Refindustry
REFRIGERATION INDUSTRY MAGAZINE

N 2025 / 3 (7)

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Ammonia Refrigeration Special Edition

Introducing the magazine “Refrigeration Industry”

Welcome to the 7th issue of our magazine!

We’re proud to present this special edition dedicated to ammonia refrigeration—a technology that continues to define the industrial landscape. In this issue, we explore how ammonia systems are evolving in response to today’s market demands, safety standards, and sustainability goals.

This edition showcases real-world innovations and expert insights that demonstrate ammonia’s enduring value in the refrigeration industry.

If you'd like to learn more, share feedback, or contribute your insights, please don’t hesitate to reach out to us by email—or contact me directly on LinkedIn.

Warm regards, Editor-in-chief

Sergei Mukminov.

The concept of the new magazine:

1. In today’s fast-paced world, staying updated with the latest developments in the refrigeration industry can be challenging. Our mission is to simplify this by providing the most critical news and insights in a single quarterly issue.
2. The magazine is published exclusively in digital format, with pages designed in a landscape orientation for optimal readability on screens.
3. Our magazine is interactive, allowing you to follow internal content links, as well as external links to detailed articles on our website and advertisements.
4. All news featured in the magazine can also be easily found on our website by title.
5. The magazine is released once every quarter.

The magazine issue plan

- N 2025 / 4 — October: Heat Pumps
- N 2026 / 1 — January: Commercial refrigeration

Learn more about the opportunities for refrigeration equipment suppliers in this magazine and on refindustry.com.

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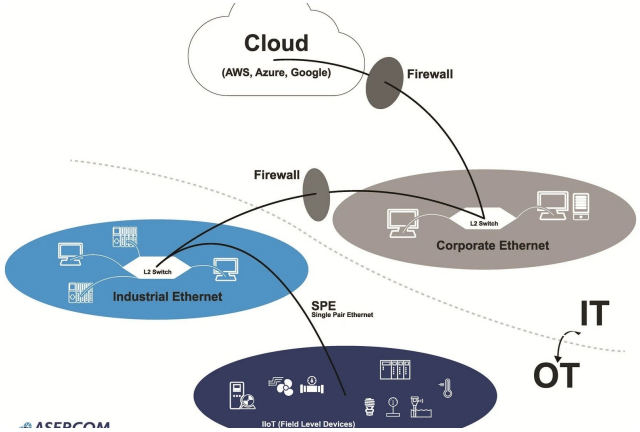
Ammonia Refrigeration Special Edition

Stephen Gill on World Refrigeration Day and His Industry Journey



On two wires into the future: how Single Pair Ethernet is transforming refrigeration and air conditioning technology

Events in Paris and Milan in June 2025

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The magazine “Refrigeration Industry”, 2025/3.

We recommend reading in a PDF viewer's full-screen mode.
Links may not work in a browser.

News Products

FläktGroup Launches Liquid-DENCO CDU for Data Centre Liquid Cooling

FläktGroup has released the Liquid-DENCO CDU, a compact and scalable cooling distribution unit tailored for high-performance data centres.

Designed to support the growing shift toward liquid-based thermal management, the CDU integrates real-time control intelligence for temperature and flow, scalable configurations for various layouts, and maintenance-friendly design.

With a focus on operational uptime and minimal footprint, the unit is suitable for dense server applications and critical environments, reflecting the increasing demand for energy-efficient cooling in data centres.

Embraco Launches Atom, Its Most Compact Variable-Speed Compressor

At AWE 2025, Embraco unveiled Atom, its lightest variable-speed compressor to date, targeting global residential refrigeration markets.

Weighing only 2.5 kg and under 110 mm in height, Atom operates with R600a and delivers energy savings over 25% compared to fixed-speed models. Its polymeric discharge line and compact inverter contribute to low noise and reduced vibration. The model's design allows increased pallet loading efficiency and appliance design flexibility, making it an ideal solution for applications such as compact refrigerators and beverage coolers.

Hussmann Launches Protocol CO_2 Unit Using Natural Refrigerant

Hussmann, part of Panasonic, has expanded its Protocol line with a CO_2-based refrigeration unit designed for indoor applications. Operating on R-744, the system includes medium temperature compressors

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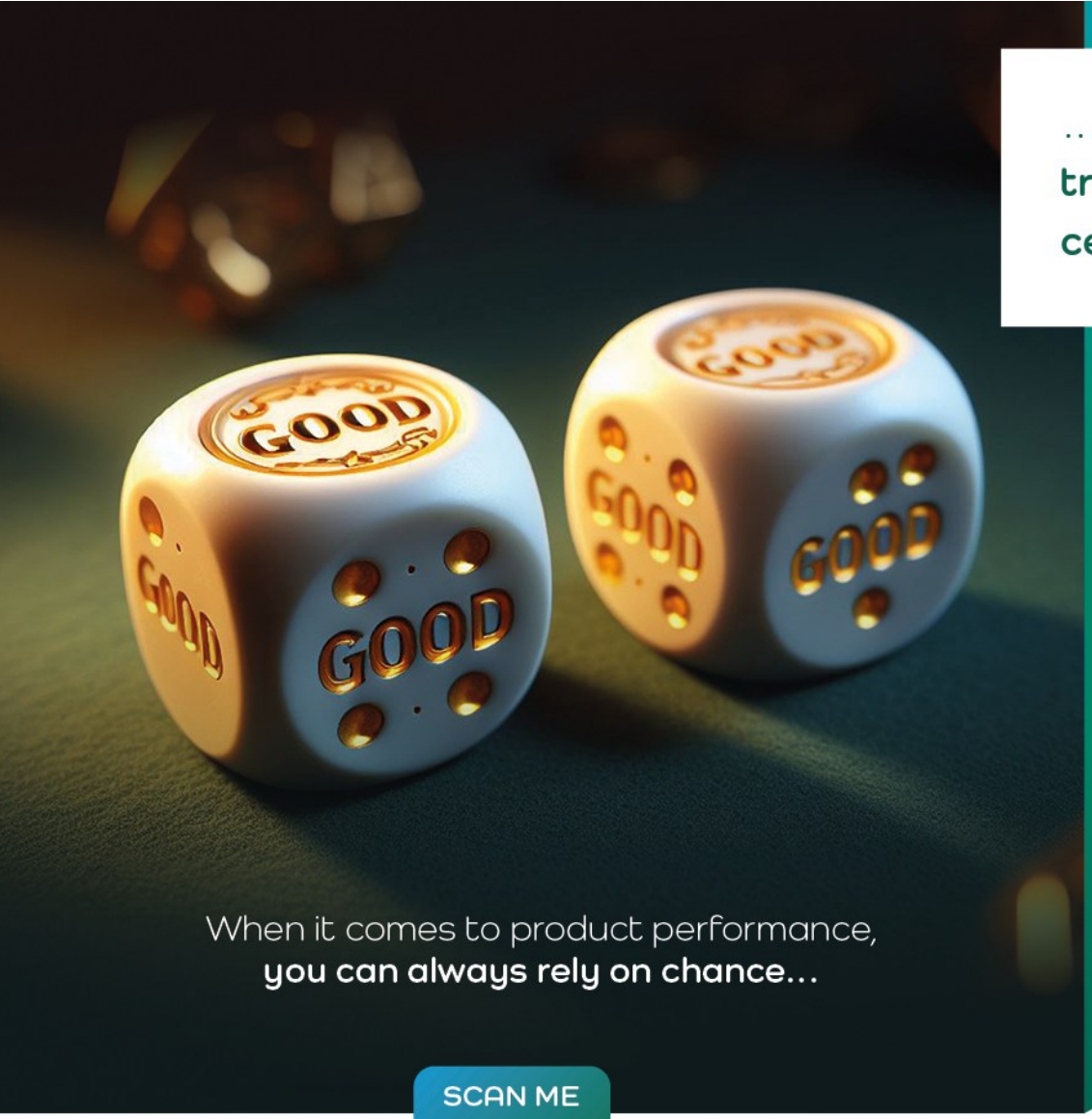

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with vapor injection and variable speed scroll technology.

It features an economizer and compact flash tank assembly for improved efficiency and maintenance access. The unit supports store renovations and energy regulations, promoting low environmental impact refrigeration.

Mitsubishi Electric Trane HVAC US Unveils Heat Pumps with R-454B Refrigerant

METUS introduced a new heat pump series using R-454B, a low-GWP refrigerant with 78% lower GWP than R-410A. Designed to meet upcoming AIM Act regulations in the U.S., the FX, GX, and SMART MULTI series offer improved energy efficiency, Smart Dry comfort mode, and operation down to -30°C.

Bluetooth connectivity and system intelligence features align the series with sustainability and performance expectations in residential and light commercial markets.

