



Carrier

A United Technologies Company

Energy is precious
Efficient solutions
at every level

e*cube

energy · efficiency · ecology

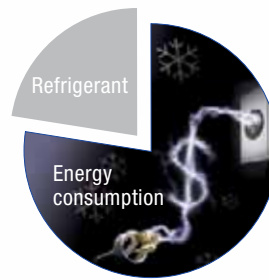


e*cube is the „energy, efficiency, ecology“ enhancement measures for all our goods and services: display cases, refrigeration systems, and after-sales.

e*cube is the most effective way to reduce both your costs and the environmental impact of refrigeration. Now discover why!

The right way to save and to care for the environment

The **energy consumption** is the element of refrigeration that has the **biggest impact on the environment**. The two pie charts demonstrate where savings must be made.



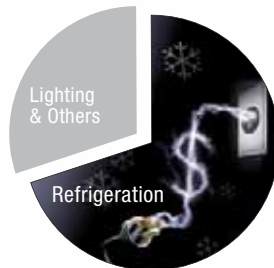
TEWI share in Food Retail Stores

60% - 100% of the TEWI (Total Equivalent Warming Impact) of a refrigeration system is caused by energy consumption*

Energy costs in a supermarket

On average, 65% of the energy consumption is attributable to refrigeration.

Source: Energie-Agentur NRW, Wuppertal [Nordrhein-Westfalen Energy Agency]

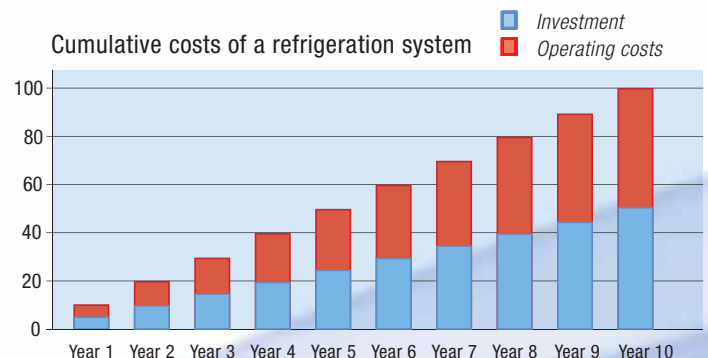


By far the **single biggest energy consumer** in a supermarket is the **refrigeration system**.

The operating costs account for a significant portion of the life cycle costs.

Lifecycle costs of a refrigeration system**

40% - 50% investment (equipment & installation)
50% - 60% operating costs (energy & service)



Significant reduction of the CO₂ footprint

The best way to minimise the effects of refrigeration on the environment is to save energy.

Very specific criteria dictate the complexity of refrigeration systems.

We consider **three steps** in implementing a complete system so as to **achieve the best performance** with the **lowest energy consumption**:

1. Parameters and components

are selected in such a way that no more energy is consumed than is needed.

2. Installation and commissioning

demand utmost precision to guarantee optimal operation per the design requirements.

3. Continuous service

keeps performance and energy consumption at the optimum level over the entire life cycle.

with three pillars:

energy	energy saving – over the entire life cycle
efficiency	sustained performance – in temperature, food quality & energy efficiency
ecology	significant carbon footprint reduction – for the entire refrigeration system

We can significantly reduce the operating costs of your refrigeration system – in 3 steps

We put together the critical pieces of the puzzle:

- Selection of the display cases
- Design of an optimal system solution
- Life cycle performance through service

Design

We engineer optimized refrigeration systems for efficient display cases

Based on your requirements we define the optimal system for your application. Store layout and ambient conditions set the frame: we offer environmentally sound and energy-optimised solutions. Combining Linde know-how with the strength of Carrier R&D investments in advanced technology & modeling, we are well equipped to design very efficient refrigeration systems.

Our extensive portfolio of components helps us reach your energy saving objectives and stay within budget at the same time.

Deliver

We deliver turnkey solutions all over Europe

Because we design and manufacture our solutions, our experts have an in-depth understanding of our systems and components. Right from the installation they set the parameters that are critical to the efficient operation of the system.

We have the largest distribution network in Europe in commercial refrigeration. Our experienced organisation can help customers implement a large number of market modernisations across Europe in a short timeframe – based on their specific requirements. This is because project management is one of our core competencies. And an important reason why our customers choose us as a turnkey solutions partner.



Sustain

We service your stores for sustainable performance – day after day

Because operating costs represent a significant proportion of refrigeration costs, it is crucial to keep key operating parameters in their optimal range.

As systems designer and manufacturer, we understand how to maintain our systems at the best operating conditions. The fact that we manage the installation and commissioning sets the foundation for optimum operation.

Our cross-European remote monitoring capability – 24 hours a day and 365 days a year – allows us to check and improve operating performance of the stores, preventing and addressing drifts in temperatures and energy consumption. We provide value-added services to benchmark and improve store refrigeration efficiency.

Our trained service technicians attend to your needs to keep new stores running at optimal efficiency, and we offer solutions to improve the performance of existing stores.

Our response to developments in the food retailing business: E5 e*cube

To tackle the challenges of reducing operating costs and environmental impact, the Linde „Evolution5“ (E5) range of chilled and frozen food cases has been enhanced to become E5 e*cube.

We provide intelligent solutions that take into account the challenges in the food retail industry: spiralling energy prices, increasing energy consumption through longer store opening hours and constant expansion of the range of goods to be refrigerated, with more lighting. e*cube cases save energy and electricity. An additional benefit is their lower refrigeration load allowing for smaller sizing of the refrigeration system.

The future E5 e*cube cases will be available in new configurations. These comprehensive packages include effective energy-saving components such as electronic fans, electronic ballast, glass lids or glass doors, partial glass lids, anti-condensation glass doors,

sequential air curtains or front glazing. Variations with additional energy-saving features such as LED lighting, night blinds etc., can be delivered as factory mounted options

Three key benefits of the E5 e*cube range

1. Components are factory tested and optimised for every display case.
2. The energy-saving components are fitted in the factory; no additional design and installation work required
3. Reduced refrigeration load, higher evaporation temperature and lower electrical consumption of the cases are taken into account right from the system design stage for compressor racks, heat exchangers, pipe work, electrical cubicles and controls.

Food Retail Requirements

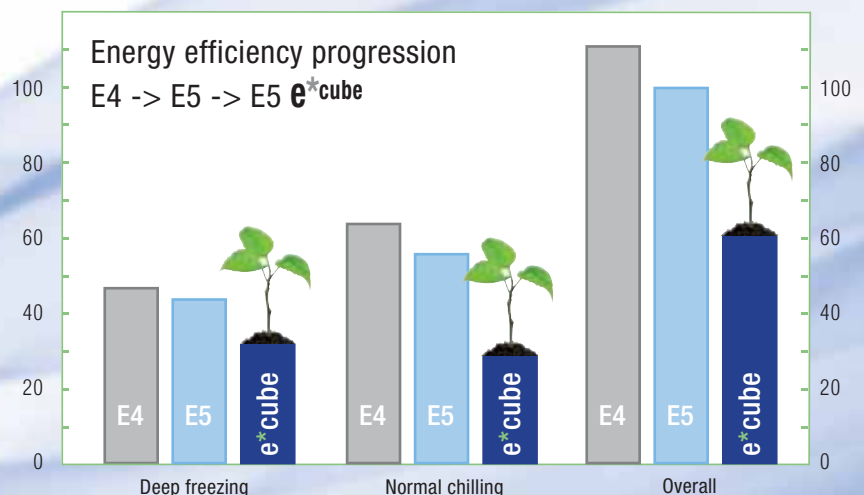
- Strong-appeal display cases
- Low energy consumption and operating costs
- Temperature-stable display cabinets and refrigeration systems
- Reliable operation even at high ambient temperatures
- Easy integration of cases in stores
- Increased protection of goods from spoilage

