

2019 CEBA Controlled Environment Design and Construction Showcase



FALL 2019

It's cool to be a good neighbor... with low charge ammonia.

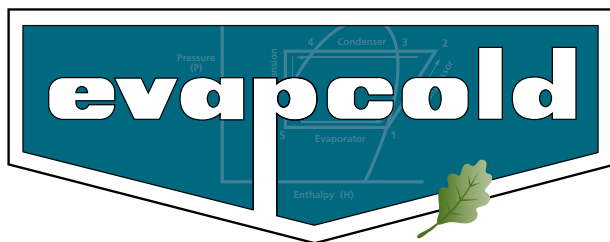
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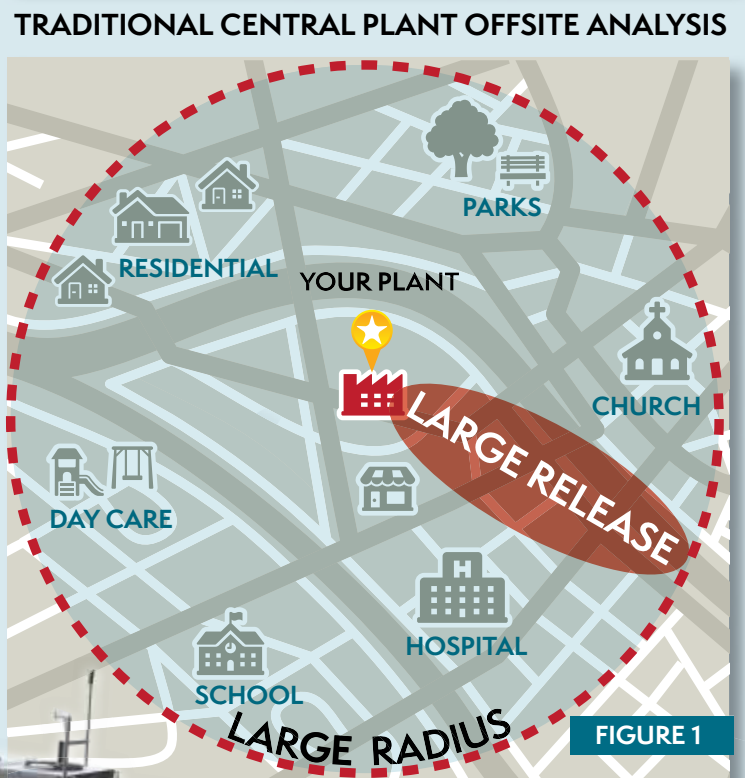
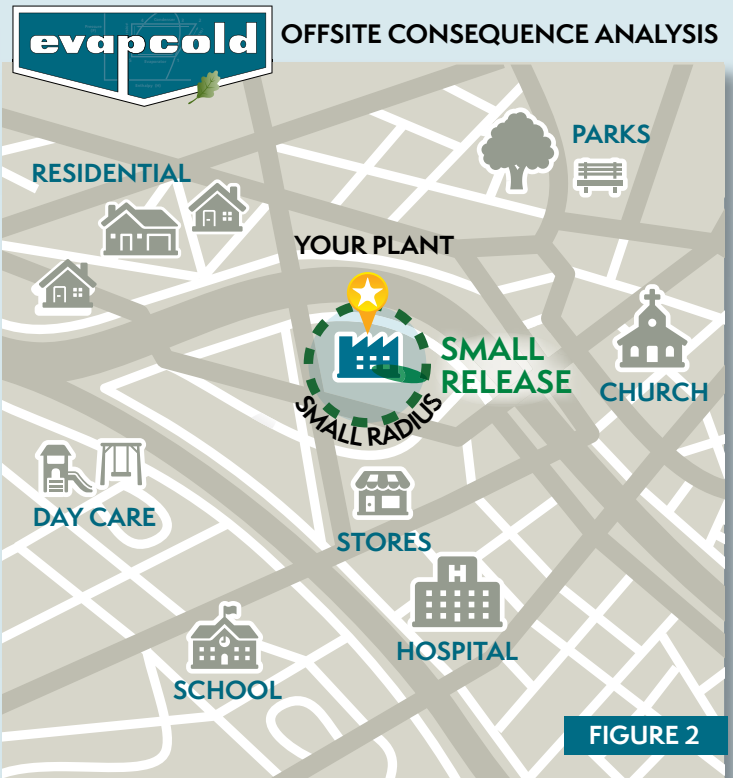
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CEBA CONTROLLED ENVIRONMENT DESIGN AND CONSTRUCTION SHOWCASE

COLDFACTS

COLD FACTS magazine is published every other month by the **Global Cold Chain Alliance (GCCA)**, an organization that unites partners to be innovative leaders in the temperature-controlled products industry. The GCCA Core Partners are:

The **International Association of Refrigerated Warehouses (IARW)**, which promotes excellence in the global temperature-controlled warehouse and logistics industry.

The **World Food Logistics Organization (WFLO)**, which delivers education and research to the industry and empowers economic development by strengthening the global cold chain.

The **International Refrigerated Transportation Association (IRTA)**, which cultivates, fosters and develops commercial and trade relations between all those engaged in the transportation and logistics of temperature-controlled commodities.

The **Controlled Environment Building Association (CEBA)** represents the design and construction industry specializing in temperature-controlled facilities that prioritize product safety best practices. We are the source for best practices of building and maintaining the thermal envelope.

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About the Cover: *Making cold storage easy as pie -- Tippmann Innovation, one of America's leading cold storage providers, teams with "America's Favorite Pie" manufacturer, Table Talk Pies, to build a state-of-the-art freezer to complement their processing facility in Worcester, Massachusetts. (Photo courtesy of Brian Richardson at Michigan Video and Photography.)*

WELCOME

A MESSAGE FROM TIM NGUYEN

CEBA: A Year of Success Under a New Brand



ONE YEAR AGO THE CONTROLLED ENVIRONMENT BUILDING ASSOCIATION (CEBA) ADOPTED ITS NEW NAME AND MISSION.

One of the most significant evolutions in our sector has been the diversification of the business. Many projects today extend beyond cold storage facilities, and CEBA members have the expertise to handle these types of projects.

Our new mission is to fully represent the expert builders who specialize in the design and construction of controlled environment buildings, including cold storage warehouses, food processing facilities, clean rooms, pharmaceutical facilities, and foodservice and retail distribution centers.

The CEBA vision is to provide a home for anyone looking to build, renovate, or modernize a first-rate, innovative facility with the most experienced designers, contractors, and manufacturers and suppliers.

Today I am pleased to report that CEBA membership has reached a record number of companies. We are providing services at a higher level than ever before to more companies than ever before.

The CEBA Built by the Best awards competition has achieved even higher prestige and recognition. See the article on page 26 about last year's Built by the Best winner. Winners are featured extensively each year in COLD FACTS magazine and recognized at the annual CEBA Conference & Expo that will be held November 14, 2019 at the Loews Miami Beach Hotel. It's where an expected 300 building professionals, suppliers, and end-users will gather to learn and do business with each other in this robust marketplace of controlled environment buildings. See the article on page 6.

CEBA is also working to build future talent, offering recruitment and retention programs and exploring other opportunities for talent development; and to implement plans for developing expertise and increase engagement with MEPs, refrigeration engineers, and customers.

This CEBA Showcase special section takes a deep dive into all that CEBA accomplished this year and what lies ahead in the coming year. The lead article, "More Building Around the World" on page 18, demonstrates the range and versatility of CEBA members as they design and build some of the best facilities across the globe.

I encourage all of you to read these excellent articles, and better yet, attend the conference in November and if you are not yet a member – join CEBA to participate in all we have to offer.

I know you will be richly rewarded. ☺



TIMOTHY NGUYEN
CEBA CHAIRMAN

IS YOUR FACILITY A GOLD-STAR ENERGY LEADER?



The GCCA Energy Excellence Recognition Program was designed to help your warehouse facility:

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- ✓ EVALUATE YOUR COMPANY'S ENERGY CULTURE
- ✓ IMPROVE ENERGY EFFICIENCY
- ✓ GAIN RECOGNITION FOR IMPROVED ENERGY USAGE
- ✓ EXPLORE RESOURCES TO IMPROVE FOR THE FUTURE

160 COMPANIES have already made a commitment to improving the cold chain

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39TH CEBA CONFERENCE & EXPO

Building an environment for success.

The 39th CEBA Conference & Expo, held November 14-16, 2019, at the Loews Miami Beach Hotel in Miami, Florida, United States, is the only event in the world dedicated to best practices in controlled environment facility construction, design and maintenance.

The event draws over 200 controlled environment facility construction, logistics, and supply chain operations professionals from around the world to gain valuable insight for improving their business.

This year, the conference features case studies, presentations by industry thought leaders, exceptional networking activities and an expo with cutting-edge products and technology.

Through robust programming focused on peer case studies, the conference delivers an education program intended to help solve the most significant cold chain business challenges.

General Sessions

General sessions at the CEBA Conference & Expo provide attendees a thorough look at the latest innovations in controlled environment design and building.

This year's conference will include presentations from the finalists of the CEBA Built by the Best Award as well as insights from industry experts.

The Built By the Best Award acknowledges industry-changing innovations and projects that exceed customers' expectations, positively impact and grow the cold chain worldwide, and contribute to the larger society through food safety, trade development, and job creation.

Construction Cafe

The goal of the CEBA Construction Café is to create an exchange of ideas and stimulate facilitated discussion on critical industry issues. Participants choose from 10 different topics, join the table at which the issue is being discussed, and spend 20 minutes sharing ideas. Participants then switch tables to discuss another topic.

CEBA Education Committee

Carl Morse
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Jay Smith
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Paul D'Agostino
Coldbox Builders, Inc.