Danfoss Launches DST G290 Propane Gas Sensor with Photoacoustic Technology

Danfoss has released the DST G290 sensor series for propane (R290) detection in HVAC and refrigeration. Using photoacoustic sensing and a patented inverted design, the sensor delivers fast and selective leak detection even in harsh environments.

Operating between -40°C and 80°C, it features a semi-permeable membrane to block contaminants and complies with IEC 60335-2-40. The unit's low energy requirements and robust diagnostics support safe use of A3 refrigerants.

Frascold and Tecnofreddo Launch R290 Heat Pump for High-Temp Applications

Tecnofreddo and Frascold have introduced the DANAE heat pump using R290 and Frascold's ATEX-HT compressors, supporting temperatures up to 80°C. Ideal for food, pharma, and data centres, the system integrates inverter-driven compressors and high-efficiency exchangers.

The LSPM motor improves energy performance, and the heat pump enables substantial energy and emissions reductions, making it a sustainable alternative for high-demand industrial heating needs.

Frascold Launches ATEX-HT Compressors for High-Temperature Applications

Frascold's new ATEX-HT piston compressors support natural refrigerants like pro-

pane, butane, and isobutane at fluid temperatures up to 135°C.

Available in four sizes, they are suited for reversible heat pumps in commercial and industrial environments.

Technical innovations include reinforced valve plates, anti-friction piston coatings, and hydrocarbon-optimized oil. These features enhance reliability and efficiency in high-load conditions, supporting decarbonization efforts.

Danfoss to Launch AK-CC25 Controller for Refrigerated Display Cases

Danfoss will soon release the AK-CC25, a flexible controller for plug-in and remote refrigerated display cases. It supports MT/LT switching, dual circuits, and variable

speed compressors. With built-in Bluetooth and ADAP-KOOL compatibility, the unit simplifies commissioning and monitoring.

It supports A3 and A2L refrigerants and includes HACCP-compliant features, helping operators meet modern energy and food safety requirements.

Johnson Controls Launches New Commercial Heat Pumps to Expand Global Portfolio

Johnson Controls has introduced several new heat pump models for commercial and industrial use, including the YORK CYK and modular YMAE units.

These systems offer hot water production up to 82°C and are designed for cold climates and high-demand applications.

New models in Asia-Pacific expand the

portfolio further. Case studies in Spain, Germany, the UK, and the U.S. demonstrate significant emission reductions and energy savings.

Johnson Controls emphasizes its commitment to ultra-low-GWP refrigerants and scalable, efficient heating solutions.

Product Showcase

The partner's materials

Enex Technologies launches R290 Indirect System for industrial refrigeration

Enex Technologies has introduced its R290 Indirect System, a modular refrigeration solution using natural refrigerants, aimed at food storage and processing facilities with cooling demands of up to 1 MW.

The system combines R290 (GWP=0.02) and, for low temperature applications, CO2 (GWP=1), both compliant with F-gas regulations and free of PFAS. The company highlights its design features, including low refrigerant charge per circuit, ease of installation via a hydronic setup, and subcritical CO2 operation.

The R290 Indirect System can deliver brine temperatures down to -15°C (5°F) and function in ambient temperatures up to 48°C (118.4°F).

Enex states the unit can replace existing HFC/HFO chillers and operate fully outdoors, even in areas with noise constraints. It also provides high-temperature hot water up to 77°C (170.6°F) for applications including defrost, heating, drying, and sanitation.

Know more

Secop launches FRK-G compressors as successors to F-Series

Secop has introduced the new FRK-G compressor series as the successors to its established FR (F-Series) compressors, widely known for their robust performance in demanding environments. The FRK-G line is designed for light commercial refrigeration and maintains the naming structure of the F-Series for comparability.

The FRK-G compressors incorporate several technical updates, including a noise-reducing shell, robust internal discharge tube, improved valve systems, optimized motors, and a newly developed muffler aimed at reducing noise and vibration.

Designed for dual frequency operation (50/60 Hz), FRK-G models offer high starting torque and include types FRK5G through FRK11G. The series features a muffler system developed for heavy-duty applications with rapid load changes and extreme liquid return conditions, supporting system reliability and overload resistance.

Know more

The bonus for our Platinum and Gold partners includes the free publication of press releases, subject to space availability in the Product Showcase section.

Learn more about opportunities for our partners.

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Market News

Hussmann and Phoenix Energy Technologies Partner to Launch AI-Powered Refrigeration Leak Detection

Hussmann and Phoenix Energy Technologies have launched Refrigeration IQ Powered by StoreConnect, an AI-driven solution to reduce refrigerant leaks and optimize refrigeration asset performance.

Combining automated leak detection with data analytics, the system is expected to cut leak rates by over 30% in the first year and support compliance with U.S. regulatory mandates, including the AIM Act.

The solution helps reduce maintenance costs and emissions while ensuring system uptime. Hussmann has also made an equity investment in Phoenix, gaining access to its EnterpriseDX platform to expand IoT-based HVAC analytics.

The system will be available from March 2025, with previews planned at EEI and ConnexFM events.

Daikin Acquires Kylslaget to Boost Heat Pump Services in Sweden

Daikin has acquired Swedish heat pump service provider Kylslaget, reinforcing its regional presence and service capacity in Sweden.

The move follows Daikin's acquisition of BKF Klima in Denmark and supports its long-term strategy in Scandinavia. Sweden has one of the highest adoption rates for heat pumps in Europe, driven by economic and regulatory incentives.

Kylslaget covers 95% of Swedish households and brings advanced technician training programs to the partnership. The integration aims to strengthen Daikin's service offerings and support national decarbonization goals.

Honeywell Names Leadership for Solstice Advanced Materials Ahead of Planned Spin-Off

Honeywell has appointed key executives for Solstice Advanced Materials, its specialty chemicals unit to be spun off by late 2025 or early 2026.

The new company will be headquartered in New Jersey and led by David Sewell as CEO. Dr. Rajeev Gautam will serve as non-executive Chairman, with Tina Pierce appointed CFO. Solstice will focus on sustainable technologies, including HFO refrigerants, and maintain a global R&D and manufacturing footprint.

The spin-off aligns with Honeywell's broader portfolio strategy, which includes divesting PPE and spinning off Aerospace Technologies by 2026.

Copeland Invests in BlueHeart Energy to Advance Thermo-Acoustic Heat Pump Technology

Copeland has made a strategic investment in Dutch startup BlueHeart Energy, supporting its development of a compact thermo-acoustic heat pump. The technology offers low-noise operation without traditional

compressors, ideal for residential use. The investment will help BlueHeart scale production and enter global markets, with Copeland providing expertise in manufacturing and customer engagement. The move aligns with global decarbonization goals and reflects IEA forecasts that heat pumps must reach 50% market share by 2030 to meet net-zero targets.

Trane Technologies Acquires Marshall Fleet Solutions to Strengthen UK Transport Refrigeration Operations

Trane Technologies has acquired Marshall Fleet Solutions, a longtime Thermo King dealer in the UK. The acquisition, effective March 31, 2025, brings Marshall's refrigeration and fleet management operations under Thermo King's direct ownership. The move strengthens Thermo King's service capabilities and innovation potential in the UK transport refrigeration sector. All operations and personnel will be retained. The acquisition supports Trane's strategy to deliver integrated cold chain solutions and reinforces its presence in a key market.

Daikin Europe Reports €5.03B FY2024 Turnover with Growth in Commercial HVAC-R

Daikin Europe posted €5.03 billion in revenue for FY2024, reflecting growth in commercial and industrial segments despite weaker residential demand.

Sales of air-to-air heat pumps and cold chain solutions rose, while residential heat pumps were impacted by high electricity costs and policy uncertainty.

New product lines, such as CO2 VRV systems and Multi+ domestic hot water solutions, supported market share.

The company's Daikin 360 service portfolio expanded, and significant contracts were secured in the Middle East. Daikin reiterated its commitment to sustainability and innovation leadership.

EPA Reconsiders HFC Limits Under AIM Act, Raising Uncertainty in Refrigeration Sector

The U.S. EPA has initiated a review of the Technology Transition rule under the AIM Act, which mandates the phasedown of high-GWP refrigerants.

The reassessment could affect compliance timelines but does not reverse the move toward lower-GWP alternatives. Legal challenges from industry groups have prompted the review, raising concerns about implementation feasibility.

While the process unfolds, state-level regulations in places like California and New York will remain in effect, potentially increasing regulatory complexity across the country.

Updated Guide Offers Insights for Transition to R290 Split Air Conditioners

GIZ Proklima and the German Environment Agency have released an updated R290 Split AC Resource Guide. The guide outlines technical, regulatory, and market considerations for adopting propane (R290) as a refrigerant in residential and light commercial systems.

It addresses safety concerns, market awareness, and manufacturing barriers, offering structured support for policymakers, certification bodies, and industry stakeholders. The update reflects ongoing efforts to align with Kigali Amendment targets and promote low-GWP technologies.