Our Solutions for Food Retail

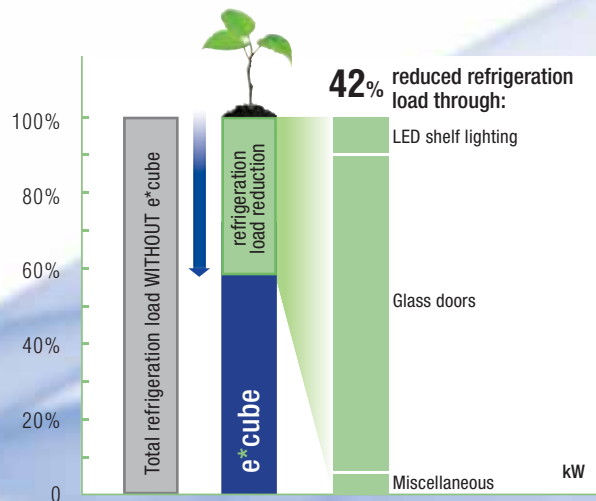
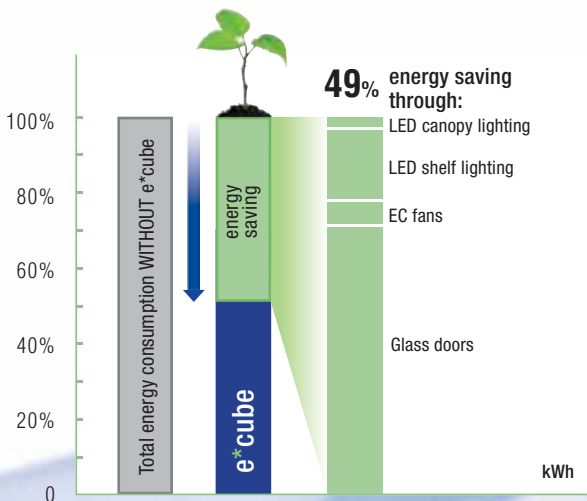
- Energy optimised refrigerated display cabinets
- Energy-saving systems delivered factory mounted
- Additional energy-saving components
- Efficiently designed refrigeration and control systems
- Clean and timely installation
- Effective service adapted to system requirements



■ E4 cabinets range (1992)
■ E5 cabinets range (2002)
■ E5 e*cube (2008)



Monaxis GD. e^{*}cube



*Source: Carrier Lead Design Center

Monaxis GD. e^{*}cube

This cabinet has frameless insulated glass doors, which protect all perishable products against harmful environmental factors and allow for excellent visibility of the goods.

Securing the quality of your goods

Glass doors prevent cold air from escaping, guarding against the occurrence of cold aisles in front of the cabinets. Simultaneously, entry of outside air into the cabinets is prevented, which extends the efficiency of the evaporator and reduces the need for defrost cycles. This protects the goods and significantly reduces inventory shrinkage.

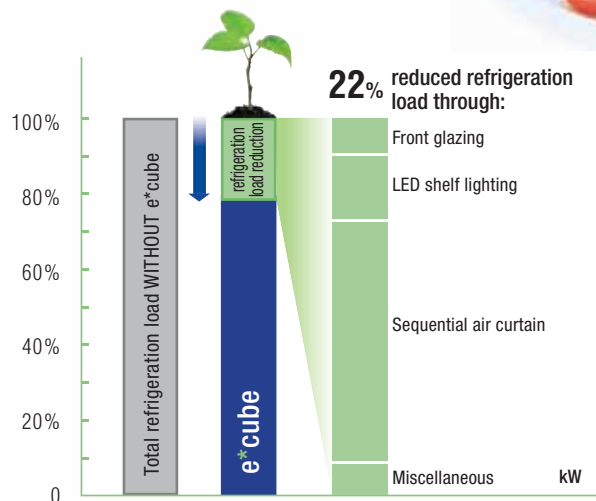
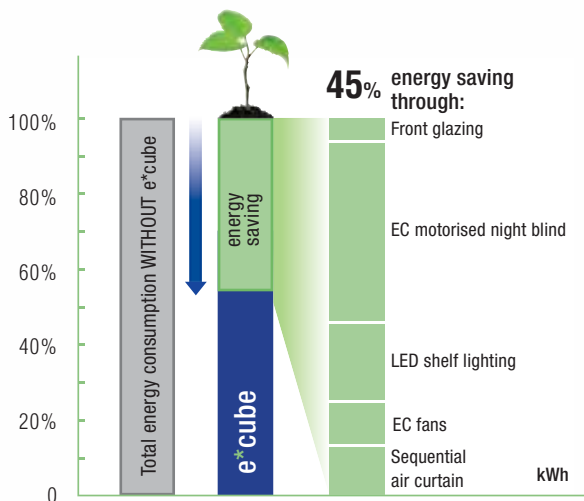
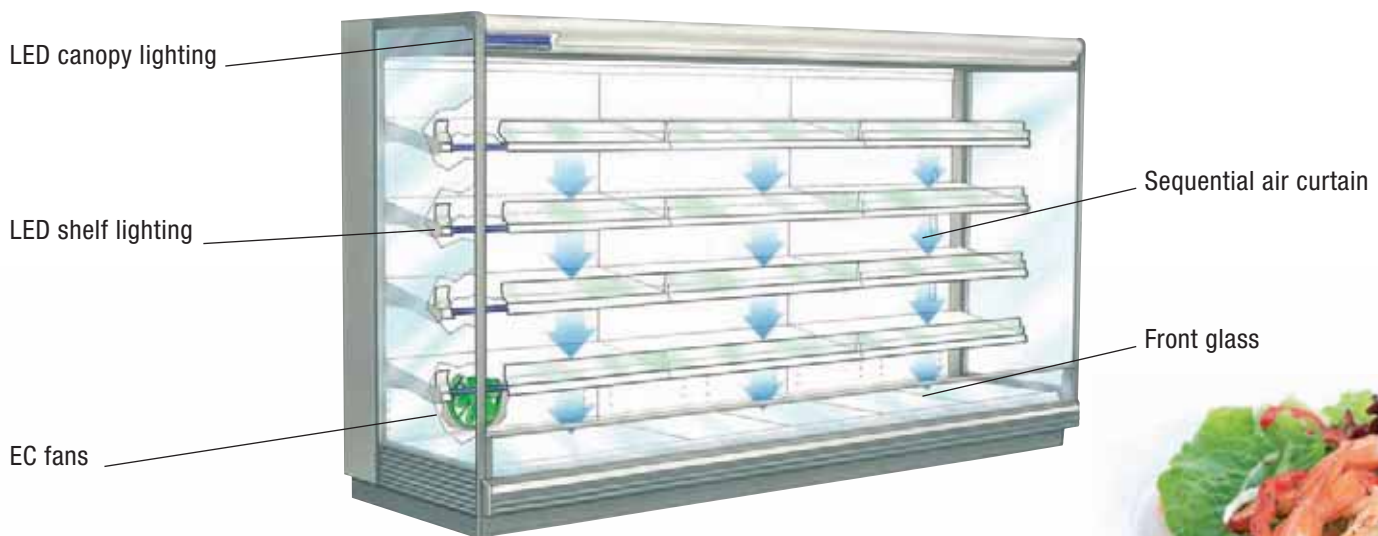
EC fans are included as standard with e^{*}cube. Energy-saving LEDs for canopy lighting and shelf lighting are available as options from the extensive range of accessories, offering additional potential for energy-saving.