Tim Nguyen
ESI Group USA



The roundtable conversations provide attendees a chance to share ideas, ask questions and solve problems with their peers in a small group setting. The moderator will guide the participants through questions they have submitted in advance, diving into the subjects that matter most to attendees.

Past topics included Recruiting a Workforce, Food Safety, Sustainability, New Technology, Profitability and Project Management, Workplace Safety, Automation and Differentiating Your Value and Expertise as a Controlled Environment Construction Specialist.

The Expo

The expo features the latest technologies, solutions, products and services from some of the most respected names in the industry.

Here is a sampling of the products and services that will be featured at the expo:

- Cold Storage Contractors
- Doors
- Energy Efficiency Solutions
- Fire Detection Systems
- Flexible Walls
- Flooring
- Insulated Panels
- Insulation
- Lighting
- Materials Handling
- Racking
- Refrigeration Solutions
- Roofing



Current List of Exhibitors

- Albany Entrematic
- All Weather Insulated Panels
- Brucha Corp
- Colmac Coil Manufacturing Inc.
- Evapco Inc.
- Green Span Profiles
- Honeywell
- Jamison Door Company
- Kingspan Insulated Panels
- KPS Global
- Metl-Span
- NORDOCK Inc.
- Republic Refrigeration, Inc.
- RHH Foam Systems Inc.
- Rytec High Performance Doors
- The Raymond Corporation
- Thermomass
- Tippmann Innovation
- Vapor Armour

Networking Events

Prominent social activities, receptions, and the exhibit hall all give industry suppliers unparalleled access to build partnerships with construction/design-build, warehousing and food processor decision makers.

Other networking opportunities include a first timer and new member reception, an opening night reception, two afternoons set aside to catch up with peers and vendors for private business meetings, a golf tournament, and an after-hours party.

This is the only event in the world dedicated to best practices in controlled environment facility construction, design, and maintenance, and serves to further CEBA's vision to be the association where anyone looking to build, renovate or modernize a first-rate, innovative facility comes to find the most experienced designers, contractors, manufacturers and suppliers.

www.gcca.org/conference



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your organization's commitment to sanitary transportation of food.

DIFFERENTIATE

your organization from its competitors as an industry leader.

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BUILDING AROUND THE WORLD

From automation to clean rooms, global trends in constructing temperature-controlled facilities.

Innovation in thermal building projects is happening at a rapid pace on almost every continent. Here is a snapshot of some of the trends in building high quality, food safety-focused, temperature-controlled environments in the Americas, Europe, South East Asia, and Africa.

Hot in Canada

“It’s a hot climate these days in Canada, with lots of activity and growth in food processing and manufacturing,” notes Marko Dzeletovich, P. Eng, President of Coldbox Builders. “A healthy economy, changes in consumer preferences and ways of purchasing food, meal kit companies becoming more common – all of these factors have an impact on the decisions that are made in building cold

storage and processing facilities.”

Dzeletovich says at this moment, the number one trend in Canada in innovative thermal building projects is end users requesting turnkey solutions and a guaranteed completion date. “It’s a sign of the business climate, schedule is very important.”

He adds that there is great demand from customers to find a single cold storage and processing facility specialist to pull it all together.

“It helps to speed up the schedule. There are so many technological and system options to choose from, and so little time for planning right now, end users need someone with the expertise to provide solutions so they can get their facility into the market as fast as possible.”

Another trend Dzeletovich points to is the increase in cross-border partnerships. “I’m seeing an increase in American companies with local clients needing a Canadian design-build partner to facilitate U.S. client growth in Canada.”

Automation is a big topic these days, according to Dzeletovich. “Semi or fully automated facilities are starting to go up and operators are exploring their options and running models to see how automation can benefit their business.”

(Left) A clean room at a project built by ARCO Design/Build – BTS, Inc. in Houston, Texas. Insulated metal panels and infit type doors are used in the construction of the room along with dedicated HVAC systems utilizing specialty HEPA filters. (Photo courtesy of ARCO Design/Build – BTS.)

When weighing whether to go with an automated facility, one has to determine how many pallets are going through the PRW against other costs, Dzeletovich explains.

“Automation systems are highly flexible and 3PLs want flexibility. Automation gives you higher density, greater height, and a smaller footprint but if you build conventionally and sprawl out, you can’t take advantage of that space at a later time. Also, automated facilities can operate at night, in the dark, staging product. A warehouseman sitting idle costs money.”

Dzeletovich points out that while the cost of labor and shortage of workers in non-automated controlled-environment buildings continues to be an issue, there’s no shortage of workers interested in technology and programming. “There are plenty of folks who would like to work in a fully automated space. Augmenting and maintaining automated systems is really interesting.”

But one of the main drivers in weighing the benefits of automation in Canada, says Dzeletovich, is whether there’s developed land available.

“It’s difficult to get developers to agree to purpose-built facilities like automated temperature-controlled buildings,” Dzeletovich says. “Developers are looking out 20 plus years and consider how this specialized building can be repurposed. Just as 3PLs want flexibility to accommodate future clients, land developers want a building that is as flexible as possible for their future tenant.”

Dzeletovich acknowledges it impacts the move to automation to some degree.

Pharma in the USA

The first fully automated temperature-controlled facility opened in the United States in 2018. “Regarding automation, it’s been a shot in the arm for the PRW industry and garnering a lot of attention. However, we’re not seeing dramatic changes yet, the ball is slowly moving down the field,” says Jake Stefan, President of ARCO Design/Build BTS, Inc.

“I can tell you that automation in the cold world in the United States has a bigger foothold in facilities designed around a

specific product(s) – for example facilities that are dedicated to manufacturing plants,” Stefan notes. “Investment is still very high on automated material handling systems so if the products being stored use similar pallet dimensions and can be handled on the same ASRS, mole system or any other automation oriented retrieval system, it’s much easier for the operator to stomach.”

There is one cold storage market that is growing by leaps and bounds says Stefan, and that is specialty pharmaceuticals, which all tend to be temperature controlled.

“The specialty pharma, or cold storage segment, is one of the fastest growing in the pharmaceutical industry. Unfortunately, even though I like it growing quickly, I’m not sure specialty pharma is going to fill your warehouse,” Stefan warns. “Pill bottles are tiny and are stored by box or case, not pallet, so much of specialty pharma is stored within walk-in coolers rather than forklift drive-in coolers. We

recently completed a pharmaceutical distribution facility with a large cooler by pharmaceutical standards, but, in the end, it was still only 3,000 square feet expandable to 6,000.”

There are ways for a controlled environment facility to share space between pharma and other products, Stefan says, but because of the stringent requirements of the DEA and pharma manufacturers, the cold pharma has typically been stored in independent facilities versus comingled facilities with completely dedicated storage spaces.

Stefan notes that he has been fielding questions from customers about one specific product related to the pharma world that can be stored in the same temperature-controlled facility as food. “A pill bottle measures a couple of inches but the frozen ice packs that go in the shipping containers take up a lot more space, have to be temperature controlled during storage, and have no related security risks,” Stefan says. “I can see a pharma distributor



An ASRS shuttle-type facility with 80,000 pallet freezer. (Photo courtesy of Coldbox Builders.)



A 13,000-square-meter cold storage warehouse capable of reaching -20 °C built in 2018 by Infrisa in Tijuana, Baja California, Mexico. (Photo courtesy of Infrisa.)

partnering with a facility that can blast freeze and store pallets of ice packs, allowing the distributor to receive a pallet or two as needed.”

One area of growth for Stefan’s company has been in designing and building cleanrooms for pharma – a controlled environment that has a low level of tolerance for pollutants such as dust, vapors, and often times humidity, for manufacturing or scientific research.

“Although there are different rules and regulations for cold cleanrooms versus cold food storage, the concept of building sanitary, air, and water tight storage is the same. The techniques and materials used in the construction of these cleanrooms are very similar to those used in cold storage,” Stefan explains. “So our expertise, technical awareness, and attention to detail from building cold storage has been a big factor in our success in the pharma world.”

Any other construction trend on Stefan’s mind? “Yes, jointless floor systems! They have such great value, I can’t understand why they haven’t become the standard – I’ve done some for PRWs but never done one yet for a food distribution facility.”

Efficiencies in Mexico

Alfredo Garza, General Director, Infrisa Mexico, couldn’t agree more with Stefan.

“The trend for us is to install concrete floors without joints – they require less maintenance, they increase operational efficiencies, they’re more sanitary, they’re easier on forklifts and their operators because there are no bumps, and they’re flatter, which makes them more secure when using high racks.”

Garza says there are also trends in the kind of insulation being used for thermal building projects. “The type of foam insulation we’re using today has revolutionized operating systems in Mexico and efficiencies in cold storage are significantly greater.”

Garza says the insulation is a foam PIR (Polyisocyanurate) that has a lot of structural advantages because it is quite rigid and strong which translates into less panel breakage and shrinking during construction.

The trends in wall design are focused on the type of materials being used and those materials, as well as the paint that will be used, are selected based on the type of product

being stored and the chemicals used to clean the walls and how aggressively those chemicals will be used. “All these elements impact the way you design and specify panels so you really have to know your client and their products,” Garza points out.

Doors also are among the new technologies that are creating better and safer temperature-controlled facilities, Garza notes. “Today, there are so many doors to choose from that make internal operations more efficient. You have to sit down with your client and explain the different technologies that are available in the market based on the nature of the client’s operation.”

Garza says that because of climate change and the risk to the environment that ammonia poses, the type of refrigerants now used in temperature-controlled warehouses in Mexico are more efficient and safer. “We’re recommending systems that use a mix of refrigerant ammonia and glycol and this reduces kilos of ammonia from the system.”

“Overall, there’s a lot of need for cold storage construction in Mexico,” Garza points

out. “We have a very low percentage of square meters of temperature controlled storage for the population, and the facilities we do have are too spread out creating long distances for refrigerated transportation to travel.”