ASHRAE Updates Refrigerant Designations and Safety Classifications

ASHRAE, in cooperation with UNEP, has published updated refrigerant designations and classifications under Standards 34 and 15.

The May 2025 factsheet includes toxicity, flammability, and GWP data for new refrigerants such as R-1233zd(E), R-1336mzz(Z),

Refrigerant Blends					
Num.[a]	Composition (Mass %)[a]	Safety Group[a]	Global Warming Potential (GWP100[b])	Bubble Point, °F[a]	Dew Point, °F[a]
Zeotropes					
407F	R-32/125/134a (30.0/30.0/40.0)	A1	1670	–51.0	–39.5
407G	R-32/125/134a (2.5/2.5/95.0)	A1	N/A[c]	–20.6	–17.0
407H	R-32/125/134a (32.5/15.0/52.5)	A1	N/A[c]	–48.5	–35.7
407I	R-32/125/134a (19.5/8.5/72.0)	A1	N/A[c]	–39.6	–27.4
417B	R-125/134a/600 (79.0/18.3/2.7)	A1	2740	–48.8	–42.7
417C	R-125/134a/600 (19.5/78.8/1.7)	A1	N/A[c]	–26.9	–20.6
419B	R-125/134a/E170 (48.5/48.0/3.5)	A2	N/A[c]	–35.3	–24.7
422E	R-125/134a/600a (58.0/39.3/2.7)	A1	N/A[c]	–43.2	–33.5
427C	R-32/125/143a/134a (25.0/25.0/10.0/40.0)	A1	N/A[c]	–50.6	–38.9
433D	R-1270/290 (35.0/65.0)	A3	N/A[c]	–48.5	–47.8
436C	R-290/600a (95.0/5.0)	A3	N/A[c]	–42.7	–39.1
439A	R-32/125/600a (50.0/47.0/3.0)	A2	1830	–61.6	–61.2
440A	R-290/134a/152a (0.6/1.6/97.8)	A2	156	–13.9	–11.7
441A	R-170/290/600a/600 (3.1/54.8/6.0/36.1)	A3	5	–43.4	–4.7

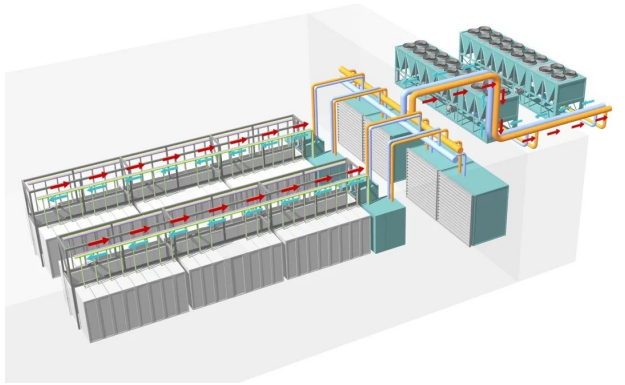
R-444A, and R-441A.

These updates aid engineers in selecting compliant refrigerants for evolving environmental regulations. Standard 15 complements the list with system safety guidelines, ensuring proper application in HVACR design.

Microsoft Introduces Zero-Water Cooling for Next-Generation Datacenters

Microsoft has rolled out a new datacenter cooling approach that eliminates water evaporation, reducing annual water use by 125 million liters per facility.

Starting August 2024, all new datacenters will incorporate closed-loop chip-level cooling. This innovation enhances Water Usage Effectiveness (WUE), bringing it close to zero.

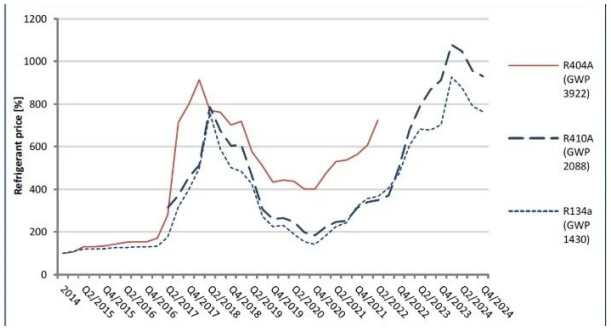


Pilot sites in Arizona and Wisconsin are planned for 2026, with full rollout expected by 2027.

The approach supports Microsoft's broader sustainability goals and addresses global water scarcity.

Market Research

Refrigerant Price Monitoring: Q4 2024 Data



Associazione Tecnici del Freddo (Italy) is an official partner of Öko-Recherche and the European Commission for the continuous monitoring of HFC prices and their availability within the EU.

In Q4/2024, 61 companies from 10 EU Member States - primarily from Germany, Poland, France, and Spain - participated in the survey. Respondents represented all levels of the supply chain, including three gas producers, 18 distributors, 28 OEMs (original equipment manufacturers), 12 service sector companies, and one company involved in fire protection. The survey collected purchase and/or sales prices of HFCs and low-GWP alternatives, expressed in absolute terms (€/kg) or as a price index (with 2014 as the base year). Companies reported prices only for the refrigerants relevant to their business activities.

Key Findings

Compared to Q4/2023, significant price increases were recorded for high-GWP gases and blends:

- R134a: +21%
- R404A: +18% (at distributor and service company levels)
- R410A: +17%

Overall, the EU refrigerant market appears stable for most companies. However, in Q4/2024, one French company reported the unavailability of R448A.

GCCA Reports 10% Capacity Growth in 2025 Global Top 25 Warehouse List

Global cold storage capacity among top providers grows to 7.3 billion ft³.

The Global Cold Chain Alliance (GCCA) has released its 2025 “Global Top 25 List,” highlighting the largest temperature-controlled warehouse and logistics providers among its members. The rankings are based on

2025 GLOBAL TOP 25 LIST

Global Rank	Company	Capacity ft (3)
1	Lineage	2,981,000,000
2	Americold Logistics	1,445,000,000
3	NewCold Coöperatief U.A.	458,569,337
4	United States Cold Storage, Inc.	419,550,000
5	Nichirei	234,320,442
6	Constellation Cold Logistics Sarl	192,050,634
7	Emergent Cold Latin America	179,079,100
8	FreezPak Logistics	141,668,955
9	Frialsa Frigoríficos S.A. De C.V.	140,040,291
10	Interstate Warehousing, Inc.	132,100,387
11	Cube Cold Europe NL HoldCo B.V.	106,565,956

total reported cold storage capacity, with the Global Top 25 now operating 7.3 billion cubic feet (207 million cubic meters) of refrigerated space.

According to GCCA, its members collectively own or operate 8.16 billion cubic feet (231 million cubic meters) of temperature-controlled capacity, marking a more than 10% increase since 2024. The growth stems from mergers, acquisitions, and the completion of expansion projects across multiple regions. However, the association notes this increase does not necessarily reflect industry-wide growth.

Overall, the Global Top 25 list grew by 640 million cubic feet (18.1 million cubic meters). GCCA noted the highest absolute and percentage growth occurred in North America, with other regions also seeing new members and capacity increases.

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Sustainability

Ammonia Refrigeration Special Edition

In an era of rapidly evolving cooling technologies, ammonia (NH□) remains a cornerstone refrigerant in industrial applications—a status it has earned through decades of reliable service. For over a century, ammonia has been the backbone of large-scale refrigeration thanks to its unrivaled efficiency, cost-effectiveness, and zero-GWP environmental profile.