Advantages and benefits of the e^{*}cube design:

- Significantly reduces energy costs
- Reduced refrigeration load, smaller piping diameters
- High temperature safety
- Excellent visibility of the goods thanks to the frameless doors
- Easy picking/stocking of goods
- Improved protection of the goods



Monaxis 83.SL e^{*}cube



Monaxis 83.SL e^{*}cube

Fitted with a sequential air curtain, this open cabinet is recommended for all products with a high turnover and for markets with high customer frequency.

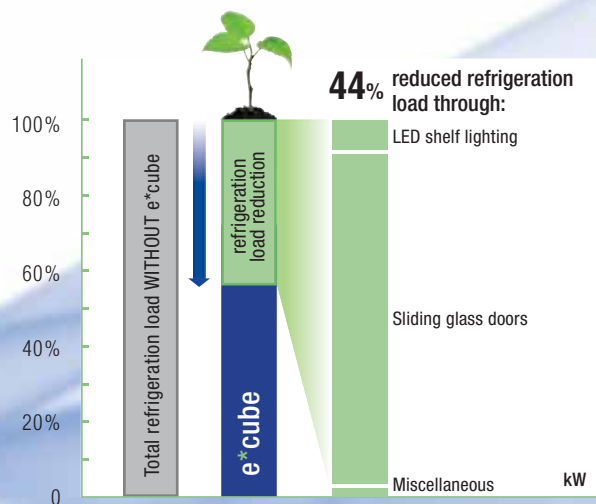
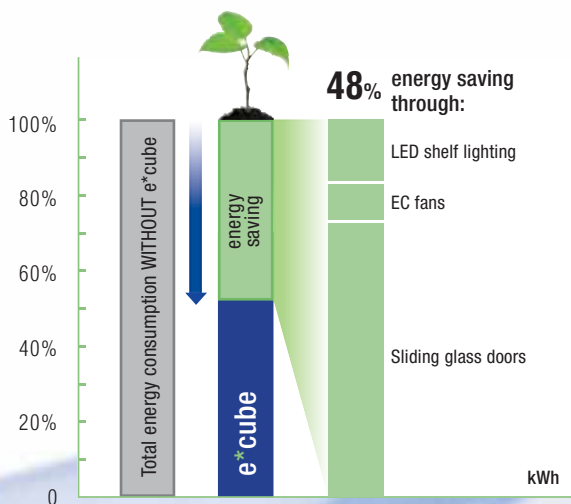
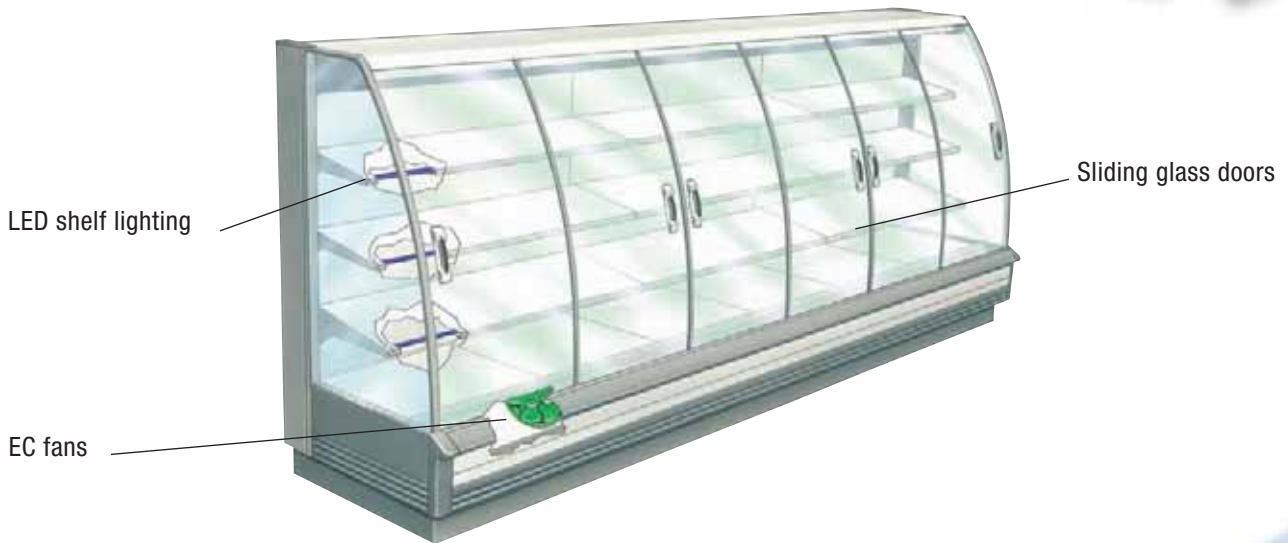
Effective air management for high customer frequency

Air flow from the top of the display case combined with hollow air-guiding shelves are key characteristics for a sequential air curtain case. The main air curtain is stabilised under each display shelf, reducing the sensitivity of the case to outside disturbances, which leads to a significant increase in energy efficiency and temperature performance. In addition to the open, accessible goods presentation, retailers also benefit from unhindered goods picking

and stocking. This case brings high productivity within a small footprint (no additional depth is required for door opening). EC fans and narrow front glazing are included as standard with e^{*}cube. EC motorised night blinds with tight sealing and energy-saving LED canopy and shelf lighting are available from the extensive range of accessories, providing extra energy-saving potential.

Advantages and benefits of the e^{*}cube design:

- Substantially reduced energy costs
- Reduced refrigeration load, smaller piping diameters
- Higher temperature safety
- Excellent visibility of the goods
- Easy picking/stocking of goods



Mirado GS. e^{*}cube

The semi-vertical cabinet for perishable goods such as certified meat products, fresh meat and convenience food.

Best protection

Nicely integrated insulated glass sliding doors and energy-saving EC fans provide considerable energy saving with very high temperature safety. They drive a substantial savings in energy costs and simultaneously reduce negative surrounding disturbances such as direct light radiation. This also guarantees excellent visibility of the goods. In addition, the lower refrigeration load allows for smaller refrigeration racks and smaller piping diameters. Cold aisle effect

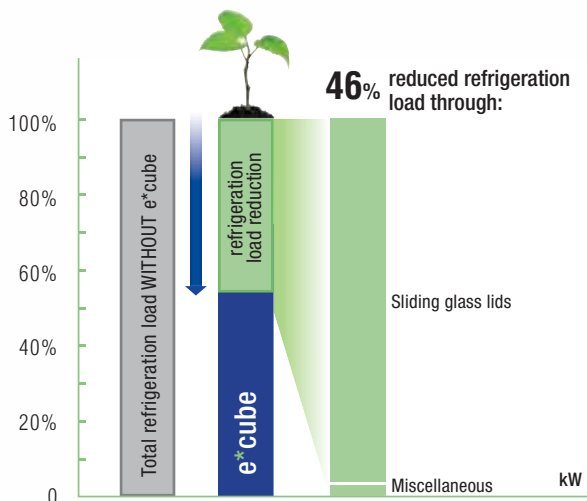
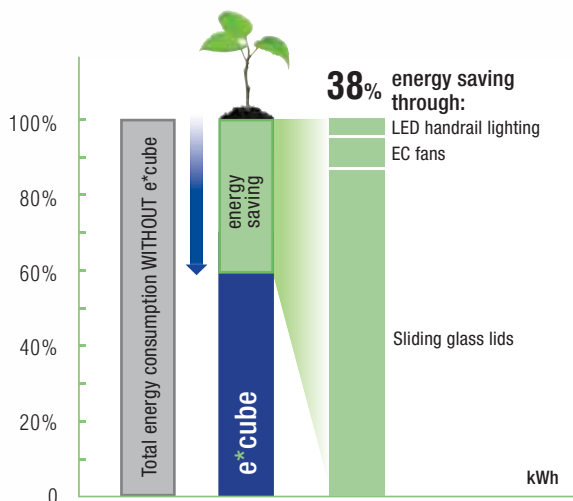
in front of open display cabinets is avoided and customer comfort increases accordingly. The Mirado can either be fitted with standard T5 shelf lighting or with modern LED shelf lighting.