Going High in the UK

“One of the biggest trends impacting cold storage in the United Kingdom is younger consumers buying smaller quantities of groceries more often and not going to large supermarkets,” says Tony Wall, Managing Director of ISD Solutions, the largest temperature-controlled facility builder in the United Kingdom. “With this trend, we’re seeing the emergence of convenience stores and the decline of big box stores.”

Wall adds that the other major demographic trend – younger consumers shopping for groceries online – is having a massive impact at every level of the food supply chain. “The frozen food market is growing immensely in the United Kingdom as it is elsewhere in Europe. Every store is adding more frozen aisles, with ambient temperature

discount stores looking to get into the frozen food market.”

Wall says that the United Kingdom’s economy has a 30 to 35 percent cold storage requirement and with the huge upsurge in demand for frozen food, his company has never been so busy building cold storage. And what they’re building are automated high bay (high rise) temperature-controlled facilities. “Now that there is a 20-year track record since the first high bay was built in Belgium, when clients are looking at a new project with high volume, they look at high bay first.”

Wall says the industry has changed a great deal since the first high bay facilities came into the market and has become very specialized. “Contractors like us used to manufacture and install ourselves, but now high bays are such expensive and technically challenging projects to build, contractors partner with manufacturers to provide a solution.”

Wall says moving into new global markets depends not only on having good partners, but also on your company’s track record.

“You can’t give high bay jobs to just any builder – it’s a huge load on the ground.”

For ISD Solutions, its partnership has been with Kingspan, one of Europe’s leading construction product manufacturers – ISD Solutions is its largest customer for temperature-controlled panels in Western Europe. Wall says, “With Kingspan being a global company, it allows us to work anywhere in the world. We just entered the Australian market with the completion of that country’s first high bay in 2017, and are fielding inquiries from the Middle East and Asia.”

Growth in Africa and Southeast Asia

Carsten Thorsen, CEO of CT-TECHNOLOGIES, a Danish company specializing in engineering climate-controlled facilities, says his company builds all over the world and is anticipating 20 percent growth annually in the coming years in demand for their services in Southeast Asia (SEA), and in Africa, particularly in Ghana and Nigeria.



Constructed by NewCold in Melbourne, Australia, with the insulated envelope and specialty doors contributed by ISD Solutions, this is the first fully automated high bay cold storage facility on the continent and the largest in the Southern Hemisphere with the capacity of 100,000 pallet spaces and measuring approximately 135m x 105m x 36m high. (Photo courtesy of ISD Solutions.)



A fully automated cold storage warehouse in Singapore engineered by CT-TECHNOLOGIES for Coca Cola. (Photo courtesy of CT-TECHNOLOGIES)

Thorsen says in Africa, where the company has been operating for 15 years, they supply more projects on a turnkey basis, providing everything from floor insulation, steel structure, refrigeration equipment, panels, and doors. In building temperature-controlled facilities in SEA over the past 30 years, he says they are more likely to provide sandwich panels, floor insulation, and doors.

“While our African customers are more interested in purchasing the entire solution from one company, another big difference between the two regions is that in South East Asia, ASRS and high-rise warehouses are more prevalent whereas in Africa, the concept is still new and interest low.”

Thorsen adds that the growth in high rise buildings and ASRS in Southeast Asia, estimated to grow by 12 percent per year, is driven by increasing labor costs, lack of space, and the improved efficiencies that

the high rise ASRS buildings allow. “Energy efficiency is a very important aspect for many clients and with the rising energy prices in all the countries we work in, this is becoming increasingly critical.”

To address energy efficiency, Thorsen says the company is focusing more and more on providing photovoltaic (solar) solutions for their cold store customers. He adds that the solar panels themselves have not changed much in recent years, but what has changed is the cost. “The prices are lower now than they were a few years ago, so that is also fueling interest in solar on the part of our SEA and African clients. Now the focus is on making the batteries, where excess energy is stored and used at night, cheaper.”

Thorsen said another trend is that fire resistance is coming more into focus in Southeast Asia, with customers asking for solutions that satisfy stricter requirements. It is also a high

priority because of past fires that have resulted in loss of life.

“In cold stores, we typically use PIR panels that are self-extinguishing and optimal in controlling smoke development, and temperature and fire penetration,” Thorson notes. “In other buildings with even higher priority on fire safety, such as high rise cold storage facilities, we use mineral wool panels as they are highly fire resistant and act as a fire barrier, slowing down fires and giving the responders more time to get the fire under control.”

Another new technology that Thorson says his company is starting to use, and which he believes will become more widespread in SEA, is active fire protection systems that reduce oxygen concentration levels, actively inhibiting fires from developing or spreading. “Unlike sprinkler-based fire protection, oxygen reduction prevents fires from starting in the first place.” ☞

Design-Build-Automate

It is widely accepted in the cold storage industry that automation is here to stay. Customer demands for faster, more accurate orders coupled with a diminishing workforce all point to automation as the solution.

Traditionally, a cold storage owner would sit down with an automation provider and ask, "What do I need to do? How can I get my product out the door faster?" Equipment, technology and staffing were all decided before talking with an architect or builder.

This approach proved inefficient. Equipment, coordination and design challenges would surface during the design-build process. Since Primus is committed to helping its clients achieve their business goals, it became evident they had to disrupt this old process and implement a new one.

Primus Solutions Group is a team of data analysts, systems supply experts and systems engineers ready to provide automation solutions for Primus's clients. This in-house team eliminates the need to hire separate engineering and automation firms and generates positive impacts including:

- Long-term cost reduction
- Faster speed to market
- Increased accuracy, flexibility and scalability
- Improved employee safety
- Lowered energy consumption
- Reduced risk of contamination



Primus integrates automation solutions into its award-winning design-build approach. During the design phase, the team provides data analysis of existing and future productivity goals and recommends automation solutions that fit the building design. During the construction phase, the group works with field teams to ensure their sites are ready to

receive equipment and assists with installation and start up.

Primus calls this turn-key approach design-build-automate. Combining all of these in-house talents minimizes risk and delivers clients peace of mind. If you are interested in learning more, visit www.primusbuilders.com.





The Power Of Low Charge Ammonia Systems

Packaged Low Charge Ammonia Technology is moving past the adoption phase and is becoming a proven technology in the Industrial Refrigeration Markets.

New Guidelines & Standards Making Regulations Easier

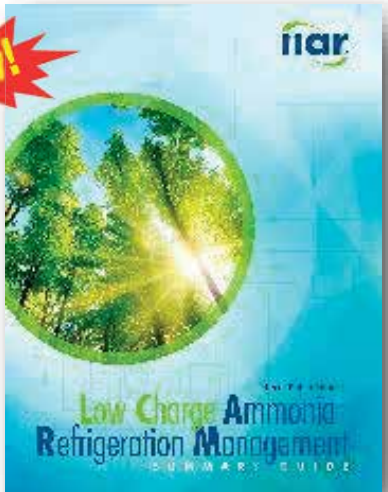


ARM – Low Charge (ARM-LC)

Below 500 lb Per Package

Easier Regulations & Guidelines

You can be the beneficiary of easier regulations and a reduction of red tape with IIAR’s new regulatory Guideline called **ARM-LC** (Ammonia Refrigerant Management – Low Charge). It was developed by IIAR over the last three years and released to the industry in March 2019. This IIAR Guideline greatly simplifies the owner's compliance requirements because of the lower risks inherent with low charge ammonia systems below 500 lb per package. There are many reasons for the lower risk and easier compliance with these low charge systems, and the ARM-LC program allows owners to take advantage of them.



Best Practices Being Published



Plan & Spec or Design-Build

A brand-new white paper is available entitled **Distributed Low Charge Refrigeration Systems**, recently released by the **Global Cold Chain Alliance (GCCA)** and the **Controlled Environment Building Assoc. (CEBA)**. The paper was developed over 2 years by its Construction Codes Committee and will help cold storage owners and their contractors, engineers and operators understand how to design & construct their building or facility for the application of Low Charge Refrigeration systems. It provides helpful descriptions of this new technology and how to design and build a facility to maximize the benefits a distributed low charge system can provide. The paper also contains a valuable **Pros & Cons table** to help evaluate and understand how this technology compares to traditional systems.

Building A Better Design-Build Process



Performance & Reliability Testing Results Are Available



5 Years of Research, Development and Testing by Evapco

The Evapcold technology has been put through 5 years of robust and continuous run testing by Evapco and has yielded very successful results and very reliable product operation. It has resulted in ultra reliable and efficient low charge ammonia packages that are revolutionizing the industry.

In addition, a third-party company, Creative Thermal Solutions (CTS) has been conducting 2 years of successful



testing of Evapcold packages. This was partially funded and supported by Southern California Edison (SCE) and the Electric Power Research Institute (EPRI), for the purpose of developing energy efficiency rebate programs for using this technology as well as predefined electric demand response programs for the refrigerated warehouse industry.



Performance Monitoring & Verification



**ULTRA RELIABLE & EFFICIENT
LOW CHARGE AMMONIA**

A Diverse, Growing Product Line & Installed Base



Evapcold units have been successfully applied to a diverse set of applications and end users including **cold storages, high rise cold storages, dairies, food processing facilities and chemical plants.**





MORE BUILDING AROUND THE WORLD

More automation, more AI, more exports and more consumer preferences impacting global cold storage construction.

Here is the second annual snapshot of controlled environment facilities construction around the world. Designers and builders in Europe, South Africa, the Philippines, Brazil and Australia discuss global and local trends and challenges.

Europe

The maturation of Asian markets, and regions where populations are seeing improved living conditions and increased purchasing power, are feeding the demand for European produce exports.

Paralleling the ever-increasing demand for produce exports is the need for more storage capacity as producers expand production.

Julie Hanson, European Director for the Global Cold Chain Alliance (GCCA), reports that the glow is off the fresh food movement,

and frozen is praised by consumers, bringing about general growth in the frozen food sector.

