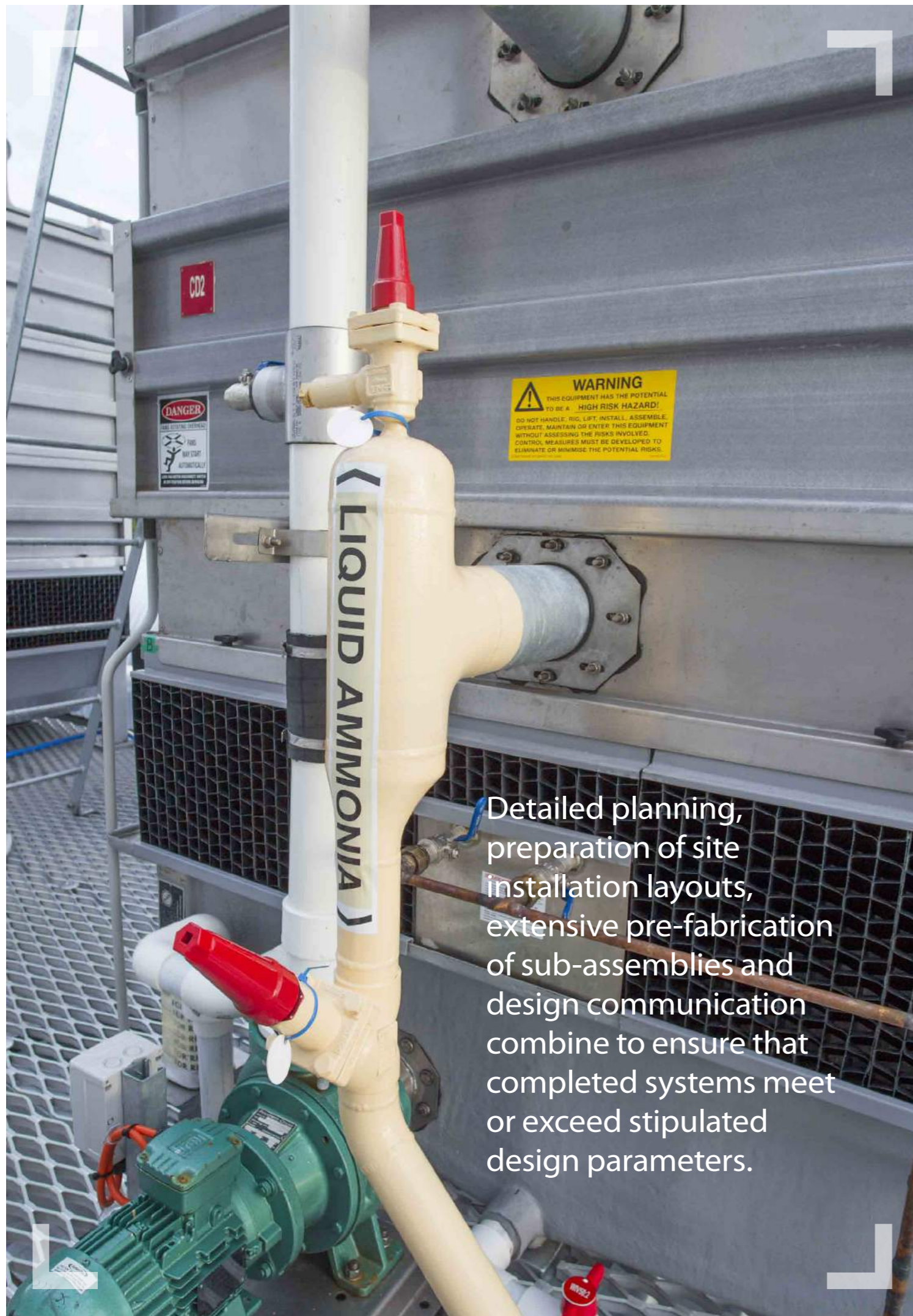
SCADA

supervisory control and data acquisition

ACCUMULATORS	
ACCUMULATOR 1	0.0
ACCUMULATOR 2	0.0
CONDENSERS	
BLAST FREEZER 1	-29.1 °C
BLAST FREEZER 2	-19.3 °C
BLAST FREEZER 3	-18.3 °C
MEAT SORTING	0.6 °C
PRESSORS	
PRESSOR 1	16.2 A 31%
PRESSOR 2	0 A 0%
PRESSOR 3	100 A 0%

From anywhere, SCADA allows you to go online or grab your internet enabled smart phone and operate your plant remotely. Check if doors are closed and if the lights are off; record both room temperature and incoming product temperatures. What's more, you can receive immediate support, advice and troubleshooting from experts all over the world, by inviting them to your join your SCADA system.

With SCADA, total control is in your hands.



Detailed planning, preparation of site installation layouts, extensive pre-fabrication of sub-assemblies and design communication combine to ensure that completed systems meet or exceed stipulated design parameters.

Comprehensive, post-commissioning service

All of our systems – from plant automation, air-conditioning and environment control to energy management and computer systems – are fully supported by the best back-up team in the business.

Our experienced service and maintenance technicians pride themselves on their professional knowledge and their wide range of skills. They offer everything from advice and trouble-shooting to highly detailed, comprehensive maintenance programs.

More than just know-how, our technicians have a full range of spare parts at their disposal, and are able to supply the right part quickly and cost-effectively.

By supplying original spare parts, continued peak performance of your equipment is ensured for many years to come. And in the unlikely event of a breakdown, our skilled refrigeration technicians and electronics engineers are on call 24 hours a day, 7 days a week.