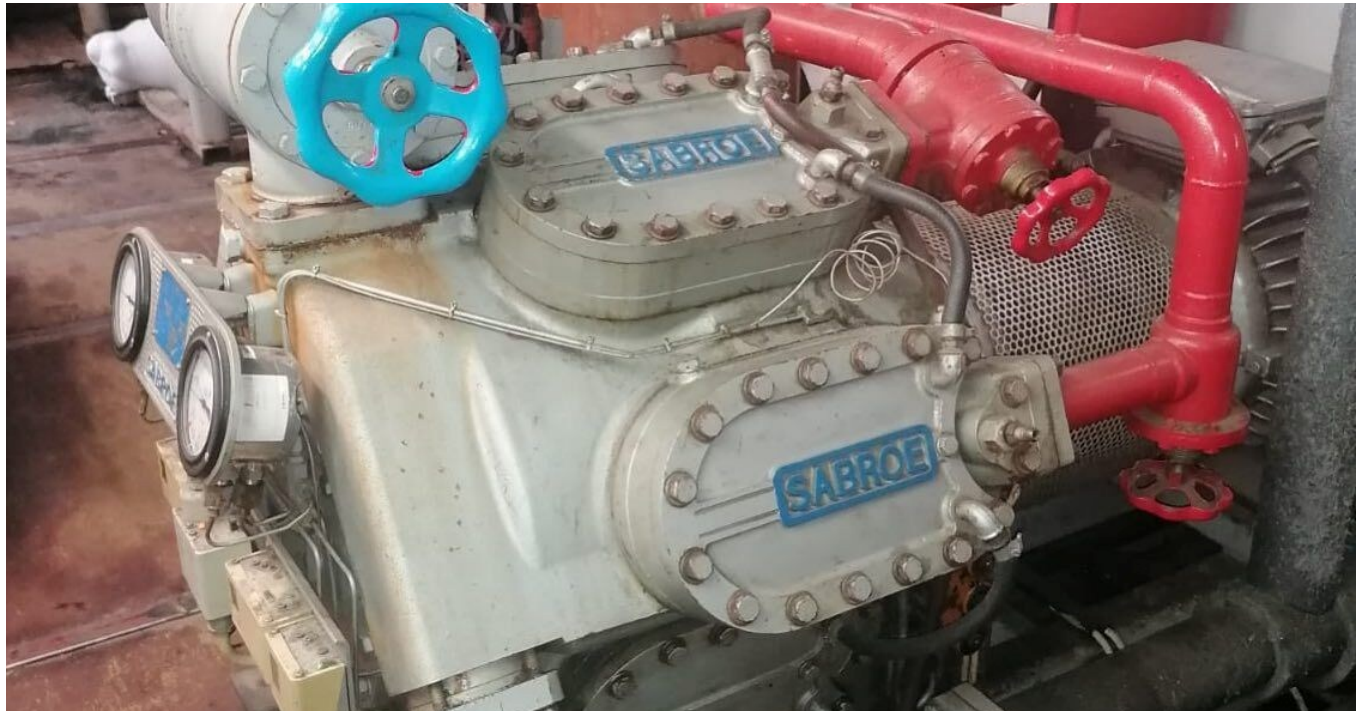
It still accounts for the vast majority of industrial refrigeration installations in markets like the United States (roughly 80–90% of the sector), even as alternative refrigerants such as carbon dioxide (CO□) and new low-GWP blends gain traction in certain niches. Industry experts affirm that ammonia's fundamental advantages ensure it will "continue to be a dominant presence" in the field, given that it is abundant, naturally occurring, and well-understood in terms of safety management.

In short, despite growing competition, ammonia's legacy of performance keeps it firmly at the heart of industrial refrigeration. However, staying on top in today's landscape means adapting to new challenges. Safety concerns surrounding ammonia's toxicity remain paramount, driving continual improvements in training, system design, and emergency protocols.

In this special edition, we explore ammonia refrigeration with a strong focus on market trends and real-world applications.

Included in this special edition:

- Our main feature article, "*Ammonia Refrigeration Evolves Amid Growing Competition*," provides a detailed analysis of how the industry is adapting—balancing ammonia's time-tested strengths with new technologies and regulatory shifts.
- The practical guide, "*First 90 Days in Ammonia Refrigeration Systems: A Technical Guidebook*," offers structured insights for newcomers aiming to master the fundamentals of ammonia system operation and safety.
- A collection of real-world case studies, highlighting practical applications from companies such as **Evapco** and **SPX Technologies**.



Ammonia Refrigeration Evolves Amid Growing Competition

By: Ilana Koegelenberg

Ammonia (NH_3/ R717) refrigeration continues to dominate industrial applications across the United States and European Union, but the sector is undergoing significant transformation as operators balance traditional advantages with evolving safety requirements, workforce challenges, and competition from alternative refrigerants. While ammonia maintains its stronghold in large-scale facilities, new technologies and regulatory pressures are reshaping how the industry approaches system design and implementation. How is the landscape changing?

Market Dominance Faces New Pressures

In the United States (US), ammonia maintains an overwhelming presence in industrial refrigeration, occupying an estimated 80% to 90% of the market, according to **Kurt Liebendorfer,** VP of Industrial Refrigeration Business Development at Evapco. However, this dominance has declined slightly over the past decade as the uptake of carbon dioxide (CO_2/ R744) refrigeration systems moves from the supermarket/ retail sector to the industrial sector as well. "This decline has primarily occurred in the new cold storage sector, where many new cold storages have been built over the same 10-year period, and some end-users have been attracted to non-ammonia solutions," Liebendorfer explains.

The competitive landscape is evolving as CO_2 systems gain ground, particularly in smaller industrial applications. **Bernhard Blaeser,** Head of Industrial Refrigeration at Bitzer, notes that in the lower-capacity industrial refrigeration sector, CO appears to be gaining ground in the European Union (EU) due to subsidies and initial price advantages for certain applications, as well as the expansion of traditional commercial CO_2 original equipment manufacturers (OEMs) into the industrial refrigeration space. However, he explains that ammonia still has a very strong presence in the higher-capacity industrial sector due to its highly efficient thermodynamic, environmental, and economic properties. “This is set to continue for the foreseeable future, as the capital expenditure gap between these two refrigerants shrinks with the size of the installation.”

Kurt Liebendorfer, VP of Industrial Refrigeration Business Development at Evapco

Bernhard Blaeser, Head of Industrial Refrigeration at Bitzer

A portion of ammonia's market share decline has also been captured by packaged industrial HFC and HFC/ HFO blends in new cold storage facilities, explains Liebendorfer. However, with pending HFC restrictions from the Environmental Protection Agency (EPA)'s American Innovation and Manufacturing (AIM) Act taking effect in the US, he notes a partial reversal in this HFC uptick, benefiting both ammonia and CO_2.Despite these competitive pressures, ammonia's fundamental advantages remain compelling. "Ammonia in industrial refrigeration applications has been, and will continue to be, a dominant presence, even as other refrigerant options are embraced and abandoned," says **Mike Sansom,** Engineering Manager at Superior Industrial Refrigeration (SIR). "Ammonia is native to the environment, it's abundant, and inexpensive. Its risks are well documented and understood and are relatively simple to minimize."

Addressing Industry Barriers

The life safety issues associated with ammonia's toxicity represent the primary hurdle, along with the added costs of associated technical remedies, according to Liebendorfer. A secondary hurdle is the cost of ammonia systems for smaller facilities, as the larger an industrial refrigeration system is, the greater the "sweet spot" for ammonia being the preferred solution, he says.

Regulatory Environment Shapes Strategy

The regulatory landscape continues to influence ammonia adoption patterns, though the impact varies significantly by region and application. In the US, the EPA's AIM Act has created a recent uptick in the application of low-charge ammonia systems and transcritical CO_2 systems over the last 18 months, says Liebendorfer.

In the EU, stricter local legislation is making it increasingly difficult to operate smaller ammonia plants in certain countries, facilitating the move to CO_2, Blaeser explains. However, the ammonia sector is responding with countermeasures, including the installation of more low-charge and direct expansion (DX) ammonia solutions to address this legislation.

Low-Charge Systems Drive Innovation

The most significant trend reshaping the ammonia refrigeration sector is the rapid adoption of low-charge systems that use less refrigerant than traditional systems.

Hernan Hidalgo, Director of Sales for Industrial Refrigeration at Danfoss Climate Solutions

Mike Sansom, Engineering Manager at Superior Industrial Refrigeration (SIR)

This shift addresses both safety concerns and regulatory requirements while maintaining ammonia's thermodynamic advantages.

Factory packaged and field constructed low-charge ammonia systems are becoming more prevalent over the historical "larger-charge" ammonia systems for new installations, says Liebendorfer. OEMs such as Evapco are actively building and selling packaged low-charge ammonia systems, along with many design-build industrial refrigeration contractors installing them, some of which are also building their own packages.

The push toward low-charge systems represents more than just a safety improvement. **Hernan Hidalgo,** Director of Sales for Industrial Refrigeration at Danfoss Climate Solutions, explains that innovative low-charge ammonia systems, such as Danfoss' NeoCharge, can result in efficiency gains of up to 20% and reduce ammonia charge by up to 50%. The technology is suitable for both new and retrofit installations, offering machine learning algorithms that deliver efficiency and reduce operator interaction.

Liebendorfer lists recent technological improvements in low-charge ammonia packages, which include advanced controls, innovative system packaging, methods of refrigerant feed such as injectors and direct expansion, and the availability of alternate condensing technologies. These developments are making low-charge systems increasingly attractive for operators seeking to balance performance with safety and regulatory compliance.

Hidalgo also notes that an increased focus on the mechanical integrity of piping and components has led to the adoption of stainless-steel valves and other relevant equipment.

Workforce Challenges Present Ongoing Concern

A persistent challenge facing the ammonia refrigeration sector is the diminishing experience level in the trained workforce. Sansom identifies this as a significant industry trend, noting that he would "like to see an increase in refrigeration service and technician training programs to help fill the gaps left by the retiring veterans of our industry."

Market Growth and Infrastructure Expansion

Despite competitive pressures, the overall

industrial refrigeration market continues to expand, creating opportunities for ammonia systems. Sansom reports that "the trend is expansion as far as the volume of refrigerated industrial space; at least that's what I'm seeing. Cold storages are upgrading and expanding, and food production is growing with increasing demand."