She also notes the expansion of fast-food chains creates opportunities for both fresh and frozen storage with European 3PLs.

Hanson says acquisitions of smaller companies by large private-equity-driven groups are intensifying in Europe, which generates the availability of capital to invest in new buildings.

“In the last couple of years, there has been a tremendous increase in the demand for warehousing, not only temperature controlled, but in general,” says Martijn Baartmans,

Left: Temperature-controlled warehouse with frozen and chilled chambers for pharmaceutical storage in San Paulo, Brazil. (Photo courtesy of Civil-Frio.)

Right: An automated high-bay warehouse with 37,000 deep freeze pallet locations built by B-Built temperature-controlled warehouse, Kloosterboer. (Photo courtesy of B-Built.)



Director, B-Built BV, based in the Netherlands. “Looking at our prospects, we can only see this trend continuing. Whether it’s market replacement, the need for automation or simply expansion, the signs are very positive.”

Baartmans attributes much of the growth to exports. “As transportation continues to make the world smaller, our clients focus on interlinking their facilities on a global footprint and we see an increase in cross-border warehousing needs.”

A continuous movement towards automation in the industry is driving technological advances Baartmans sees incorporated in Europe’s temperature-controlled warehouse design/builds. “Whether it’s ASRS (automatic storage and retrieval systems) equipped warehouses or mobile racking warehouses, both appear to be on a clear path towards full automation.”

As a result, Baartmans says the warehouses his company builds today are up to 43 meters high (141 feet) compared to 10 years ago when they built to a height of 34 meters (105 feet).

Another trend Baartmans sees in the way controlled environment buildings are designed and built is the consideration of value-added services.

“The layout of the warehouses we build all take into account the need to layer pick or case pick or have an area for machines or robots capable of mixing products on a box level,” he points out.

Baartmans reflects that the biggest change in the construction of temperature-controlled warehouses in the past 10 years has been local government initiatives that encourage and support warehouses to invest in environment-friendly buildings.

“For example, operators are supported in their efforts to build with increased insulation values, fast acting sliding doors, DOBO (dock on before opening) docking and solar panels.”

Baartmans has a positive outlook on the industry’s future.

“People will always eat and always store food and I have no doubt the construction of temperature-controlled buildings will continue to develop,” Baartmans says. “The globalization of the logistics industry will only support this even more.”

South Africa

The South African cold chain industry is almost 100 years old this year and has enjoyed steady growth. However, it has also seen huge growth in capacity over the past decade.

The mixed model of pure commercial, multi-user facilities, and producer/importer in-house facilities that enter the commercial market from time to time with excess capacity, and the third category of pure 3PL providers, is still prevalent. This last category has seen the most growth in recent years in South Africa.

The export of temperature-controlled perishables such as citrus, sub-tropical fruits, table grapes and deciduous fruits, is an important source of foreign revenue for the country and relies heavily on an efficient cold chain.

The new cold storage facilities for the export of fruit and the new distribution centers for all the supermarket groups, has brought growth in the cold chain sector that is far above the national economic growth of South Africa.

However, in South Africa, the business of designing and building warehouses has not been great, contends Martin Bailey, Chairman of Industrial Logistic Systems, Johannesburg, South Africa.

“The economy is not growing because we have an ‘unfriendly to industry’ government and a high tax rate that sends investors elsewhere.”

Although it has now been eclipsed by Nigeria as the largest economy on the continent, South Africa still stands out as an economic leader and the primary entry point into Southern Africa. But, the country’s economic growth is sluggish and has failed to expand by more than 2 percent a year since 2013, due in large part to the global economy as well as by constraints on the supply of electricity.

Energy costs of both electricity and fuel are a major challenge facing the South African cold chain, as are drought-induced water shortages.



A hot dog processing facility in the Philippines with 20,000 pallet positions. (Photo courtesy of Jojo Castro.)

All sectors of the cold chain are challenged to improve efficiency, reduce carbon emissions and find alternative sources of energy to that of the national grid.

Electricity tariffs generally increase on average 15 percent per year forcing warehouse operators to look to alternative sources such as solar systems. And because of load shedding and interrupted supply, many operators also invest heavily in diesel powered standby generators.

In addition, there is a lack of managerial expertise and skilled workers. Although wages continue to rise, unemployment is exceptionally high, reaching 27.5 percent in 2018.

South African cold storage facilities mainly use mobile racking for pallet storage. Refrigerated warehouses are still designed for bulk storage or for case picking and distribution, with most warehouses offering storage and some case picking and labeling can be done if required.

But that is changing.

“The need for improved energy management as well as labor inefficiencies mean that the warehouses we are building are getting bigger, more energy efficient and more automated,” Bailey points out. “Our customers want their facilities to be as environmentally friendly as possible.”

In addition, Bailey notes that what their customers generally want to get from their new or expanded facilities are deliveries that are faster, smaller, better at OTIF (on time in full) and at a lower cost.



Temperature-controlled warehouses in the Philippines, like this one for pharmaceuticals operated by Distriphil, are growing in double digits, and are bigger and more automated. (Photo courtesy of Jojo Castro.)

Other factors that Bailey notes as impacting the design and construction of temperature controlled facilities in South Africa includes consolidation in the industry, an increased number of SKUs, more consumer demand for fresh versus canned, the availability of cutting-edge IT software and hardware and the decreasing cost of automation.

Bailey says the main difference in the way they build temperature controlled warehouses today is that they really focus on process first and then wrap the building around that process.

Looking to the near future, Bailey contends that the biggest impact on the design and construction of temperature-controlled warehouses will be more automation as costs are reduced and more players enter the market, artificial intelligence that will bring better forecasting and inventory control and better systems to optimize warehouse operations.

Philippines

While the Philippines is a newly industrialized country that is transitioning from an agricultural economy to one based more on services and manufacturing, an adequate cold chain

is critical to feed the country's population of 110 million and sustain its export/import potential.

Most food products in the Philippines do not pass through the cold chain, but travel to a traditional wet market. Compounding the problem is a market culture that, while slowly evolving, still prefers fresh over frozen.

"The Philippines is experiencing a remarkable growth rate compared to other ASEAN countries, and exports of bananas, mangoes, pineapples and now coconuts are booming," points out Jojo G. Castro, a local refrigeration consultant who has worked with the GCCA. "Naturally, temperature-controlled warehouses are riding on that growth but we really need to catch up with our neighbors Thailand and Vietnam, which have bigger installed capacities."

Castro says temperature-controlled warehouses, with support from the government, are growing in double digits, and are bigger and more automated. "I surmise our total capacity is now at 350,000 metric tons."

"There is a cold storage facility under construction with automatic storage and retrieval system that uses ammonia as a refrigerant within Metro Manila," Castro notes. "As to automation, many warehouses are using basic automation software packages, and the facilities come in different shapes and sizes, mostly with two deep, and six to seven high, pallet arrangements, from 18 meters tall to 40 meters."

Castro says he is currently involved in the construction of a 7,000 pallet position facility, is bidding on another with a total of 16,000 capacity and in the works is a 12,000 pallet position, 2-deep, 9-high facility.

Other ways in which construction of temperature-controlled warehouses is changing is in insulation panels, which Castro says have come a long way in the past 10 years.

"Polyurethane is rapidly on the way out, replaced by Polyisocyanurate (PIR) panels, but that might also be replaced in a few years by another technology," explains Castro. "We are now specifying quadcore technology together with PIR for the panels."

Castro notes warehouses are now designed without any columns in the middle to accommodate more racking systems.

"Ammonia is the preferred refrigerant for big warehouses, but small ones (1,000 pallet positions and less) still use halocarbon refrigerants," Castro says. "But the refrigerant market is changing now and in fact we are helping a company that promotes the new generation of refrigerants establish its presence here."

Consumer preferences are beginning to shift from fresh to frozen, which also represents a sizable market volume that would require cold chain support.



Distriphil pharmaceutical warehouse in the Philippines with 6,388 pallet positions. (Photo courtesy of Jojo Castro.)

"In private subdivisions and villages, hypermarkets and grocery stores are sprouting all over Metro Manila and other major cities and logistics companies are coming up with various ways to entice these new clients, from delivery and pick up services to using lithium-ion batteries for their forklifts," Castro says.

Castro notes that he recently designed the ventilation system for a big facility that is launching a ready-to-eat meal package service for working millennials.

"Likewise, the online delivery system is also having a heyday here," Castro points out. "A few online delivery food companies have started delivering hot meals from consumers' favorite restaurants in major cities all over the archipelago. Replicate this all over Southeast Asia, and you have a booming food and beverage industry – cold storage will have to catch up by then."

Brazil

The Brazilian cold chain, primarily temperature-controlled warehouses, has been growing above the country's GDP for the last few years, despite a challenging economy.

Cold storage capacity is estimated close to 19 million cubic meters, divided nearly equally between private and public warehouses. There are approximately 180 to 200 cold storage warehouses owned by logistics operators in Brazil.

One of the main trends in the Brazilian cold chain is creating proficiency in product handling and distribution. Automation and artificial intelligence are expected to positively impact the Brazilian cold chain, with investment in improvements close to \$100 million a year.

"Companies have come to consider supply chain management and storage efficiency as basic and strategic principles for competitiveness and growth, and a sound business model," says Anselmo dos Santos Pires Filho, Technical Director, Civil-Frio. "Increasingly, logistics is outsourced in Brazil, and that adds to the likelihood of logistics operators and real estate investors constructing temperature-controlled buildings."

Pires Filho notes the growth of the frozen foods market in recent years, especially the development of new products in line with current consumer trends of people living alone and with less time or inclination to cook with fresh items. As a result, he says frozen food companies in the segment are more demanding.

In designing and building temperature-controlled warehouses, Pires Filho says he sees this reflected in cost control, quality of infrastructure to comply with regulations and legislation, environmental certifications for building and management, applying investments in new spaces and retrofitting existing buildings.