Advantages and benefits of the e^{*}cube design:

- Substantially lower energy costs
- Reduced refrigeration load, smaller piping diameters
- High temperature safety
- Improved customer convenience
- Better protection of the goods



Irios GS. e^{*cube}



Irios GS. e^{*cube}

The curved, nicely integrated glass sliding panels on this freezer island reduce the effect of thermal and light radiation and protect frozen food against outside disturbances.

EC fans are included as standard with e^{*cube}. An internal LED handrail lighting can be selected as option.

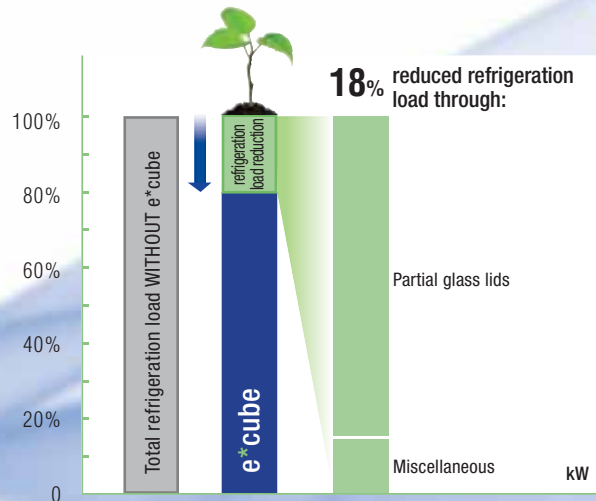
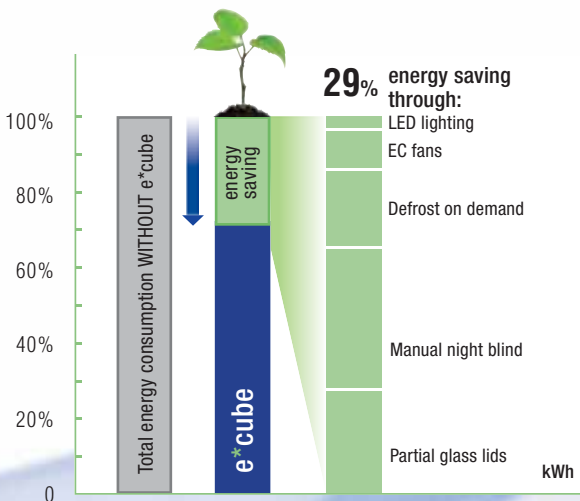
Reduced refrigeration load

The lean design of the system allows both outstanding visibility of the goods and good product transparency. Outside air penetration is avoided to a large extent and thus extends the efficiency of the evaporator. This reduces the need for defrost cycles and improves the protection of the food. The lower refrigeration load saves energy, and simultaneously allows for significantly smaller sizing of the refrigeration system.

Advantages and benefits of the e^{*cube} design:

- Significantly reduced energy costs
- Reduced refrigeration load, smaller piping diameters
- High temperature safety
- Good visibility of the goods
- Improved protection of the goods





Irios GP. e^{*}cube

This freezer island boasts energy-saving partial glass lids and is best suited for markets with a high turnover of frozen food.

EC fans are included as standard with e^{*}cube. Internal LED handrail lighting and LED lighting above the partial glass lid as well as a manual night blind can be selected as options.

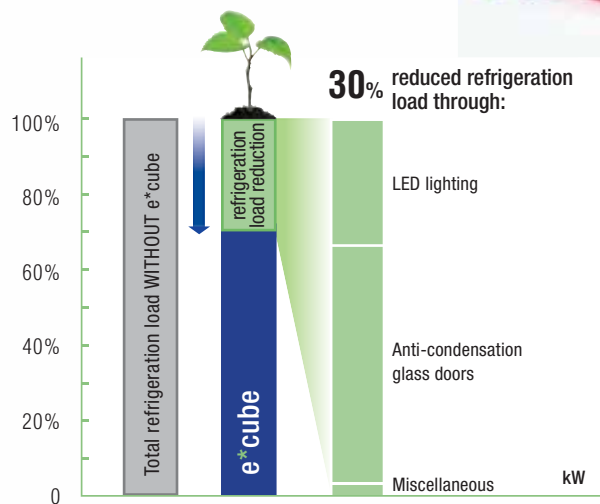
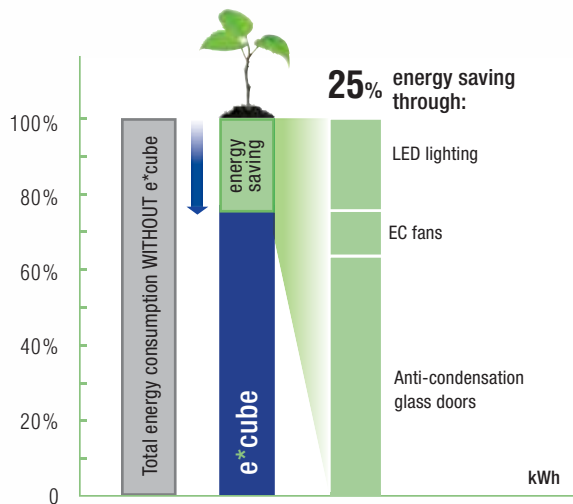
Also safe for open display

The narrow partial glass lid stabilises the air curtain in the colder rear area, without hindering the picking of goods or their visibility. This allows significant energy-saving and higher temperature safety – despite the open configuration. The energy savings during daily operation is very close to that of a closed night blind (when operating outside of store opening hours). As a result, the partial glass lid allows smaller sizing of the refrigeration system.

Advantages and benefits of the e^{*}cube design:

- Significantly reduced energy costs
- Reduced refrigeration load, smaller piping diameters
- Higher temperature safety
- Excellent visibility of the goods
- Easy picking/stocking of goods
- Improved protection of the goods

Velando AF. e^{*}cube



Velando AF. e^{*}cube

This freezer case features anti-condensation glass doors and EC fans and absorbs the humidity present in the air thanks to a special coating that prevents fogging of the glass when the doors are opened.