Future Outlook

The ammonia refrigeration sector stands at a crossroads where traditional advantages must be balanced against evolving market requirements. While ammonia maintains its dominance in large-scale industrial applications due to its superior thermodynamic, environmental, and economic properties, the industry is successfully adapting through technological innovation, with CO_2 gaining ground in some applications.

The development of low-charge systems, advanced controls, and hybrid solutions demonstrates the sector's ability to evolve while maintaining its core advantages. As Hidalgo concludes, "It is an exciting time to help drive efficiency, reduce waste, and help create a more sustainable industrial refrigeration industry."

The continued growth in low-charge installations, coupled with ongoing research efforts, suggests that ammonia refrigeration will maintain its critical role in industrial applications. Success will depend on the industry's ability to address workforce training needs, continue innovation, and effectively communicate ammonia's long-term value proposition to end users navigating an increasingly complex refrigerant selection process.

Read the full article: *Ammonia Refrigeration Evolves Amid Growing Competition*

SPX Technologies

Refrigerated Distribution Center Retrofit – Tracy, CA

SGS Refrigeration Delivers Turnkey Evaporator Replacement Solution

Client: Albertsons

Location: Tracy, CA

Completion Date: May 2025

Facility Type: Cold Storage Distribution

Contractor: Clauger US

Introduction

Albertsons, a leading national grocery retailer, operates a critical refrigerated distribution center in Tracy, California. To ensure continued efficiency and reliability, the company initiated a comprehensive retrofit project aimed at replacing approximately 80 aging evaporators. The goal was to modernize the facility's refrigeration infrastructure to meet current performance standards and extend operational longevity.

Site Evaluation and Planning

SGS Refrigeration deployed a specialized field team to conduct an in-depth site evaluation. This phase involved meticulous measurements, documentation of existing equipment specifications, and direct consultations with facility personnel. The objective was to gain a thorough understanding of the operational requirements and constraints unique to the Tracy distribution center.

The insights gathered during this evaluation were instrumental in designing replacement evaporators that would seamlessly integrate with the existing infrastructure. This proactive approach minimized potential installation challenges and ensured alignment with the facility's operational goals.

Execution and Implementation

SGS Refrigeration supplied 79 custom-configured evaporators, each engineered to meet the specific performance demands of a high-volume, temperature-sensitive environment. Throughout the project, SGS maintained close communication with both Albertsons and Clauger US, providing technical support and coordinating logistics to adhere to the project timeline.

Clauger US, known for its expertise in industrial refrigeration and process air treatment, played a pivotal role in the installation process. Their experience in delivering tailored, plug-and-play refrigeration solutions contributed to the efficient execution of the retrofit.

Results and Outcomes

The retrofit project achieved several key outcomes:

- *Timely Completion:* All 79 evaporators were replaced on schedule, adhering to the specified requirements.
- *Seamless Integration:* Accurate field measurements ensured zero fitment issues during installation.
- *Enhanced Performance:* The new evaporators improved system reliability and temperature control, critical for preserving perishable goods.
- *Collaborative Success:* Effective coordination among Albertsons, Clauger US, and SGS Refrigeration facilitated a streamlined project execution.

Conclusion

The successful retrofit of the Albertsons refrigerated distribution center in Tracy, CA, underscores the importance of meticulous planning, customized engineering, and collaborative execution in large-scale industrial projects. SGS Refrigeration's commitment to delivering reliable, field-validated solutions, combined with Clauger US's installation expertise, ensured that the facility is well-equipped to meet current and future operational demands.

This project serves as a model for similar facilities seeking to upgrade their refrigeration systems with minimal disruption and maximum efficiency.

Find out more about

SPX Technologies solutions

EVAPCO

9800KW Ammonia / Glycol Frozen Food Production Facility

Location: Scarborough, United Kingdom.

Completion Date: July 2020.

Client: Manufacturer of Frozen Potato Food Products.

Facility Type: Food Processing and Cold Storage.

Contractor Name: Seward Refrigeration, Manchester, United Kingdom.

Project Summary

New production facility to include:

- 4 x IQF tunnel freezers
- 1 x -18c cold store, 1 x +5c cold store
- 1 x loading & discharge bay area
- 2 x deck areas
- 1 x NH3 / Glycol heat exchanger serving batter chilling & glycol coolers
- Extra provision for an additional spiral freezer for future plant expansion.

Technical Solution

5 x EVAPCO ATC-935E high efficiency silent mode induced draft condensers with a total THR of 11,500KW based on a design wet bulb temperature of +21°c and a condensing temperature of +30°c serving 7 x Mycom V Screw compressors.

The general system design consisted of a combination of pumped ammonia and an ammonia / glycol plant.

1 x EVAPCO ESWA-144-24J high efficiency closed circuit glycol cooling tower with a thermal capacity of 1,953KW providing glycol at +35c serving the screw compressor(s) oil cooling requirements.

Main Results & Benefits

When the new system was fully commissioned, operational and producing the required quantity of product, the existing tunnel freezers, cold stores and evaporative condensers were decommissioned. This resulted in the amount of ammonia on site reducing from 29,000 KG to15,900Kg in total.

The 5 x ATC-953E high efficiency evaporative condensers and the ESWA-144-24J closed circuit cooling tower contributed to a further reduction in the production facility energy consumption costs.

Learn more about EVAPCO solutions

Technical Insights

First 90 Days in Ammonia Refrigeration Systems: A Technical Guidebook

by Kushal Aurangabadkar, Engineering Manager, Cargill Inc

Ammonia refrigeration systems play a critical role in industries such as food processing, cold storage, and HVAC. For new operators and technicians, the first 90 days are crucial for understanding the fundamentals, ensuring safety, and building proficiency. This technical guide provides a structured pathway to help one succeed in the new role with the deeper understanding of the ammonia refrigeration system.

Safety First

Ammonia (NH3) is a highly effective refrigerant but poses significant risks that require thorough understanding and vigilance.

Types of Ammonia Hazards

- Toxicity
- Flammability and Explosion Risk
- Environmental Impact

Common Sources of Hazards in Refrigeration Systems

The common sources of hazards in refrigeration systems are through leaks or system failures. Improper maintenance, corrosion of pipes, valve failures, or accidental damage are typical causes. Use ammonia sensors, handheld detectors, or chemical test paper to identify leaks early. Overpressure in the system can cause line ruptures or equipment damage. Equipment like compressors, condensers, and evaporators must be regularly inspected to ensure proper function.

Mitigation and Prevention

The hazards can be mitigated by engineering controls, proper use of PPE, and emergency planning. Ensure proper airflow in all areas housing ammonia systems. Install exhaust fans and emergency ventilation

systems. Use properly rated pressure relief valves to prevent overpressure incidents.

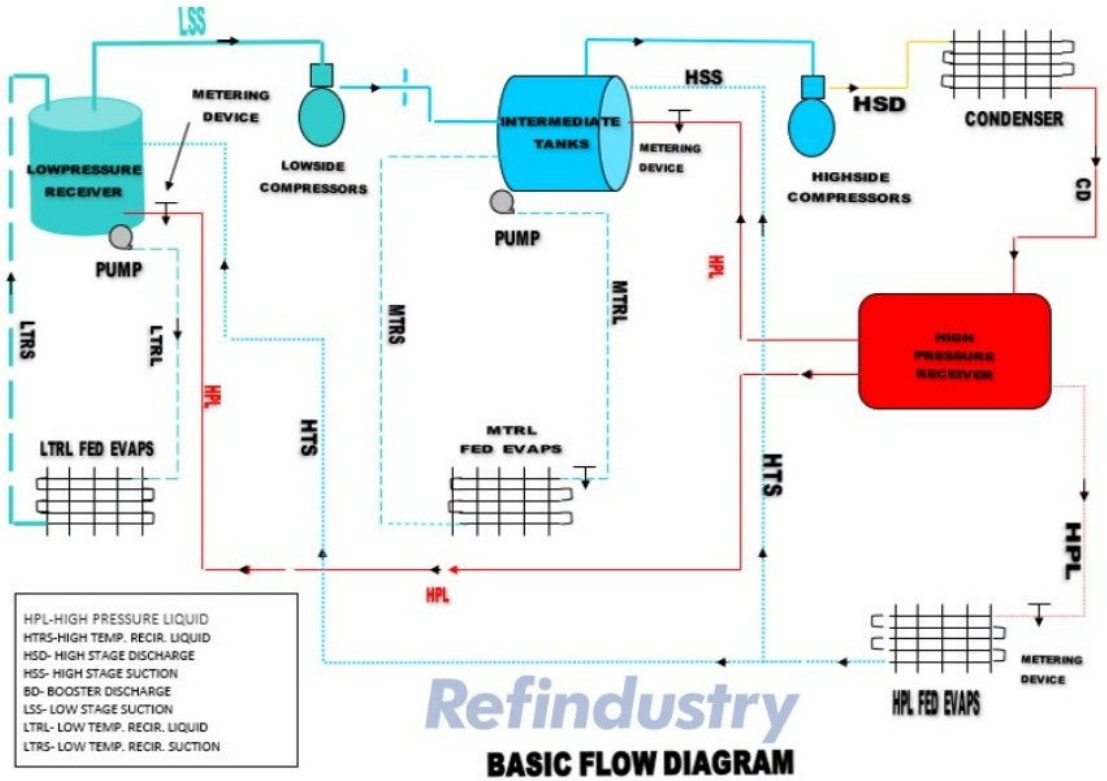
PPE includes gloves resistant to chemical burns, splash-proof goggles, face shields for eye protection, proper clothing, and full-face respirators with ammonia-rated cartridges or self-contained breathing apparatus (SCBA).