Pires Filho notes that his company develops buildings from a group of parts with pre-defined structural sections, which fit into modulations capable of responding to the most varied spans and load requests.

“Standardization of parts and assemblies through the design of intelligent construction systems results in reduced schedule, material quality, competitive cost and lower future maintenance,” Pires Filho explains. “This is due to the application of scheduled procedures, repetitive and constant production, high productivity and use of galvanized parts fire bolts connected by screws.”

He says in temperature-controlled storage, they reduce the need for height work by mounting floor-level structures, raised by a crane set, and with coupled refrigeration brackets for insulation and cooling.

“We optimize the use of applied refrigeration supports, which are used to perform structural functions in the building, such as locking the roof or fixing side closures, as well as supporting insulation and cooling,” Pires Filho says.

One very big change for Pires Filho’s company over the past couple of decades is that they now design flexible warehouses.

He says his company originally began operations with prefabricated dry warehouses in the 1990s, and moved to temperature-controlled warehouses in 2005. But with flexible warehouses, it is possible, without a high initial cost, to create an adaptable and adjustable space for a very specific use for refrigerated loads.

Looking to the future, Pires Filho predicts more sophisticated order picking and storage systems. He also believes autonomous vehicles capable of higher load handling will increase efficiency and productivity.

“By maximizing operations, there is a continuous search for solutions with a smaller and more functional structure for greater capacity, efficiency and control, and to reduce costs.”

Australia

“In Australia, there has been minimal investment in the cold storage market for decades, and now the country is seeing consolidation in the industry, fueled by capital from large equity funds. All this has led to a decline in cold storage construction.”

So says, Shannon Porter, CEO of Retracom. However, Porter is optimistic.

“The long-term outlook is positive. The need to build more energy efficient cold storage and the impact of changing sales points is going to drive the need for new and custom facilities,” Porter says.



A refrigerated warehouse for fish production and storage built by Civil-Frio in Rio De Janeiro. (Photo courtesy of Civil-Frio.)

He also points out as land and labor prices escalate, a reduced footprint and reduced labor needs are becoming paramount to a successful business model.

For those reasons, Porter says, “The most prevalent trends are around high-rise (high-bay) construction with greater automation.”

Although Porter says his company is predominantly responsible for the insulated panels on cold storage design/build projects in Australia, because of the move towards high-rise and automation, his company is more involved than ever before in the overall design.

He notes that the need for reduced energy consumption and greater quality control (more cold chain) are the driving factors in a new era in temperature-controlled storage design in Australia.

He points out the increasing speed of service requirements necessitate additional space on the loading dock.

“The retail market will drive the need for individual skew picking,” Porter says. “Current cold storage facilities have an emphasis on pallet movements with the local retailers responsible for display and single skew presentation.”

And, Porter says container volumes through distribution centers are increasing because of trends in import/export inventory transshipments.

“New facilities are designed to allow for fast throughput of inventory, racking and automation options to allow for flexibility with changing customer requirements, like skew picking and dispatch,” Porter notes.

Thinking of other trends that might lie ahead, Porter believes insurance and compliance will impact the cold storage construction industry.

“Insurance requirements and fire compliance will have a growing influence on what type of cold storage is designed and built if premium increases become a major financial hurdle,” Porter contends.

And, he adds, “As the ‘Amazon’ sales model takes hold the need for cold storage facilities to manage the retail single, skew pick and delivery will become increasingly prominent.”

Cold Storage Distributor Optimizes Rack to Continue Expansion

Rugged drive-in rack enhances longevity and access

To meet retailer demand for efficient cold chain distribution east of the Mississippi River, Manfredi Cold Storage has had to keep expanding its Kennett Square, Pennsylvania facility.

The distributor handles fruit, vegetables and food stuffs from 22 countries, at 0-55°F temperatures, in its facility that provides retailers with wireless, real-time inventory and access.

In order to keep their fast-paced growth on track, effective operation has required the use of exceptionally rugged drive-in rack, according to Rob Wharry, the facility's Director of Operations.

"About 150-200 truckloads of product move in and out of our storage everyday, about 25,000 pallets, so the drive-in rack needs to be very durable and accessible," says Wharry. "The product has to go out quickly and efficiently to stores, distribution centers, and the food service industry."



Drive-in rack holds up to 75% more pallets than selective racking, and Steel King's robust design is ideal for cold storage.

Enduring a Tough Environment

Drive-in rack enables storing up to 75% more pallets than selective rack and is ideal for high-traffic and cooler/freezer installations. With drive-in rack, forklifts drive directly into the rack to allow storage of two or more pallets deep.

But because forklifts drive directly into the rack, they tend to take more abuse than other rack structures. In cooler and freezer applications,

the rack must withstand some of the greatest forklift abuse in warehouse material handling due to the confined space, slick surfaces, and cold temperatures that slow driver reflexes and make impact more frequent.

"We're in and out of rack with heavy pallets and equipment so many times a day," says Wharry. "It's a fact of life that sometimes forklifts will run into the rack, so it just needs to be able to stand up to the daily use."

Looking to optimize the rack's durability and operation, the cold chain distributor turned to Steel King Industries, a storage system and pallet rack manufacturer.

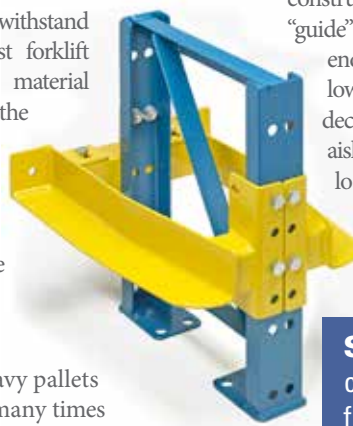
"We had used several different manufacturers previously, but have pretty much exclusively used Steel King for the last 13 years because they make a very rugged product that is specifically designed for our application," says Wharry.

In the most recent expansion, about 4,000 pallets of refrigerated storage capacity were added. For this, Manfredi Cold Storage chose SK3000® pallet rack, a rugged bolted rack with structural channel columns, by Steel King.

Compared to typical racking, the pallet rack constructed of hot-rolled structural channel column with full horizontal and diagonal bracing offers greater frame strength, durability and cross-sectional area. All Grade-5 hardware provides greater shear strength, and a heavy 7-gauge wrap-around connector plate ensures

a square and plumb installation with a tighter connection and greater moment resistance.

For ease-of-use and safety, the drive-in load rail construction includes: structural angle rails that "guide" pallets for ease of use; flared rail entry ends to allow easy bay access; space-saver low profile arms that increase clearance and decrease possible product damage; welded aisle-side load arms that eliminate hazardous load projections into aisles; welded rail stops that prevent loads from being pushed off and increase safety; and 2" vertical adjustability of the bolted rack, which



SK3000 hot-rolled structural channel column provides greater frame strength and durability.

allows for a variety of configurations for current or future products.

"The heavy rub rail inside the rack helps to guide the pallets in," says Wharry. "The flared rail entry makes it easier to put pallets in and to take them out of the upper positions."

For extra protection against forklift impact, a double column, welded angle column protector was added on the front of the rack.

"Our operation is a different because we're dealing with lots of different sized products," says Wharry. "Everything is specific to our application: rack height, width, pallet loads, and how we utilize it."

"Other companies can build to order, but Steel King is more willing to work with us to design a system that gives us exactly what we need," says Wharry.

With continuing growth expected, however, the distributor is already planning to start the construction of a brand new cold storage facility in southern New Jersey.



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FISHER WINS CEBA BUILT BY THE BEST AWARD FOR LOW-OXYGEN HIGH-BAY FREEZER

Project management key in joint design effort with NewCold.

The recently completed NewCold Tacoma in Tacoma, Washington, is NewCold's first cold storage facility in the United States, and only the second low-oxygen, high-bay freezer in the country. The state-of-the-art freezer is a joint design effort by Netherlands-based NewCold and the design/build firm Fisher Construction Group of Burlington, Washington. Fisher was the general contractor for the project.

While the facility is one of the largest in the United States, it is attracting a great deal of attention (see "Innovation and Automation Address Key Challenges in Cold Storage," Cold Facts, November-December 2018) for the cutting-edge automation deployed throughout the facility in combination with intricate, vertical design processes housed within a fireproof, low-oxygen environment.

The building, which opened for business in Spring 2018, provides high-volume, high-capacity throughput while being situated on a fraction of the footprint that a traditional frozen food warehouse requires. The 157,000-square-foot high-bay reduces the footprint of a traditional warehouse by nearly 75 percent for warehouse space alone.

For the many complexities and innovations of the build, as well as the level of project management required, Fisher Construction Group was named the winner of the 2018 Controlled Environment Building Association's Built by the Best Award for its project with NewCold. The award was presented on November 8, 2018, during a general session at the 38th CEBA Conference & Expo.

Project Management

Planning and managing a project with a first-time customer in itself is a significant challenge. Planning and managing a project for a foreign customer's first entrance into the U.S. market multiplies this challenge.

"Working with a European customer new

to the U.S. market, dealing with an eight to nine hour time difference, with multiple trips to Europe to coordinate design, was a new and challenging experience," recalls Josh Currie, who was Fisher's Senior Project Manager on the build. "And all that is compounded when the collective project team originate from seven different countries, seven different cultures, and speak six different languages."

To bring about the success of the project, a high degree of organization, cooperation, and communication, far exceeding that for a typical warehouse project in the United States, was needed.

Through multiple meetings in the Netherlands, at the corporate office of NewCold, and at several of their western European facilities, Fisher's design and construction team was able to fast-track the understanding of NewCold's needs and expectations, as well as overcome some of the initial language and cultural differences.

Currie says the Fisher team actively listened to the customer and not only heard, but understood the conversations. "The ability to observe operational conditions in European facilities, nearly identical to the one being designed in the United States, was instrumental in understanding NewCold's needs and expectations."