From front-end to back-end and beyond, we look after you

Meeting your needs is important to us. Spaceframe's commitment to you is that we will respond to your needs with high quality products and services as they relate to the particular requirements of your application. What we propose will suit you, your needs, deadlines and budget. We work with you and what we do for you must work for you. We listen. We understand. We deliver.

Our specialities

- Domestic and offshore turnkey projects
- Industrial refrigeration plants of any kind
- Specialised air-conditioning and environment control systems
- Computerised control and monitoring systems

In short, our know-how, engineering capacity and advanced technology combined with outstanding service and commitment to excellence, make our refrigeration technologies the industry leader.



A state-of-the-art food production facility for Eastbalt



Project Details

Location	Beijing
Size of building	2,500m ²
Contract Value	RMB 22 Million
Start/Completion dates	2003
Scope	EPC

International Food Standards in China

As part of the ever increasing reach of McDonalds, the Bakery of East Balt was located on an existing property with Havi Logistics in the Business Development Area of Beijing.

Although this facility has no refrigeration as a bakery it is an example of our ability to provide food grade facilities to meet international food safety requirements.

Yeast and Flour can be detrimental to a facility if it gets into gaps and spaces within the wall panels.

In designing and delivering this building, focus was on air tight construction, to supplement the companies stringent hygiene and wash down procedures. To achieve this our tripple seal for panel jointing ensured a vapour proof building that has worked without incident since 1998.

Product movement and protection of the wall panel system was also critical to the longevity of this facility. Typical details and products to protect the facility against wear and tear such as, kerbs, coves, as well as food grade high impact flooring systems were employed to ensure high wear for steel wheeled trolleys.



Reliability & Specialist Engineering & Construction



Project Details

Location	Beijing
Size of building	6,000m ²
Contract Value	RMB 50 Million
Start/Completion dates	2005
Scope	EPC

Berry Processing, Fruit Juice & Flavorings

Beijing Lurou Berry Juice Co., Ltd, a fruit company located in the north of Beijing, required a blast freeze tunnel and -18 degree celcius store solution as part of their processing and shipping chain for strawberries to the European market.

Our solution to provide specifically sized and variable speed refrigeration plant , managed by the SCADA remote monitoring and control system, allowed us to establish a very efficient system that was capable of combining high production demands during harvesting periods with efficient low cost refrigeration during the during the quieter periods as well as remote monitoring for engineers located in Europe.

Other facility requirements included, 5 pallet high movable racking system, an ability to include futre automation, staged expansion for production in both the Freezer Tunnel, Freezer Storage areas, associated allowances for machinery plant rooms and facility protection associated with prodcut movement.

By working closely together a facility was established that included, high potential for expansion, international food safety requirements, and invoative detailing to ensure that high loads from the moveable racking system were sucessfully transfered through the freezer slab without affecting the performance of the thermal barriers.



A two stage variable speed ammonia refrigeration system



Project Details

Location	Beijing
Size of building	4,000m ²
Contract Value	RMB 50 Million
Start/Completion dates	1998
Scope	EPC

Delivering long-term solutions

Havi Logistics plays a vital role in the global distribution of McDonalds products including toys, bread buns, meat patties and fresh vegetables. All products need to be stored at the correct temperature to ensure the best possible quality is in stores to meet the high standards of both McDonalds and their consumers

With a proven track record, Spaceframe has worked with Havi Logistics on the design and construction of cold store facilities (including extensions) in Shanghai and Beijing. The refrigeration systems installed at these two distribution centres - both in 1996 & 1998 - have served to consistently deliver the best possible product by using the most efficient solution.

We used our two stage custom designed ammonia refrigeration system with variable speed compressors at both sites. The systems were engineered and commissioned to very specific cold storage requirements, while ensuring minimum long term facility running costs. What is more the use of environmentally friendly refrigerants have served to ensure the green image of McDonalds has been consistently preserved

In 2008 Spaceframe were awarded the chiller and freezer expansion project to support the 2008 Beijing Olympics. A further example that our long term collaborative approach is appreciated by our clients



Safety \neq First

Protecting our most valuable asset...
Our people

SAFETY+FIRST calls for commitment from employees, business partners, subcontractors and clients alike to adhere to its principles. SAFETY+FIRST is our individual and collective undertaking to:

- Deploy effective work policies and training programs that strive to ensure safety and proper risk management for everyone at all times

- Conduct ourselves in the safest possible manner, eliminating hazards and ensuring safety across all our operations
- Provide each person with a safe and healthy workplace environment

Only when we work together can we eliminate hazards and ensure safety.



Partners in One-Stop Industrial Refrigeration Solutions

Shanghai

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Room 17A, Huamin Empire Mansion
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200050 Shanghai, P.R.China

Brisbane

Head Office
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Murarrie Qld 4172
Australia

Beijing

Branch Office
Room 401, D Building
Ocean International Center
56 The Eastern 4th Ring Middle Road
Chaoyang District
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Thailand

Head Office
253/659 Kaha Rom Klao 64 Road
Ladkrabang,
Bangkok 10520

Changsha

Branch Office
Room 8J, 359 Middle Fu'Rong Road
Sector 2
410007 Changsha, P.R.China

Nanhui Pudong

Fabrication Facility
Building 8, 2303 Xuanhuang Highway
Nanhui District
201300 Shanghai, P.R.China



★ Celebrating 30 Years in China ★

Planning

Contractors

Ventilation

Refrigeration

Pre-Engineered