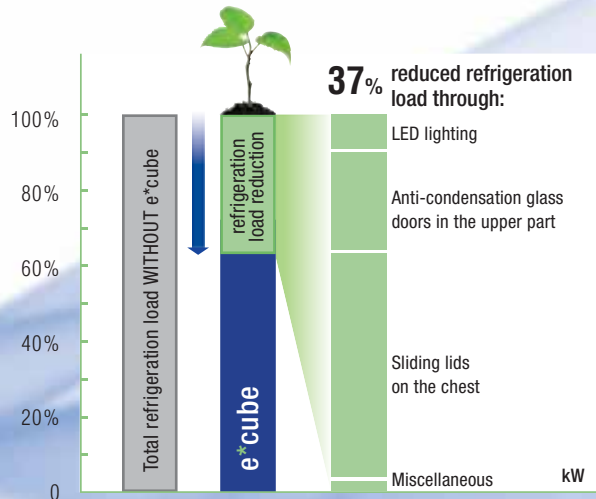
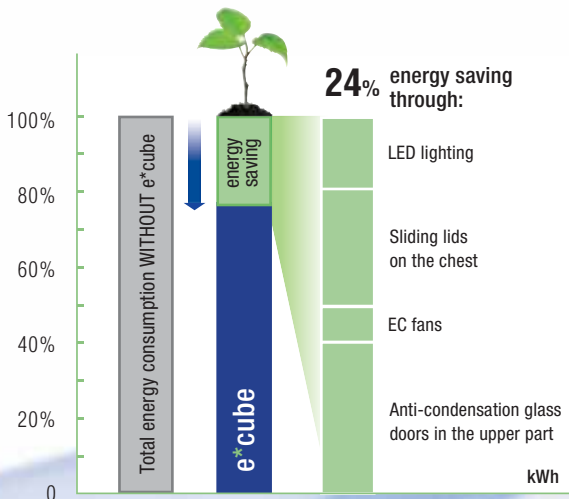
Freedom in the visibility of the goods

This new technology does not require anti-condensation heaters for the doors. This reduces energy and refrigeration load and enables the downsizing of refrigeration systems and piping diameters. Because there is no fogging when the doors are opened, the goods are clearly visible at all times. The anti-condensation coating also allows more even distribution of the light behind the doors.

As an option, Velando can be fitted with modern, vertical LED lighting.

Advantages and benefits of the e^{*}cube design:

- Significant reduction in energy costs
- Reduced refrigeration load, smaller piping diameters
- Higher temperature safety
- Excellent visibility of the goods
- Improved protection of the goods



Vantis AF. e^{*}cube

This efficient combination case is fitted with anti-condensation coating on the cabinet doors and with sliding lids on the chest.

Maximum area productivity

The anti-condensation coating absorbs the humidity in the air and prevents fogging of the doors during opening. This smart solution does not require anti-condensation heaters. The anti-condensation coating also brings a more even distribution of light behind the doors. Because there is no fogging when the doors are opened, the goods are clearly visible at all times. The sliding lids on the chest protect the goods against outside disturbances. Even in the rear area of the chest and with the sliding lid system, underneath the top section, Vantis provides an unobstructed view and an easy access to the goods. Besides reduced energy

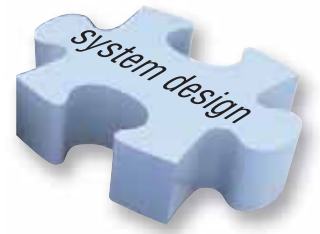
consumption, this combination case provides a high degree of temperature safety. In addition, the refrigeration system can be significantly downsized due to the lower refrigeration load. EC fans also help save energy.

As an option the top section and the lower section can be fitted with modern LED lighting.

Advantages and benefits of the e^{*}cube design:

- Significantly reduced energy costs
- Reduced refrigeration load, smaller piping diameters
- Higher temperature safety
- Excellent visibility of the goods
- Improved protection of the goods





A network of experts

Our distribution organization is trained extensively on the basis of your proposed design configurations. Here again we take advantage of the calculation tools developed specifically by Carrier for the design of refrigeration systems. Our computing software to design piping networks reflects decades of experience in refrigeration projects. It optimizes the economical and ecological aspect to size piping networks.

Interacting with our installation specialists to introduce new concepts provides a further opportunity of knowledge transfer. We make sure that our installation managers and supervisors are trained in new technologies, all of which supports the level of success of our new installations.

The perfect system

We make sure all these building blocks fit together. This is the only way to get a result greater than the sum of its individual parts.

To do this we invest in people with excellent skills across the entire organization.

Development – in the unique „Lead Design Center“, which was opened in 2007, near Frankfurt/Main

Project Engineering – develops system solutions and special tools

Sales & Project Management – with expert teams in more than 25 countries

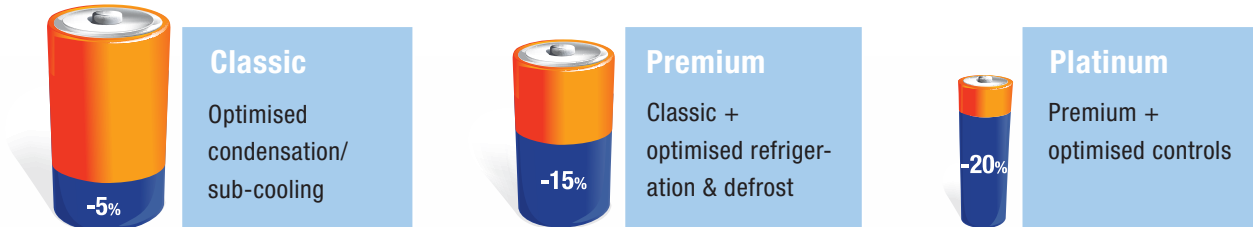
Service – the Carrier network of service engineers and remote service centres covers all our European locations