Train personnel to handle ammonia leaks, spills, and exposures as part of an emergency response team. Establish clear evacuation routes and assembly points and provide eyewash stations and safety showers.

Key Tips for New Operators and Technicians

- Treat even minor leaks seriously; they can escalate quickly.
- Understand alarm systems and respond promptly to warnings.
- Participate actively in all safety drills and inspections.

By maintaining vigilance and adhering to safety protocols, you can effectively minimize risks associated with ammonia refrigeration systems.

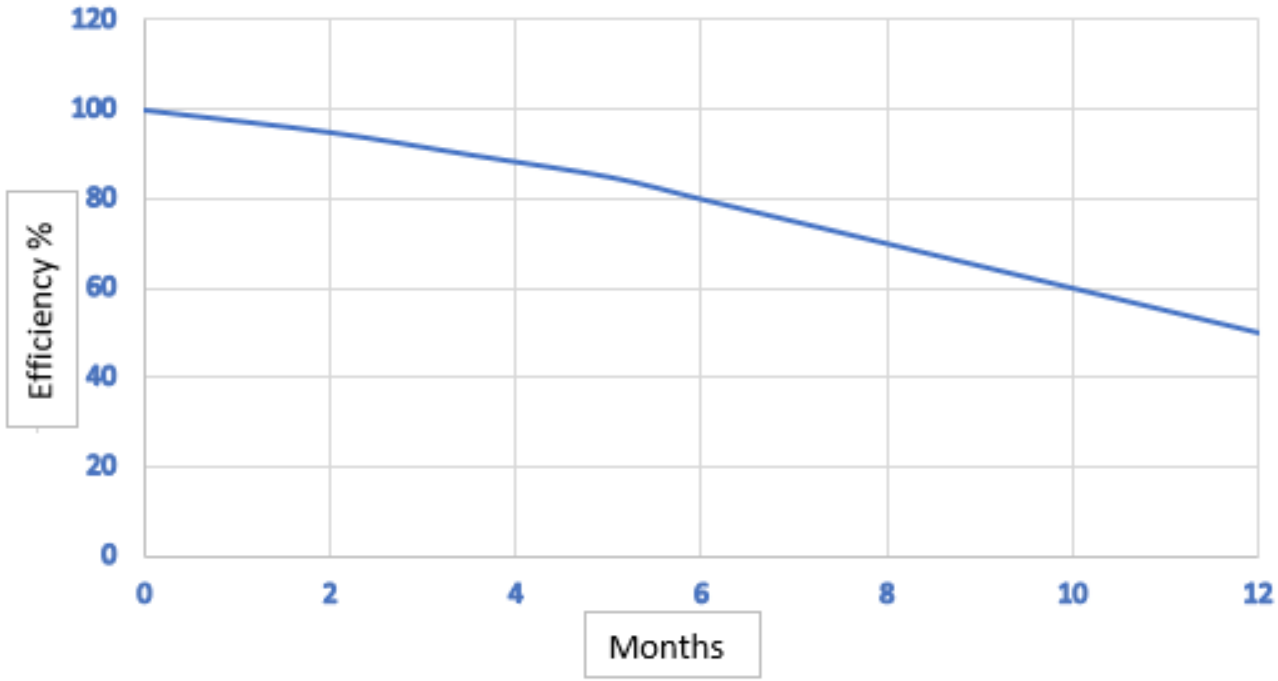


Day 1 to Day 30 – Building the Foundation

- Training and Orientation

Attend company-specific orientation programs to learn about system design and protocols. Shadow experienced technicians to observe daily operations. Study Standard Operating Procedures (SOPs) for operating and troubleshooting equipment. Learn about common system configurations, such as direct expansion and flooded systems.

- Check system pressures and temperatures.
- Inspect for visible leaks or abnormal noises.
- Ensure proper operation of compressors, condensers, and evaporators.
- Learn about ammonia sensors functionality and leak detectors.



Day 31 to Day 60 – Developing Competence

- Hands-On Maintenance and Monitoring Performance

Practice basic maintenance tasks like oil changes and filter replacements. Learn to conduct leak detection using instruments such as ammonia sensors.

- Understand how to read system gauges and analyze performance trends.
- Record data regularly to identify potential inefficiencies.
- Identify common issues, such as pressure imbalances or compressor overheating. Follow diagnostic steps to isolate and resolve problems.

Day 61 to Day 90 – Building Independence

- Advanced Operations and Emergency Response Skills

Understand how to adjust system settings for seasonal variations. Gain experience with defrost cycles and their impact on system performance. Participate in annual safety drills. Learn to manage ammonia releases safely and efficiently.

Impact of Heat Transfer Efficiency in Refrigeration Systems Over Time

Interpreting the graph below, we can correlate that the heat transfer efficiency drops over time. The biggest and most common drivers are clogging of heat exchanger surfaces, oil contamination in the system, corrosion of the heat exchanger causing the system to operate at reduced capacity, poor maintenance of the heat exchanger, reduced airflow, and aging equipment.

Conclusion

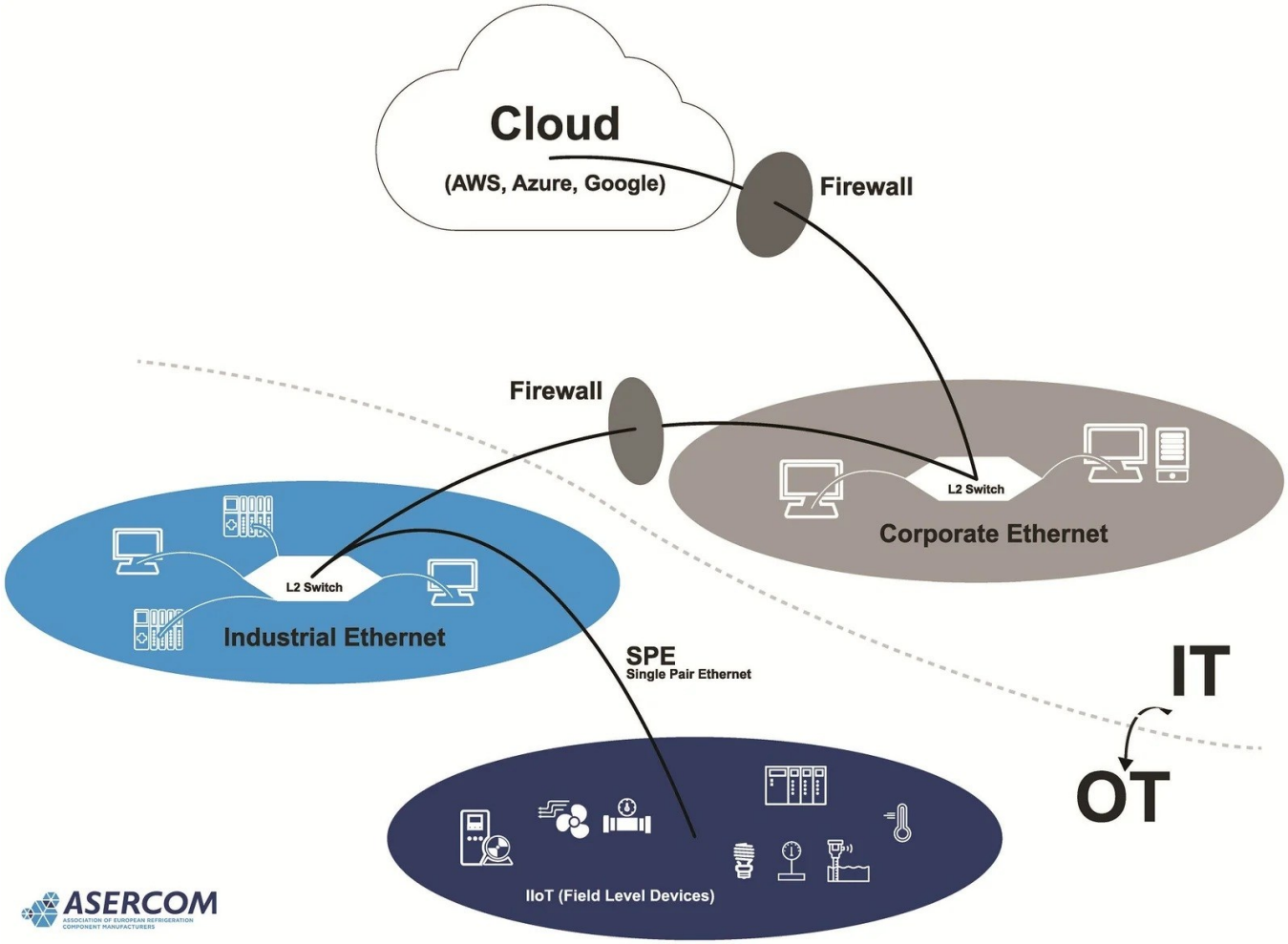
The first 90 days as an ammonia refrigeration operator or technician are critical for mastering the basics, ensuring safety, and building a core foundation for long-term success. By following this structured guide, you'll be well-prepared to contribute effectively to your team and advance in your career.