The Fisher team acclimated itself to New-

Cold's high-bay building program by learning and understanding NewCold's culture and language nuances. This helped the Fisher team to properly transform NewCold's program into a compliant U.S. and E.U. design. "The client is used to doing things a certain way in Europe, which might not work the same way in the States," Currie points out. "For instance there are notable differences in some key terminology, differences with team structuring as well as unique approaches to how work is subcontracted."

According to Currie, these meetings and site visits allowed for real time platforms to better define the execution plan and strategy for the design and construction of this unique facility.

Along with learning and understanding NewCold's culture, needs, and desires, the team transferred their knowledge of the U.S. cold storage market to NewCold. This started with seemingly simple things – such as converting the Metric to the Imperial System of Measurement – but also encompassed nuances other than simple mathematical conversions or the phrase difference when speaking and converting to a second language.

For instance, Currie notes that labor was a stumbling block. "There are discrepancies in how labor is priced in the United States versus Europe. Initially, that created a situation where the customer was not 100 percent confident until the issue was thoroughly vetted and differences clarified."

"We had European subcontractors onsite and so there were the hurdles of dealing with visas necessary for their labor force as well as transportation and Customs challenges shipping materials from overseas," Currie adds.

"It might seem like a small thing, but with so many workers and subs on such a small site, managing onsite staging and access to certain areas, and creating onsite parking for 350 people, was daunting to say the least."

Beyond the obvious items were other challenges such as design software compatibility, file sharing, web/tele conferences, and multi-company personnel reviews.

The execution plan included but was not limited to the following:

- Set-up and management of real-time file sharing platforms and platforms that were tailored to allow for multiple levels of permissions and access, as well as being intuitive to use.
- Set-up of management calls, design review web conferences, in-person design review



Fisher Construction Group was named the winner of the 2018 CEBA Built by the Best Award competition for NewCold Tacoma, a joint design effort with NewCold Advanced Cold Logistics. The award was given at the 38th CEBA Conference & Expo. L to R: Corey Rosenbusch (CEBA-GC-CA), Josh Currie (Fisher), Jonas Swarttouw (NewCold), and CEBA Chairman Tim Nguyen.



The NewCold Tacoma state-of-the-art freezer is a joint design effort by Netherlands-based NewCold Advanced Cold Logistics and the design/build firm Fisher Construction Group of Burlington, Washington. It is one of the largest cold storage facilities in the United States, with Phase 1 containing approximately 25 million cubic feet of storage capacity an 103,000 pallet positions. ((Photo courtesy of NewCold.)



The 120,000-square-foot frozen two-story dock ensures receipt of product to storage as well as picking of product to outbound loading each takes under 20 minutes. (Photo courtesy of Fisher Construction Group.)



Uninterrupted pallet racking with unobstructed areas within can reach 135 feet. (Photo courtesy of Fisher Construction Group.)



A section of the 1.5 miles of conveyors contained within NewCold Tacoma. (Photo courtesy of Fisher Construction Group.)

meetings, and specific issue resolution sessions in a manner that included redundancy and back-up.

- Set-up and management of electronic design coordination such as BIM/Clash Detection software. What is commonly accepted and used by most of today's U.S. contractors and design firms was extremely challenging when European design companies do not use REVIT/Navisworks compatible software.
- Definition and establishment of communication protocols that considered the workdays in substantially different time zones while maximizing the exchange of information and minimizing wait times for critical responses.

Collaboration and Communication Key

NewCold Tacoma, unlike traditional warehouses, required designs from four separate structural engineering firms, plus a European consulting engineer. The slab engineer was with a U.S. based company but the parent company was in Europe. The rack engineer came from Germany. The decking and paneling engineer and the mud slab designer were American.

Project Profile, NewCold Tacoma

Project Elements:

- 10,000 Tons Steel
- 25,000 Cubic Yards of Concrete
- 8,000,000 Bolts
- 8 Cranes and 3 Shuttles
- 1.5 miles of conveyors
- Remove and add 30,000 cubic yards of recycled and reused concrete material
- 98 percent of material/construction waste recycled

Building Specs:

- 30 acre site
- 310,000 square feet including 120,000-square-foot frozen two story dock and pick area
- 140 feet tall
- 25,500,500 cubic feet of storage
- 103,000 pallet positions
- 30,000 square feet of Class A offices for NewCold and Trident Seafoods

Innovative Features:

- Soil anchors provide tension within the brace zones to withstand seismic events as well as strong winds.
- Referred to as a "dark" high-bay, it operates within a strictly controlled system where oxygen is reduced to 16.5 percent saturation through a nitrogen exchange process eliminating the possibility of fire.
- Rack supported construction in the low-oxygen, high-bay makes it possible to build 12 stories high – uninterrupted pallet racking can reach 135 feet – with unobstructed areas within, and free of traditional building supports.
- 25,000,000 cubic feet of high-bay and low-bay is kept at -5°F with an evaporator capacity of only 450TR. Also utilizes air cooled condensing requiring less electrical consumption and no water.
- The building operates on half the energy consumed by conventional storage.
- Proprietary WMS directs all automated and manual flows in the warehouse providing complete traceability and trackability and significant reduction in shrinkage
- Fully-automated robot-driven stacker cranes and shuttle cars convey product inbound and outbound.
- The shell is a Zero Energy Loss Envelope and extensive vapor/thermal barriers, specialty movement details addressing thermal structure, airlocks for all pass-through openings, and double interlock fast-acting airlock doors for all conveyor pass-throughs support the thermal envelope integrity.
- The efficiency of high-bay product storage is nearly double that of a traditional frozen warehouse – high-bay has a footprint of 157,000 square feet and houses 103,000 pallet positions; receipt of product to storage as well as picking of product to outbound loading each takes under 20 minutes.

“Many of the subcontractors were not used to European codes and design standards,” Currie says. “The management, coordination, and collaboration required of this project were imperative to its success. This required more frequent and more in-depth design review sessions to assure all elements were understood and accounted for in the design.”

One of the elements that was considered early in the planning process was the fire protection system. “The choice of a low oxygen system to prevent fires from starting or propagating is not a new strategy for NewCold, but does require planning in the design stages of the facility,” says Frank Siedler, president of Wagner Fire Safety.

Early communication with local agencies was critical for approval of the fire protection system because there are no U.S. standards or codes that apply to the use of a low oxygen system, Siedler says. Meetings with local authorities to explain and demonstrate that the system provides equal or better fire

protection were successful and approvals were obtained in a matter of months.

Currie says meshing everything into one efficient, cohesive package was a very interesting element of the build. “It was very collaborative and at times frustrating. Despite all the pre-work that went into the build, at the end of the day we still had challenges we couldn’t avoid.”

“It took awhile for people to understand certain terminology and means and methods that might be different, and that was a two-way street, but eventually we became harmonized,” Currie concludes. “Now that we’re finishing up a second project with NewCold, we still have interpretation impediments that occasionally pop up, but like any good relationship, communication is key. You have to listen and make sure you understand and vice versa. That was the biggest learning curve on the whole NewCold Tacoma project, but when I look back at where we were three years ago, the progress is dramatic.”

Safety First

“Safety is the most important aspect of any project,” Currie acknowledges, “but on a project of this size, which at its peak had over 350 people on a very small site, including foreign employees, temp labor, and direct contractors to the owner, it was a huge feat and safety challenges presented themselves daily. Safety management alone was beyond a full-time job.”

Currie says Fisher rose to the challenge beginning with a risk analysis that proactively identified, assessed, prioritized and managed risk from pre-construction through final completion and “first pallet in.” “This was essential to reducing exposure to the typical pitfalls of a construction project, and encompassed construction considerations ranging from seasonal weather issues, highly specific site area logistics, and transcontinental material shipments using just-in-time deliveries.

Fisher implemented more than 1,000 safety orientations for all on-site employees, regular preconstruction meetings, daily huddles, pre-lift and pre-task planning, weekly safety meetings for all hands, and mandatory stand-downs to assess near-miss accidents. Currie added that Fisher required OSHA 10 certifications for all personnel on-site and employed a full-time safety officer to monitor for all high-risk elements for the high-bay structure erection.

Fisher also reached out pro-actively to consult with WISHA (Washington Industrial Safety and Health Act) in Washington State before the build began and brought local emergency services to the site to orient them.

Currie says he’s happy to report that, “Fisher completed this project with zero WISHA violations or citations, and only one recordable injury.”

A Final Reflection

Currie notes that while a smart contractor goes into a project with protocols clearly planned and in place, the circumstances of the NewCold Tacoma project required the ability to adjust, adapt, and conform to ever-changing processes and protocols to best improve and maximize efficiencies throughout the course of the programming, design, and construction.

“The ability to be flexible and receptive to suggestions of the collective team proved as important, if not more important, than the ability to write a good subcontractor scope of work or put together a strong and meaningful schedule. This project required managing and adapting concurrently for project success,” Currie concludes.



The reception area is part of 30,000 square feet of Class A offices for NewCold and Trident Seafoods. (Photo courtesy of Fisher Construction Group.)



The 157,000-square-foot high-bay footprint reduces the footprint of a traditional cold storage warehouse by nearly 75 percent. (Photo courtesy of Fisher Construction Group.)

Award-Winning Supplier Profiles

A number of suppliers were integral to the success of the winning project. Among them is SubZero Constructors, which specializes in providing refrigeration/thermal design and construction services on a nationwide basis for the low-temp and food processing industry.

Vince Free, Vice President-Thermal with SubZero Constructors had this to say about being part of the award-winning project. "I love the CEBA Built by the Best award because it highlights the most challenging projects every year and provides an educational opportunity that otherwise wouldn't exist for our association and industry. The scoring includes a point system that rewards utilizing subcontractors and suppliers that are CEBA members. This incentive ultimately provides the end user of the project a more complete and professional industry expert team. A CEBA team! I look forward to future CEBA Built by the Best presentations and I am grateful to be on the team for the 2018 award winning project."