Efficient energy-optimised refrigeration

We offer individual system solutions to reach optimum energy efficiency

e*cube engineering packages

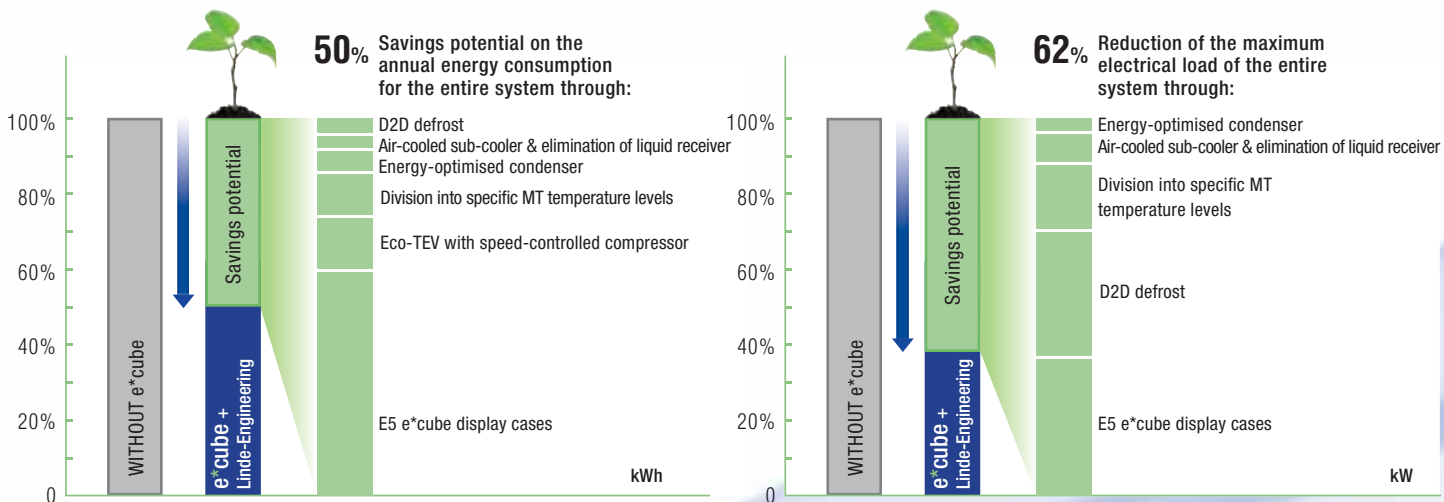


We recommend Linde heat recovery concepts for all three packages

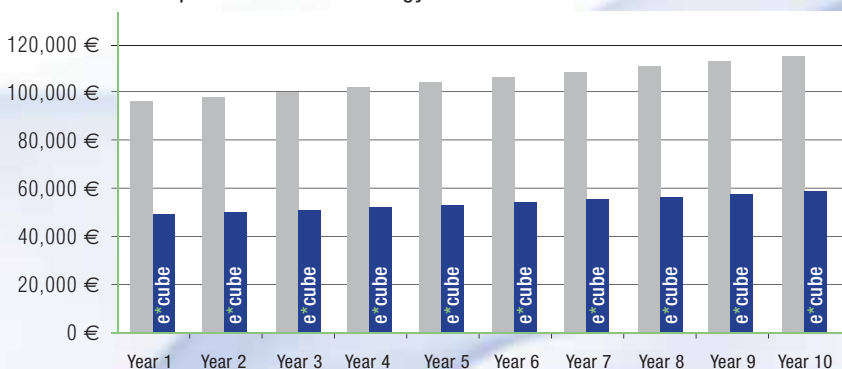
Linde system solutions: significant savings at low investment costs

Depending on the structure of the contract with the energy utility, the maximum electrical load of the entire system and the actual yearly average consumption can be significantly different. Based on our customers' needs, we produce the optimal design targeting short return on investment.

The following simulation (based on a standard supermarket with 200 kW medium temperature and 65 kW low temperature) shows significant savings potential:



Comparison of annual energy costs*



Within a 10-year system operation, more than 500,000 EUR can be saved if all the technologies proposed are used, in the case of a standard supermarket with 200 kW for the medium temperature and 65 kW for the low temperature.

Legend: Standard (grey bar), e*cube + Linde engineering (blue bar)



Improved food quality through sustained cooling

In addition to the energy savings potential, our sights are also set on guaranteeing quality. Avoiding interruptions in refrigeration improves the protection of the goods, especially for sensitive products such as fresh meat.



How to design a continuous refrigeration operation and a more food-friendly defrost procedure?

Our answers are as follows:

Optimal, constant compressor operation through:

- Best compressor selection
- Speed control
- Intelligent consumers/ compressor communication (Eco-TEV)
- Interconnection of different suction levels

Food-friendly defrost procedure:

- Patented Linde D2D process

What makes Linde D2D special?

- Defrost periods shortened up to 75%
- Very low heat penetration into the display area and into the products
- High cleaning effect for evaporators and base tray

Servicing your refrigeration system pays for itself

Our claim to deliver optimal performance and efficiency also applies to after sales service. The key factors for achieving a constantly optimised system are how often the system is checked and maintained and also by whom it is checked.

What should Service provide for the ideal operation of a refrigeration system?

On the one hand, a system's individual parts and components must be considered; on the other, the system in its entirety must also be addressed.

All refrigeration systems are vulnerable to the negative influence of environmental and operational factors such as vibration, dirt, seasonal temperature fluctuations, meteorological factors or incorrect use of the refrigeration system. These factors can lead to the refrigeration system drifting outside its originally set working range.



Maximum efficiency and performance can only be achieved if:

- Service personnel possess in-depth **system and product knowledge**
- **Temperature compliance and energy consumption** are considered
- The necessary **diagnostic equipment** is available
- The **necessary inspection and maintenance cycles** are observed.



Measures	Potential Savings
Modernising of the refrigeration system	15-20 %
Optimum control	5-10 %
Appropriate technical maintenance	10-15 %
Total savings potential if all service measures are implemented	up to 25%

Note: Total savings potential should not be understood as the sum of the partial potentials, because of the overlapping effects of the individual measures.



Comprehensive and highly trusted

Due to our extensive product portfolio, our customers can assemble management packages that are tailored to their individual requirements.

Core Service

- 24 hours a day, 365 days a year on-site repair service
- Spare parts availability

If a fault occurs, call us. A highly trained Service Technician, equipped with a comprehensive range of spare parts, can quickly be dispatched to site, even if the fault occurs at night or at the weekend.

Maintenance

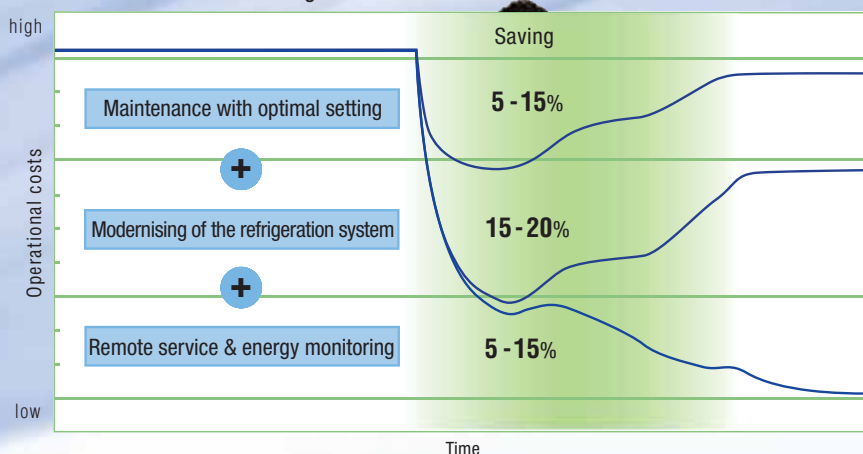
We undertake all necessary maintenance work for you regularly and at a fixed price. Maintenance work includes, for example, checking safety devices/operating parameters or performing a legally prescribed leakage detection test. Through such measures we ensure that your refrigerated system is always operating safely and efficiently.

Carrier service represents the ultimate in convenience, safety and efficiency. Reduce your administrative costs and at the same time enjoy – particularly in summer - highest priority as a service customer. This fixed price service package includes all necessary maintenance work and a 24 hours/365 days a year on-site refrigeration repair service.

e*Service

Carrier's refrigeration technology offers a broad remote service product portfolio, known as e*Service, which is based on electronic data processing.

Sustainable operation:
Maintenance and monitoring



Prevention through database analysis

By means of project-related analysis, our e*Service database can rapidly determine weak points in your refrigeration system. This enables us to detect technical irregularities and provide fault prevention so that we can take the appropriate actions quickly and efficiently to minimize or even eliminate equipment downtime.

Energy and operational optimisation

Regular, remote maintenance ensures ideal temperatures are maintained with low energy consumption.

Quality control/goods temperature

You can check your display cases and cold room temperatures conveniently by Internet access and if necessary record the data to ensure service quality is maintained. Cost savings can therefore be made through the avoidance of manual temperature recording and data administration.

24 hours a day/365 days a year remote monitoring

Qualified remote service engineers monitor your refrigeration system around the clock. In the event of a fault, an on-line diagnosis and repair can often be made immediately. In the event a qualified Service Technician is required, the pre-agreed alarm management steps will be implemented. Carrier's remote monitoring concept ensures against costly system failures. Our service facilities are available in most European countries.

Savings disappear over time without a strong focus on Service!