Read the full article

Technical Insights

On two wires into the future: how Single Pair Ethernet is transforming refrigeration and air conditioning technology

In the digitalisation of industrial processes, growing demands for energy efficiency, cybersecurity, and controllability are confronted with legacy technologies such as serial interfaces, proprietary bus systems, or installations that are difficult to scale. With Single Pair Ethernet (SPE), a new technology is emerging that addresses these challenges. But what exactly is SPE? What specific advantages does it offer manufacturers, mechanical engineers, and operators? And how can the transition to this future-oriented technology succeed?



Single Pair Ethernet (SPE) is a new, globally recognised physical Ethernet standard that enables both data transmission and power supply over a single twisted pair of copper wires. In contrast to conventional Ethernet, which uses four wire pairs, SPE allows for a more compact and resource-efficient infrastructure. The so-called “Power over Data Line” (PoDL) technology also makes it possible to supply connected devices with up to 50 watts of electrical power.

With a range of up to 1,000 metres at 10 Mbit/s (according to IEEE 802.3cg), SPE is particularly well suited for building and process automation. Even higher transmission speeds of up to 1 Gbit/s are possible over shorter distances. The corresponding connectors are defined in IEC 63171 and specifically designed for compact and robust industrial applications.

Why SPE is especially relevant now

As the networking of intelligent components increases and the desire for seamless IP-based communication grows, traditional fieldbus systems are reaching their limits. A gap often remains between the IT world and the field level, which currently

has to be bridged using Remote-IO, media converters, repeaters, gateways, and parallel cable paths. This is precisely where SPE comes in: it eliminates this technical fragmentation and brings Ethernet communication directly to the sensor or actuator - with minimal cabling effort. For the first time, it becomes possible to implement standardised IP structures from the cloud to the inside of the device.

Dr Christian Ellwein, Head of the Electronics Working Group at ASERCOM, the Association of European Refrigeration Component Manufacturers, emphasises the strategic significance of SPE: “The technology originally derives from the automotive sector and is already widely used there. The opportunity now lies in unlocking its potential for building automation - and, beyond that, for refrigeration and air conditioning technology.”

ASERCOM and SPESA: cooperation for a common standard

ASERCOM and the Single Pair Ethernet System Alliance (SPESA) - a global network of 90 leading technology companies - have recognised that the introduction of SPE into refrigeration and air conditioning technology cannot be achieved solely on a technical level. They have therefore joined forces in a working group to jointly develop standards, requirements, and recommendations for action. The aim is to establish the conditions necessary for an interoperable, cross-manufacturer implementation.

This is not only about technical specifications. The ongoing collaboration also addresses communication requirements, data structures, update cycles, and power supply needs. A key point is the evaluation of existing infrastructure: Which cabling can continue to be used? Which interfaces will be relevant in the future? And how can pilot projects be implemented in a sensible and practical way? Initial results will be presented at the SPE Forum in autumn 2025.

Technological benefits in networked systems

A key advantage of SPE is the unification of the communication infrastructure. Instead of a multitude of proprietary fieldbuses, the technology enables the development of a consistent IP network all the way to the lowest level. This not only simplifies planning but also reduces potential sources of error.

Furthermore, many security and communication standards from the IT domain can be applied directly. Certificate-based encryption, role-based access models, and update options via the network are already well established today - and with SPE, they can now also be implemented at the device level. At the same time, smaller connectors and a smaller number of wires enable more compact devices and simplified installations.

Conclusion: infrastructure of the future also relevant for operators

Single Pair Ethernet is more than just a new cabling technology—it is a strategic lever for digitalisation, efficiency, and sustainability. For manufacturers in the refrigeration and air conditioning sector, the technology opens up new possibilities in design, integration, and networking. But operators also benefit: systems become more transparent, easier to control, and more maintenance friendly.

For example, in the food retail sector, logistics industry, or among operators of building complexes, this means better data for controlling cooling and air-conditioning systems, easier integration into existing networks, and reduced maintenance effort.

The ongoing cooperation between ASERCOM and SPESA demonstrates that a structured approach is possible. Those who start thinking ahead today will be able to act more efficiently tomorrow. After all, the infrastructure used for communication is the silent backbone of any successful digitalisation.

Read the full article

Interviews

Stephen Gill on World Refrigeration Day and His Industry Journey

By Ilana Koegelenberg

Stephen Gill, founder of World Refrigeration Day and newly appointed Head of Industry Insights for HVAC Europe at Haier, discusses how a chance encounter led to a 45-year career and ultimately sparked a global movement to raise awareness of the refrigeration, air conditioning, and heat pump sector.

Refrigeration Industry (Ri): How did World Refrigeration Day come about?

Stephen Gill (SG): Raising the profile of the refrigeration, air conditioning, and heat pump (RACHP) sector in a positive way has been a challenge throughout my entire career, ever since I first tried to explain what I do to friends and family. It was obvious that our industry is a blind spot to those outside of it, and I'm sure this realization isn't unique to me.

The idea for an industry day started growing in 2004 after attending an industry dinner where the discussion centered on how difficult it is to attract people to join our "hidden" industry. In 2007, I naively posted on social media that April 15th – the birthday of William Cullen, who created ice artificially in 1756 – should be World RACHP Day. Much to my surprise and dismay, the post received no attention whatsoever.

I realized I needed to rethink my approach, though I still believed it was a good idea. As I researched other awareness days, I became aware that most 'World' days aren't truly celebrated around the world at all, only in certain regions. I wanted to do better and knew I had to gain support from as many organizations worldwide as possible to do so.

Ri: How did you go about building that support?

SG: Starting in 2011, I began reaching out to various industry bodies and international influencers, referring to it as World RACHP Day. This was a long, slow process over several years. Each conversation was different, but similar themes emerged: several said the idea wasn't new and had never taken off; most agreed it was good but felt their own organization was best placed to lead it; all suggested alternative dates that suited them; most voiced objections to supporting an initiative led by another association; none wanted to fund it, though some saw opportunities to make money from it.

There was no universal consensus on a date that suited everyone. It felt like one step forward, one step backward.

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-15°C	**-45°C**	**48°C**	**77°C**

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Ri: What was the breakthrough moment?

SG: The turning point came at the ASHRAE Associate Society Alliance meeting in Long Beach, California, in 2017 – which just happened to be on June 26th. After a long pause, former ASHRAE President Jim Wolf asked, "But why June 26th? We can't have a day just because it coincides with this meeting."

I was pleased to be able to reply that June 26th is also the birthday of Lord Kelvin, the pioneer of the absolute temperature scale and the first to propose the concept that would later evolve into what we now call heat pumps. I added, "We are all connected by temperature, as is the work we do."

That shifted the conversation. Up until then, one of the stumbling blocks to universal agreement had been which pioneer's birthdate should be chosen. By focusing on Lord Kelvin and the broader unifying theme of temperature, it helped move things forward. Jim gave a nod – literally – and while there was no formal resolution that day, the seed was planted.

At the same ASHRAE meeting a year later, in 2018, Tony Gleeson from the Australian Institute of Refrigeration, Air Conditioning and Heating (AIRAH) announced that AIRAH had launched an 'International Day of Refrigeration' on April 17th, marking James Harrison's birthday. When it was pointed out that we had informally agreed the year prior to June 26th, Tony immediately responded with support: AIRAH would shift its observance to align with the internationally agreed date. "It's important that we all get behind this," he said.

That moment of unity was the real breakthrough. June 26th became WRD – a day with deeper meaning that could unite the sector.