ALL WEATHER INSULATED PANELS

With over 90 years of combined industry experience, All Weather Insulated Panels is an innovator in the design, construction and advancement of insulated metal panels to meet the growing challenges facing the building industry. Contact Kim Harrell at kharrell@awipanel.com or 707-359-2280. www.awipanel.com.

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Enviro Cold Storage Doors manufactures a complete line of insulated, steel reinforced fiberglass, galvanized and stainless steel door systems, including manual or power-operated doors for all uses. Applications include: horizontal (bi-parting and single slide), swinging, vertical rise and high-speed roll-up doors, along with the fully insulated, two-way impactable hard panel sliding horizontal door. The air door products allow you to travel in and out of freezers without the constant opening and closing of a door. Its unique system keeps the warm side warm and the cold side cold with no fog, ice, or condensation. Nationwide sales and service available. Contact Chuck Zimmermann at czimmermann@asidoors.com or 414-464-6200. www.asidoors.com.

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Located in Concord, California, Ricker Thermline, Inc., is a leader in the construction of turn-key low-temperature facilities. We draw from 40 years of experience to



SubZero Refrigeration Superintendent talking with his team about rigging mechanical equipment at the 120-foot elevation. (Photo courtesy of SubZero Constructors.)

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SubZero specializes in providing refrigeration/thermal design and construction services on a nationwide basis for the low-temp and food processing industry. Contact Dean G. Soll at dsoll@szero.com or 949-458-9878. www.szero.com.

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Twintec USA designs and builds steel fiber reinforced and engineered industrial jointfree floors. Our jointfree FREEPLAN engineered floors do not have saw cut joints, effectively minimizing if not completely suppressing maintenance and repair costs, while increasing the productivity in your cold storage. Being a highly specialized sub-contractor, Twintec USA offers world-class design build services to a variety of clients in North America within the cold storage, distribution and heavy manufacturing industries. The track record of their parent company, the Twintec Group, is strong of 500 million

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COMPANY RESOURCE GUIDE

CONTROLLED ENVIRONMENT BUILDING RESOURCE GUIDE

The 2019 Controlled Environment Building Resource Guide includes companies that are members of the Controlled Environment Building Association (CEBA), a Core Partner of the Global Cold Chain Alliance (GCCA).

If your company is looking to build, renovate or modernize a facility, start by using the most experienced designers, contractors, manufacturers and suppliers in the industry. Listings with a ❖ denotes a company that is exhibiting at the 39th CEBA Conference & Expo taking place November 14-16, 2019 in Miami, Florida.

1Cold Ltd.

Solihull, United Kingdom
<http://1cold.com>

A M King

Charlotte, NC United States
<http://www.amkinggroup.com>

Aaron Bradley Dock Equipment (ABC Docks)

Franklin, TN United States
<http://www.aaronbradley.com/>

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Gurgaon (Haryana), India
<http://www.acmetelepower.com>

Ahern Fire Protection

a division of J. F. Ahern Co.
Fond du Lac, WI United States
<http://www.ahernfire.com>

AIR Consulting Global Ltd

Northern Ireland, United Kingdom
<http://www.airconsulting.eu.com/>

Aislamientos Constructivos, S.A. de C.V.

Monterrey, Nuevo Leon, Mexico
<http://www.grupoaislacon.com.mx>

❖Albany Entrematic

Lawrenceville, GA United States
<http://www.albanydoors.us>

❖All Weather Insulated Panels

Vacaville, CA United States
<http://www.awipanel.com>

Alliance Development Corp

Elkhorn, WI United States
<https://www.alliancedevelopment.biz>

Alliance Industrial Refrigeration Services, Inc.

Walnut, CA United States
<http://www.therefrigerationalliance.com>

Allied Steel Buildings

Fort Lauderdale, FL United States
<http://AlliedBuildings.com>

Alston Construction

Atlanta, GA United States
<http://www.alstonco.com>

ALTA Refrigeration, Inc.

Peachtree City, GA United States
<http://www.cold4u.com>

Amana Contracting & Steel Buildings Co. LLC

Dubai, United Arab Emirates
<http://amanainvestments.com/>

American Igloo Builders

Libertyville, IL United States
<http://www.americanigloobuilders.com>

American Thermal System, Inc.

Conroe, TX United States
<http://www.ats-construction.com>

Anis Ahmed & Brothers

Karachi, Pakistan
<http://www.aabros.com.pk>

APC Polycoat

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<http://www.polycoatusa.com>

Apex Refrigeration & Boiler Co.

Phoenix, AZ United States
<http://www.apexrefrig.com>

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<http://www.arcodb.com>

Arctic Insulation, Inc.

Omaha, NE United States
<http://www.arcticii.com>

Arctica Ltd

Stamford, United Kingdom
<http://www.arctica.co.uk>

ASAP Consulting Group, SAC

Lima, Peru
<http://www.asap-peru.com>

ATI Architects & Engineers

Costa Mesa, CA United States
<https://www.atiae.com>

AutoMak Assembly, Inc.

Crown Point, IN United States
<http://www.cladboyusa.com>

Azane Incorporated

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<http://www.azane-inc.com>

Baltimore Aircoil Company

Jessup, MD United States
<http://www.baltimoreaircoil.com>

Bayer Material Science Pvt. Ltd.

Greater Noida, India
<http://www.bay-systems.com>

B-Built

Bergen op Zoom, Netherlands
<http://www.b-built.com>

Beca Pty Ltd.

Melbourne, Victoria Australia
<http://www.becca.com>

Bentall Kennedy (U.S.) Limited Partnership

Boston, MA United States
<http://bentallkenedy.com>

Bethlehem Construction

Cashmere, WA United States
<http://www.bethlehemconstruction.com>

Big-D Construction Corporation

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<http://www.big-d.com>

BITZER U.S., Inc.

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<http://www.bitzerus.com>

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<http://boszarch.com>

British Frozen Food Federation

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<http://www.bfff.co.uk>

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<http://www.brucha.com>

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Norfolk, United Kingdom
<https://www.bultonconstruction.co.uk>

Burch Corporation

Birmingham, AL United States
<http://www.burchcorp.com>

Campanelli Construction

Braintree, MA United States
<http://www.campanelli.com>

Carnot Refrigeration

Trois-Rivieres, QB Canada
<http://www.carnotrefrigeration.com>

CB27 Engineering Co., Ltd

Ho Chi Minh City, Vietnam
<http://www.cb27.com.vn>

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<http://www.coldclad.com>

Cold Storage Construction Services Inc.
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Cold Storage Manufacturing, Inc.
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<http://www.coldstoragemfg.com>

Cold Store Group of Saudi Arabia
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<http://www.cgs.com.sa>

Cold Summit Development
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<https://www.coldsummit.com>

Coldbox Builders Inc.
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<http://www.coldboxbuilders.ca>

Coldman Logistics Private Limited
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<http://www.coldman.in>

Coldroom Systems, Inc.
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❖ **Colmac Coil Manufacturing Inc.**
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<http://www.colmaccoil.com>

Consolidated Construction Co., Inc.
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<http://www.consolidated-const.com>

Controlled Environment Structures Inc.
Mansfield, MA United States
<http://www.cesweb.com>

Couch Perry & Wilkes LLP
Birmingham, United Kingdom
<http://www.cpw.com>

CSI of Virginia, Inc.
North Chesterfield, VA United States
<http://www.csiinc.org>

CT-Technologies ApS
Vedbaek, Denmark
<http://www.ct-technologies.dk>

Cushman & Wakefield of GA, Inc.
Atlanta, GA United States
<http://www.cushwake.com>

Davis International, Inc.
Youngstown, OH United States

Delta T Construction Company Inc.
Menomonee Falls, WI United States
<http://www.deltatconstruction.com>

Denovo
West Des Moines, IA United States
<http://www.Netzeroalliance.com>

Development Solutions, Inc.
Oak Brook, IL United States
<http://www.dsi-group.com>

Dinpro S.A.S. – Direccion Integral de Proyectos S.A.S.
Medellin, Antioquia, Colombia
<http://www.dinpro.com.co>

Dow Building Solutions
Midland, MI United States
<http://www.dowbuildingsolutions.com>

DualTemp-Clauger
Chicago, IL United States
<http://www.dualtempcompanies.com>

Dupont
New Delhi, India
http://www2.dupont.com/India_Country_Site/en_IN

Dynaco Entrematic
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<http://www.dynacodoor.us>

EDGEWOOD ELECTRIC, INC.
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Excel Engineering, Inc.
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<https://www.excelengineer.com>

Fastener Systems, Inc.
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<http://www.fastenersystems.com>

Fibertite Roofing Systems by Seaman Corporation
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<http://www.fibertite.com>

Fisher Construction Group
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<http://fishercgi.com>

FK Construction Limited
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<http://www.fkgroup.co.uk>

Foam Supplies Inc.
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<http://www.foamsupplies.com>

Frank Door Company
Newport, NC United States
<https://frankdoor.com>

FREEZ Construction
Trabuco Canyon, CA United States
<http://www.freezconstruction.com>

Frica Construcciones S A de C V
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<http://www.frica.com.mx>

Fricks Company, The
Fort Worth, TX United States
<http://www.thefrickscompany.com>

Frigo Stahl SA
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<http://www.frigostahl.gr>

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<http://www.gplconstruction.co.uk>

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<http://www.graycor.com>

❖ **Green Span Profiles**
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Groom Energy Solutions
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<http://www.groomenergy.com>

Group4 Reps
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Gubba Cold Storage Limited
Secunderabad, India
<http://www.gubbagroup.com>

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<http://www.hadavie.co.uk>

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<http://www.hansencold.com>

Hansen-Rice, Inc.
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<http://www.hansen-rice.com>

HB Products A/S
Hasselager, Danmark, Denmark
<http://www.hbproducts.dk>

HBCL Coldstores Ltd
West Yorkshire, United Kingdom
<http://www.hbclcoldstoresltd.co.uk>

Heatcraft Refrigeration Products Div.
Stone Mountain, GA United States
<http://www.heatcraftprd.com>

Hemsec Panel Technologies
Merseyside, United Kingdom
<http://www.hemsec.com>

Heritage Hygienic Environments Ltd
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<http://www.heritagehe.com>

HighJump
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<http://www.highjump.com>

HIL Installations Ltd
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<http://www.hil-installations.com>

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<http://www.hillphoenix.com>

Holden Installations Ltd.