Prevention through service excellence

service action packages from Carrier

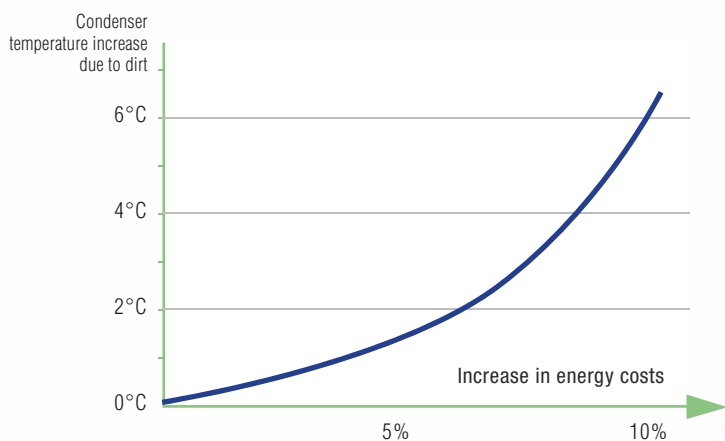
Even the highest quality technology equipment cannot be guaranteed to work in a continually optimal state. Besides our core and maintenance service offerings, Carrier can provide you with service action packages, with which you will be able to fit-out your refrigeration systems for the future.

Cleaning service

Layers of dirt on evaporators and condensers prevent heat convection. Heat transfer efficiency falls and energy consumption increases. Dirty refrigerated display cases are not only unhygienic and inefficient, they also cause operating faults.

Refrigerant Change

In order for your refrigeration system to remain legally compliant and operationally safe going forward, we offer a customised refrigerant change solution. The highest priority is given to temperature and operating safety throughout the year – from winter to high summer. The solution worked out for you also takes into account operating costs after the refrigerant change.



Oil ageing and quality maintenance

Constant operation of a supermarket refrigeration system places the highest demands on the material properties of the lubricants. If the oil and filters are not changed often enough, dirt and particle friction will cause damage. Lubricants also gradually lose their lubrication properties due to thermal loading.

Prevention

Carrier operates a unique research laboratory for applied chemistry in refrigeration technology (compressor rack oil, primary and secondary refrigerants, corrosion inspections, wear inspections). Our maintenance offering consists not only of providing the correct exchange cycle for oil and filters, but also ensures that the best possible machine oil for your requirements is used. This increases a refrigeration system's useful working life.



*Carrier laboratory
for applied chemistry
in refrigeration
technology*



Leakage Detection

Leaking units dramatically increase a system's power requirement, and therefore energy consumption. Leaks can be caused by vibration, temperature change or incorrect use. If the refrigerant charge escapes due to a leak, optimal temperatures cannot be reached even if the energy use is increased. Leaks are costly and damaging to the environment.

Prevention

Our service package can include a regular leakage detection test, which ensures economical operation of your refrigeration system, preventing costly damage and reducing environmental impact by reducing the emission of greenhouse gases.

Summary

We allow our customers to concentrate on their core business. Our portfolio of cleaning, statutory leakage detection checks, maintenance (including oil check) and our 24/7/365 repair service provides a high degree of safety and convenience.



Leak test by service engineer with electronic leak detector

We keep our customers' equipment up to date

Retrofitting refrigeration systems

Our innovations are not only useful for new refrigeration systems. To keep your refrigeration systems at the cutting edge of modern performance and design, our Service offering can provide you with opportunities to modernise and upgrade your display cases, electronic controls or even your complete refrigeration system.

e*cube system audit

We perform on a project basis a detailed audit of your refrigeration system covering operation, energy consumption and equipment analysis. On this basis, we are able to calculate precisely which individual measures should be taken for improved efficiency. You will receive our recommendation, including an amortisation breakdown.

e*cube retrofit

Most e*cube features presented can be retrofitted to existing systems. We will be pleased to advise you on those energy saving components which apply to your refrigeration system.

e*cube for display cases

Includes LED lighting, EC fan, sliding lids, glass doors, anti-condensation glass doors and night blinds.

e*cube for electronics

Periodic frame heating, Eco-TEV, electronic expansion valves, remote service system, latest control software.

e*cube for system engineering

External/internal sub-coolers, heat recovery systems, latest condenser technology.

Legal and planning security

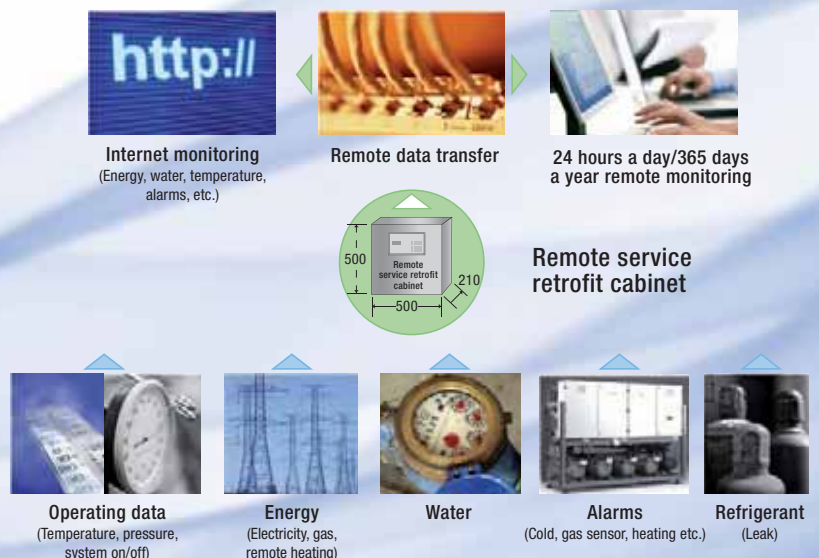
Besides technical and economical skills in refrigeration, we also provide our customers with information on regulatory aspects and their impact on refrigeration systems.

For example, we provide advice on the maximum ambient temperatures required for operating refrigeration systems. Until a few years ago, condensers were generally designed to perform at a maximum air temperature of +32 °C and some older refrigeration systems were only designed to run below +28 °C. Refrigeration systems today are designed for operation at up to +38 °C ambient temperature.

We discuss the impact of applicable regulations with our customers and develop solutions that are legally compliant.

Retrofitting a remote service system

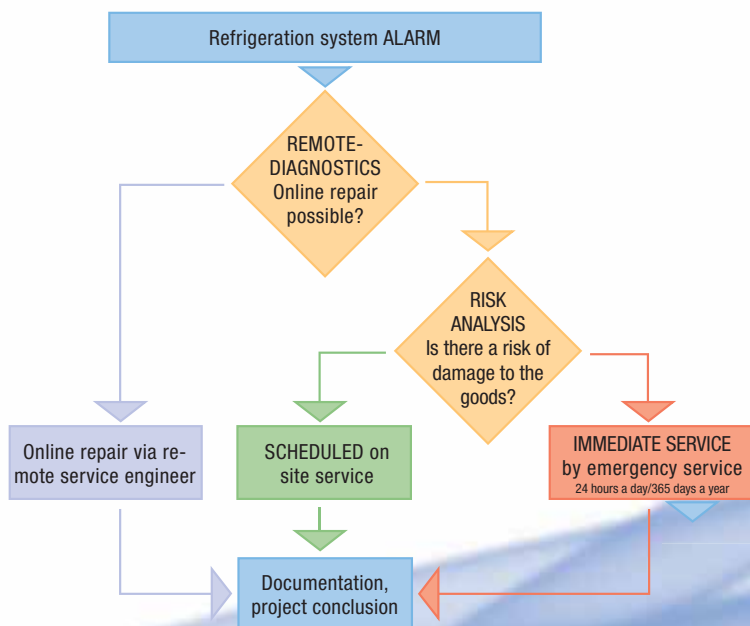
This service is also perfectly suited for the 24 hour/365 day detection of refrigerant leaks.





The advantages of the e*Service principle

At numerous levels, remote service is a valuable tool for guaranteeing the best possible operation of a refrigeration system. Here is how:



24 hours a day/365 days a year with alarm management

This service allows considerable flexibility outside store opening times.