Shortly after, on June 26th, 2018, Graeme Fox, a then-to-be future President of the Institute of Refrigeration (IoR) tweeted that today is World Refrigeration Day. However, the big launch was the following year only, so when asked, I always say that WRD started in 2019.

Ri: How did you gain broader recognition?

SG: In addition to support from national associations, I knew from the outset that gaining recognition beyond our industry was essential if WRD was to have truly global legitimacy. That meant engaging with organizations like the United Nations (UN).

The United Nations Environment Programme (UNEP)'s OzonAction team had long been active at international industry events, often represented by Ayman Eltalouny. I saw their involvement as pivotal. I approached Ayman repeatedly, and over several years. He was always encouraging and interested in the concept but understandably couldn't commit on behalf of UNEP without evidence of widespread international support.

That breakthrough came in mid-2018, after AIRAH and many others agreed to unite behind the June 26th date. By then, over 90 national associations had expressed their support.

When Ayman mentioned he'd be attending the Chillventa exhibition in Nuremberg that

October, I made sure I was there too, determined to share the progress face-to-face. On an unseasonably warm October day, I updated him with the latest developments. That was the moment he'd been waiting for.

Ayman's support was instrumental. Thanks to him, I was invited to present the WRD initiative at a UNEP-hosted meeting held at the UNESCO headquarters in Paris on February 19, 2019. That presentation – delivered not to a technical audience, but to national ozone officers and policy makers – marked a major step toward broader institutional recognition.

Ri: What happened on that first WRD?

SG: I had no idea what would actually happen. A couple of days before, I thought about staying in bed and pretending I was sick in case nothing happened. But then it began – New Zealand was first, holding a webinar for students. Then, more and more events started popping up. Because the event wasn't restricted, and nobody needed permission to do anything, it really spread fast. Everyone could make it their own.

I watched it ripple across the world during that day. There were really creative approaches – kids drawing pictures, people going into schools, all sorts of unique events that people organized off their own backs. We counted about 800 activities that first year in around 157 countries. I thought it couldn't get any bigger than that.

Ri: How has WRD grown since then?

SG: After the pandemic pushed everything online, we started seeing explosive growth of online activity, which was easier to track. A couple of years ago, in 2021, when physical events resumed, more than 11,000 events were loaded on the WRD website. Last year, we counted around 17,000 activities in 162 countries. We now have very close to 400,000 subscribers on the website.

Ri: Is WRD achieving its original objectives?

SG: To some extent. Things are changing; the industry's profile is being raised. But 90% of the conversation is still happening internally within the industry. However, people are now feeling empowered to go out and talk about what they do. Do our neighbors know what we are doing? No, they still don't. Do our sons and daughters know? Often not. While large-scale grand awareness campaigns are important, the real change takes place in our local communities. I can sense movement in the right direction. It's moving, but it's not there yet.

The narrative is changing, though, and I'd like to think WRD has had a hand in that. The focus has given us an opportunity to examine ourselves and has helped connect discussions about inclusivity. There's much more focus on how we present ourselves to the outside world. It's not just inclusivity – it's also energy saving, decarbonization, all the positives that were always there are now being shared.

Read the full interview

Events

Innovations, Regulations, and Market Trends: A Summary of the XXI European Conference on Refrigeration and Air Conditioning Technologies

The XXI European Conference organized by Centro Studi Galileo took place on June 12-13, 2025, at Politecnico di Milano, bringing together industry experts, policymakers, and researchers to discuss advancements, regulatory changes, and technological innovations in refrigeration and air conditioning systems.

The conference was held under the auspices of UNEP, IIR, AREA, REI, and ATF.

Key topics covered were refrigerants, global and European RAC situations, the cold chain, innovative technologies, equipment and components, F-Gas regulation, energy efficiency, renewable energy integration, and policy regulations.

Explore the full conference summary

Read the interview with Marco Buoni, Director of Centro Studi Galileo

World Refrigeration Day 2025 Event Brings Global Experts Together in Paris to Advance Sustainable Cooling Solutions

On June 18, 2025, the International Institute of Refrigeration (IIR) hosted the World Refrigeration Day event at Salons Hoche in Paris, bringing together nearly 170 high-level participants from governments, industry, academia, and international organizations across more than 60 countries.

The event celebrated the pivotal role of refrigeration and heat pump technologies

in enhancing human well-being, animal welfare, and climate sustainability.

This year's event marked a significant milestone—exactly one year after the launch of the IIR's 2024–2028 strategy—and reinforced the organisation's mission to foster global collaboration and knowledge exchange in the refrigeration sector.

Read more about the event

Introducing the magazine in PDF Format to the partners

We are thrilled to introduce our new PDF magazine, designed to be a valuable resource for our readers. In a world brimming with information, our mission is to streamline the process of staying informed by delivering the most crucial updates and insights from the past quarter.

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We are committed to ensuring that our readers receive our magazine promptly. We distribute it through our newsletter to over 4,000 subscribers, registered users on our website, and webinar attendees.

Additionally, we will actively promote the magazine across our social media platforms. With more than 50,000 followers on our news feeds and over 150,000 members in our LinkedIn and Facebook groups, we guarantee extensive and far-reaching exposure.

We are excited to share our initial outlook on this new magazine and have plans for its ongoing development. Join us on this exciting journey, and please share your feedback and ideas.

Discover more about the magazine's features and pricing on the following pages.

Main Headings in the Magazine

- **The Most Popular News from Refindustry.com:** Stay updated with the most crucial developments.
- **Sustainability:** Discussing green refrigeration practices and their impact on the environment.
- **Technical Insights:** Explaining complex concepts and providing technical insights into refrigeration equipment.
- **Case Studies:** Real-world examples of successful industrial refrigeration projects, installations, and problem-solving.
- **Maintenance and Troubleshooting:** Tips and guides for maintaining and troubleshooting refrigeration equipment.
- **Interviews:** Insights from industry experts, engineers, and leaders in the field.
- **Opinions:** Expert perspectives, commentary, and analysis on relevant industry issues and trends.

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Place an advertising module or contribute an article on topics like sustainability or successful case studies, sharing your company's experience with the magazine audience. Discover more in our Media Kit.

Magazine Issue Plan

- N 2025 / 4 — October: Heat Pumps
- N 2026 / 1 — January: Commercial refrigeration

For any inquiries, feel free to contact us at

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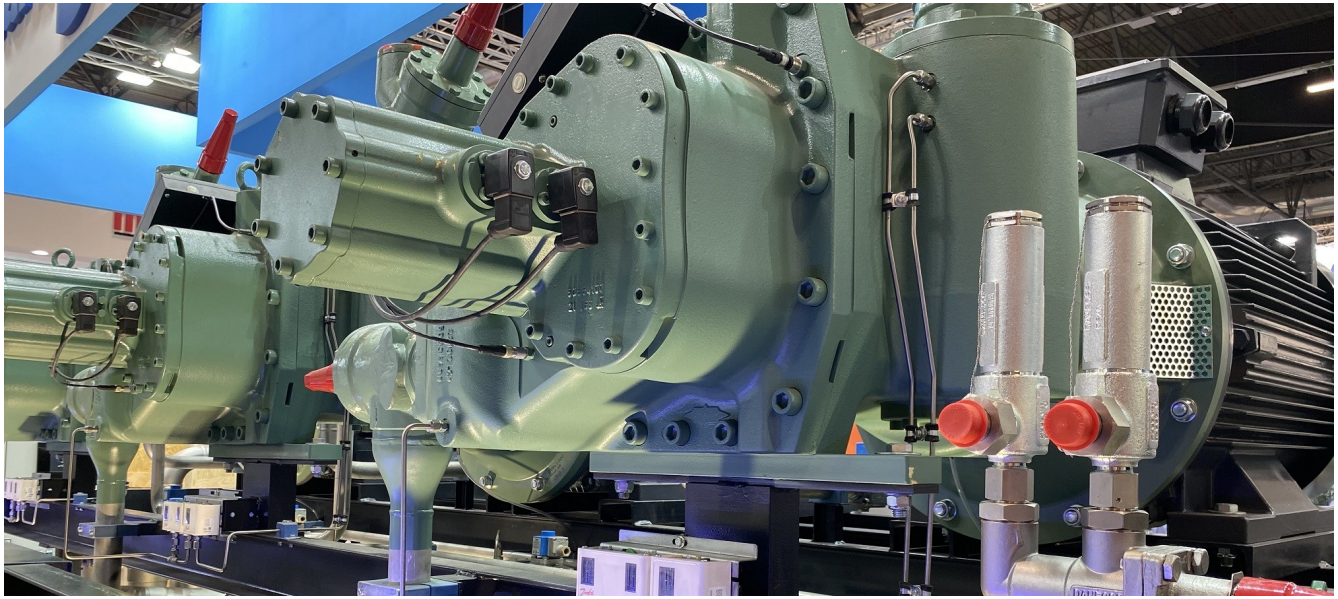

The opportunities

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