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<http://www.icpadhesives.com>

Impelpro SCM Solutions Pvt. Ltd

Thane, Maharashtra, India
<http://www.impelpro.in>

Industrial Cork Co, Inc.

Elmhurst, IL United States
<http://www.corco.org>

INFRISA MEXICO SAPI DE CV

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<http://www.infrisa.com>

Innovafoods, S.A.

Guatemala, Guatemala

Innovative Refrigeration Systems, Inc.

Lyndhurst, VA United States
<http://www.R717.net>

ISD Solutions

Gloucester Gloucestershire,
United Kingdom
<http://www.isd-solutions.co.uk>

ISOPAN SPA

Verona, VR Italy
<https://www.isopan.com>

IXL Co., Ltd

Bangkok 10250, Thailand
<http://www.ixl.co.th>

❖ **Jamison Door Company**

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JAX Refrigeration

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<http://www.jaxrefrigeration.com>

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Sittard, LI Netherlands
<http://www.linkedin.com/in/geert-jan-laudy>

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<http://www.liftmaster.com>

**Lisa Line Life Science Technologies
Pvt., Ltd.**

Mumbai, India
<http://www.lisalineasia.com>

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<http://www.logix-controls.com>

LTI Contracting

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<http://www.lticontracting.com>

LTW Intralogistics, Inc.

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<http://www.LTWUSA.com>

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<http://www.svarn.com>

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<http://www.magil.com>

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<http://www.metzgermcguire.com>

Midwest Materials Company

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<http://www.midwestmaterials.com>

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New York, NY United States
<http://www.mizuhobank.com>

Mollenberg-Betz, Inc.

Buffalo, NY United States
<http://www.mollenbergbetz.com>

MT Cold Storage Solutions Ltd

Worcestershire, United Kingdom
<https://mtcss.co.uk>

National Design Build Services

Saint Peters, MO United States
<http://www.nationaldbs.com>

ndustrial.io

Raleigh, NC United States
<http://www.ndustrial.io>

❖ **NORDOCK Inc.**

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<http://www.nordockinc.com>

North American Roofing

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<http://www.narof roofing.com>

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Los Angeles, CA United States
<http://nxtcold.com>

O'Connor Construction Group

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<http://www.ocgbuild.com>

Oomiak Pty Ltd.

Dudley Park, South Australia Australia
<http://www.oomiak.com.au>

Owens Corning Foamular

Toledo, OH United States
<http://www.owenscorning.com>

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Group Alliance)**

Medelin, Antioquia, Colombia
<http://www.conconcreto.com>

PED Consultants Ltd

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Performance Contracting Inc.

Lakeland, FL United States
<http://www.pcg.com>

Premseal

Scunthorpe, United Kingdom
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Primus Builders, Inc.

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<http://www.primusblders.com>

Proform Thermal Systems, Inc.

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Quest/Therma-stor

Madison, WI United States
<http://www.thermastor.com>

R.A.Sneddon Ltd

Coatbridge, Scotland
<http://www.rasneddon.com>

Radhakrishna Foodland Pvt. Ltd.

Thane, Maharashtra India
<http://www.rkfoodland.com>

RANINA

Delhi, India

❖ **The Raymond Corporation**

Greene, NY United States
<http://www.raymondcorp.com>

RC&E, Inc.
Fort Worth, TX United States
<http://rce-nh3.com>

R-cold, Inc.
Perris, CA United States
<http://www.r-cold.com>

Refrigeracion Linca SA de CV
Mexico, Mexico
<http://www.refrigeracionlinca.com>

Reindycom
Leon, Guanajuato Mexico
<http://www.rcr.com.mx>

❖ **Republic Refrigeration, Inc.**
Monroe, NC United States
<http://www.republicrefrigeration.com>

❖ **RHH Foam Systems Inc.**
New Berlin, WI United States
<http://www.rhhfoamsystems.com>

Rice Building Systems, Inc.
Sauk Rapids, MN United States
<http://www.ricebuildingsystems.com>

Ricker Thermline
Martinez, CA United States
<http://www.rickerthermline.com>

RINAC India Limited
Bangalore, India
<http://www.rinac.com>

Rite-Hite Corporation
Milwaukee, WI United States
<http://www.ritehitedoors.com>

Roadware Inc.
South St Paul, MN United States
<http://www.roadware.us>

RollSeal, Inc.
Bremen, AL United States
<http://www.rollseal.net>

RPS Group Plc
Nottinghamshire, United Kingdom
<http://www.rpsgroup.com>

Ryan Companies US, Inc.
Minneapolis, MN United States
<http://www.ryancompanies.com>

❖ **Rytec High Performance Doors**
Jackson, WI United States
<http://www.rytecddoors.com>

S & S Refrigeration Company
Jersey City, NJ United States
<http://www.ssrefrig.com>

Senneca Holdings
Cincinnati, OH United States
<http://www.senneca.com>

Senneca Holdings
Cincinnati, OH United States
<http://www.senneca.com>

Shadco Column Bearing Blocks
Home, PA United States
<http://www.shadco.com>

Sistemas de Refrigeracion Totales SA de CV
Estado de Mexico, México Mexico
<http://www.equipostrtmexico.com>

SNL Enterprises USA, Inc.
Prospect, KY United States
<http://www.snlenterprises.net>

Southern Thermal Solutions Inc.
Mt. Crawford, VA United States

Sprinkmann Sons Corporation
Milwaukee, WI United States
<http://www.sprinkmannsonscorp.com>

SSOE Group De Mexico S De RI De Cv
León, Gto. C.P., Mexico
<http://www.ssoe.com>

Stancold plc
Bristol, United Kingdom
<http://www.stancold.co.uk>

Stanker & Galetto Inc.
Vineland, NJ United States
<http://www.stankergaletto.com>

Steine Cold Storage, Inc.
Plymouth, MN United States
<http://www.steinecoldstorage.com>

Stellar
Jacksonville, FL United States
<http://www.stellar.net>

Storax Racking Systems
Bromsgrove, United Kingdom
<http://www.storaxsystems.com>

SubZero Constructors, Inc.
Rancho Santa Margarita, CA United States
<http://www.szzero.com>

Sun Commercial Roofs
Dallas, TX United States
<http://www.suncorooofs.com>

Swisslog
Newport News, VA United States
<http://www.swisslog.com>

Team Group, Ltd.
Eules, TX United States
<http://www.teamgrp.com>

Technocool Engineering
Tashkent, Uzbekistan
<http://www.technocool.kz>

Termosoluciones, S.A.
Guatemala City, Guatemala
<http://www.termosoluciones.com>

Thermal Construction Specialists
Blaine, MN United States
<http://www.tscold.com>

Thermal Technologies, Inc.
Blythewood, SC United States
<http://www.thermaltechnologies.com>

❖ **Thermomass**
Boone, IA United States
<http://www.thermomass.com>

Tippmann Construction
Fort Wayne, IN United States
<http://www.tippmanngroup.com>

❖ **Tippmann Innovation**
Fort Wayne, IN United States
<http://www.ticold.com>

Tracy Cold Storage Construction, Inc.
Middle Village, NY United States
<http://www.tracycoldstorage.com>

Translift Bendi Limited
Redditch, Worcestershire, United Kingdom
<http://www.bendi.co.uk>

Trinity Insulation Company
Garland, TX United States
<http://www.trinityinsulationllc.com>

❖ **TrueCore**
Laurens, SC United States
<http://www.truecorepanels.com>

Trundley Design Services Limited
Norfolk, United Kingdom
<http://www.trundley.com>

Twintec Industrial Flooring
Rugby, Warwickshire, United Kingdom
<http://www.twintec.co.uk>

Twintec USA
Cornelius, NC United States
<http://www.twintecusa.com>

United Insulated Structures Corp.
Berkeley, IL United States
<http://www.unitedinsulated.com>

Unitherm, Inc.
Charlotte, NC United States
<http://www.unitherm1.com>

V. Paulius & Associates
Allendale, NJ United States
<http://www.vpa.com>

❖ **Vapor Armour**
Clackamas, OR United States
<http://www.vaporarmour.com>

Victaulic
Easton, PA United States
<http://www.victaulic.com>

❖ **Viking Cold Solutions**
Houston, TX United States
<http://www.vikingcold.com>

The Viking Corporation
Hastings, MI United States
<http://www.vikinggroupinc.com>

❖ **Wagner Group GmbH**
Langenhagen, Germany
<http://www.wagner.eu>

Walter Fedy
Kitchener, ON Canada
<http://www.walterfedy.com>

❖ **Weiland Doors**
Norfolk, NE United States
<http://www.weilanddoors.com>

The Whiting-Turner Contracting Company
Baltimore, MD United States
<http://www.whiting-turner.com>

❖ **Wiginton Fire Systems**
Sanford, FL United States
<http://www.wiginton.net>

Xlt-Cor, Inc.
Scottsdale, AZ United States

Zeppelin Mobile Systems India Ltd
Noida-201305, U.P., India
<http://www.zeppelinindia.com>

Zero Zone, Inc.
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The logo for Jamison Door, featuring the word "JAMISON" in a bold, white, sans-serif font on a dark blue background, followed by "DOOR" in a white, sans-serif font inside a white rectangular box with a slight shadow, all on a dark blue background.

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