Our experts maintain an overview of your systems and are aware of time pressures. In contrast to simple alarm forwarding, which cannot assess the priority of a fault, we have a structured alarm management system. In the event of an alarm, we can use the e*Services profile to know what action to take:

- Online Service action (e.g. activate defrost, etc.)
- Schedule engineer visit for the next day
- Immediately dispatch an engineer to the site

This not only helps saving energy and detecting refrigerant leaks early, but also reduces goods damage.

Monitoring

An internet-based tool allows round the clock, expert monitoring of

- Temperature
- Energy consumption
- Alarms

Additionally, the viewing enables a chain operator to make quick and simple comparisons between individual stores. Differences can thereby form the basis for more precise analyses and improvements in energy consumption.



Environmental awareness

is a profitable approach to doing business



Energy saving does not only bring cost reductions, it also makes a decisive contribution to reducing the CO₂ footprint and thus reduces the impact of doing business on the environment.

In addition to these indirect effects, the selection of the refrigerant and the amounts used to fill refrigeration circuits can also make a difference.

Reduce direct TEWI* emissions (refrigerant leakages) by:

Hermetic sealing of refrigeration circuits

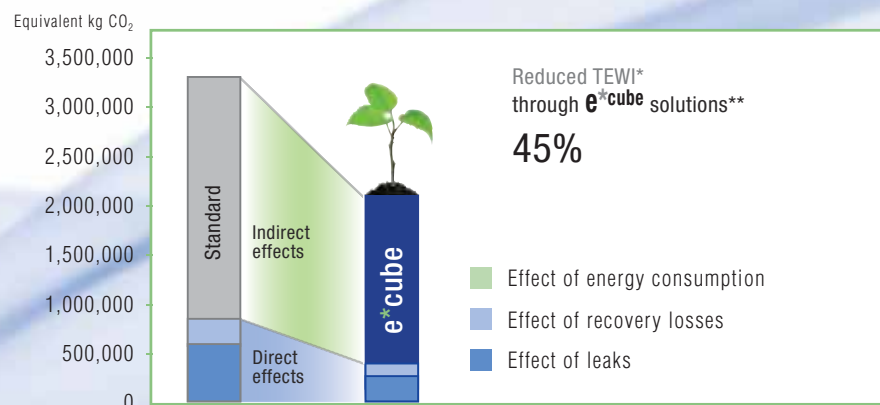
- Selection of suitable assembly materials
- Use of well trained installation personnel

Reduction of refrigerant fillings

- Elimination of liquid receivers for refrigerant
- Joint liquid feeding line for medium temperature and low temperature consumers
- Reduced piping diameter through sub-cooled liquid

Natural refrigerant (CO₂)

The study highlighted in the below chart (simulation based on a standard supermarket with 200 kW medium temperature and 65 kW low temperature) shows the significant potential of reducing direct and indirect emissions over a ten-year operating period (units: equivalent kg CO₂):



* TEWI = Total Equivalent Warming Impact

**assuming R404A refrigerant, 5% leakage and a recovery loss rate of 10%

CO₂ – Renaissance of an outstanding refrigerant

History

Until the 1950s CO₂ was used in break-bulk shipping refrigeration systems, and was then replaced by CFC and later HCFC refrigerants, called at the time “safety refrigerants” for their less harmful chemical properties than other natural refrigerants such as ammonia. Nowadays, thanks to its climate neutral characteristics, CO₂ is experiencing a renaissance as a refrigerant.

CO₂, among other production methods, can be extracted as a by-product of air separation or derived from natural sources. CO₂ is used in beverage filling (carbonated drinks & soda water). It is widely available worldwide and more affordable than traditional HFC refrigerants used in commercial refrigeration.

Advantages of CO₂ refrigeration systems

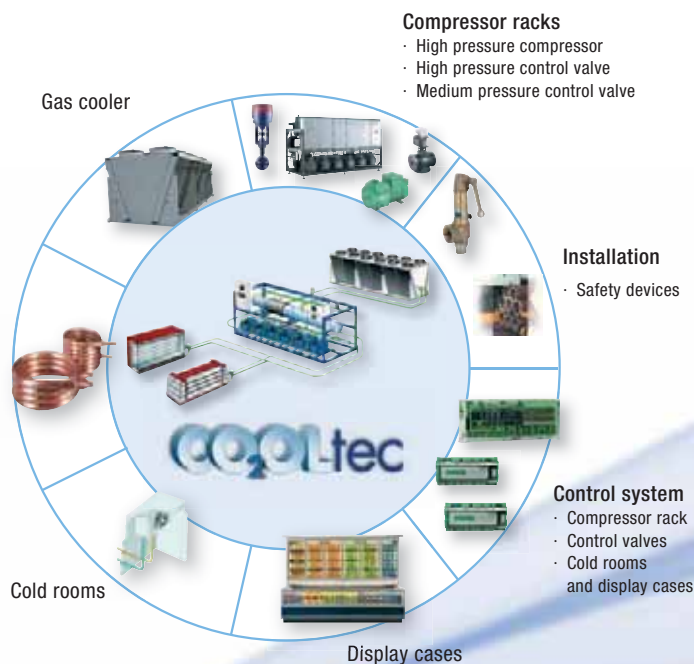
Carrier has the right refrigerant solution for every application, but every application will not have the same refrigerant solution. For supermarket refrigeration, the CO₂OLtec™ concept is a trendsetting refrigeration system that makes a relevant contribution to the environment. And this without the inconveniences found in indirect refrigeration systems.

European experience

Since the first installation in 2000, we have been able to gather reliable operating experience in 120 stores, with a total of 3,900 kW refrigeration capacity. With the first refrigeration system working trans-critically for medium temperature in a hypermarket, the concept made a step forward in 2004. Meanwhile, 22 more stores are successfully operating in the medium temperature range, with a total refrigeration capacity of 4,000 kW (status as of end 2007).

Energy saving with CO₂

For European climates with yearly average temperatures of up to 15 °C*, the CO₂OLtec concept provides attractive energy savings for refrigeration as compared



to conventional HFC direct expansion systems. More and more, building and store owners are looking for ways to reduce the CO₂ footprint of their property. The trans-critical CO₂OLtec™ system is well suited for heat recovery applications and can therefore save significant amounts of fossil fuels traditionally used for heating and hot water production. These savings come in addition to potential savings on pure refrigeration considerations.

A safe future with CO₂

Customers who can look back on several years of successful operation have shown a very high degree of satisfaction with this innovative technology. With CO₂OLtec™, a store operator has a long-term, secure solution, with a substance that is not subject to the F-gases regulation EU 842/2006. Moreover, CO₂ is not subject to current taxes on the global warming potential of refrigerants such as those already in place in some European jurisdictions.

*For example, yearly average temperatures are in Stockholm 7 °C, Paris 12 °C, London 11 °C, Milan 13 °C and Madrid 14 °C
- Source German National Meteorological Service, 2007



Think system – master energy

Smart systems use energy wisely, where needed, when required.

Based on this understanding we offer solutions combining “energy, efficiency and ecology”.

This stands for energy savings over the entire life cycle, sustained performance in temperature quality and food safety, and significant carbon footprint reduction. On this we focus our energy.

Increasing sales is one of your benefits.

We provide more: sustainable refrigeration with state-of-the-art solutions.



Carrier

A United Technologies Company

Carrier Kältetechnik Deutschland GmbH
Sürther Hauptstraße 173
50999 Cologne · Germany
www.carrier-refrigeration.de