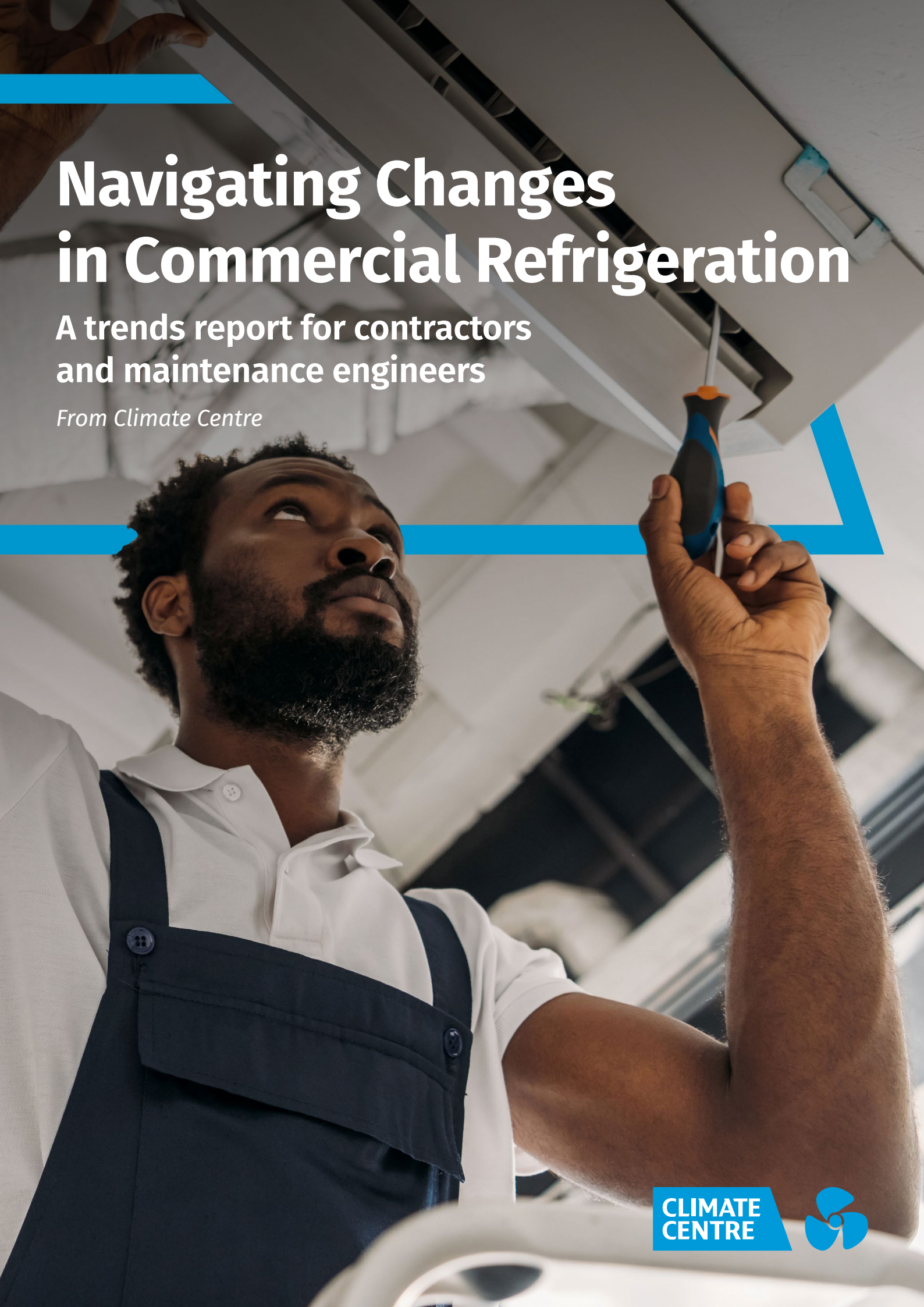
Navigating Changes in Commercial Refrigeration

A trends report for contractors and maintenance engineers

From Climate Centre



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Contents

Foreword 4 - 5

Industry pulse 6 - 7

Legislative updates 8 - 11

Understanding your equipment 12 - 13

Pipe sizing support 14 - 15

Removing your admin headaches 16 - 17

Case study: Switching to A2L refrigerants 18 - 19

The future of refrigeration 20 - 21

Foreword

Building resilience in an evolving market

The commercial refrigeration sector is in the midst of one of its most significant periods of change in decades. From legislative reform to technological innovation, the pace of transformation means contractors and maintenance engineers must adapt faster than ever before.

This report has been designed to help you navigate that change with confidence. Whether you work with commercial packaged equipment or bespoke heavy-duty industrial systems, the same challenges apply: selecting refrigerants that meet future F-gas targets, designing for efficiency, and ensuring systems remain robust and resilient for years to come.

Regulatory shifts are reshaping the way we specify, install and maintain systems. At the same time, advances in controls, connectivity and component design are creating new opportunities to improve performance, reduce running costs and extend equipment lifecycles.

At Climate Centre, our focus is on providing the technical expertise, product range and supply chain support you need to thrive in this changing landscape. I hope this report gives you practical insight, useful guidance and, above all, the confidence to embrace change and build truly future-ready refrigeration systems.



Peter Woods
Director of Technical Services
Climate Centre

Industry pulse

What's happening in commercial refrigeration?

Building futureproof systems

The inevitable focus across the refrigeration market right now, is on building systems fit for the future. This means systems that are compatible with the new generation of A2L refrigerants (even if not currently using them), capable of meeting future efficiency demands and of course built to last.

Anybody installing an A1 refrigerant system today should be aware that the necessary switch to A2L refrigerant under F-gas regulations will be introduced before the expected lifespan of that system ends. A2L compatibility is crucial to save reducing the lifecycle of the entire system.

For larger applications, the same future resilience can be achieved through the use of CO_2, which has a Global Warming Potential (GWP) 1 to sidestep the regulatory phase-downs affecting HFCs.

Energy saving solutions

Refrigerant choice is not the only way to boost the efficiency of a system in line with wider sustainability targets.

The use of EC fans on condensing units in place of traditional AC fans is driving energy savings, offering higher motor efficiency, variable speed operation and a lower condensing pressure, all of which cuts energy use.

We're seeing increased use of inverter control on compressors to match output to demand and avoid inefficient stop/start cycles, as well as the use of digital scroll compressors that can modulate capacity without changing motor speed, again reducing unnecessary compressor work.

Microchannel coils – condenser or evaporator coils that use very small-diameter refrigerant channels – are proving popular. These reduce refrigerant charge size and optimise heat transfer efficiency, which directly reduces compressor workload.

Achieving cost control

Contractors are also looking at ways to keep costs down for the end user, notably strategies to reduce the refrigerant charge. Using smaller pipe runs to reduce the entrained volume of refrigerant in the system not only saves on piping costs, it also helps mitigate the impact – and cost – of any refrigerant loss through leakage.

Embracing Industry 4.0

Another trend is the shift towards connectivity, embracing key technological developments such as the Internet of Things (IoT) and big data to help optimise the monitoring, performance and longevity of refrigeration systems.

A new generation of controls on commercial refrigeration equipment includes Bluetooth connectivity, with in-built data touchpoints to streamline daily operations such as HACCP reporting. Remote transmitters, the use of apps and other software is giving users access to data like never before.

Digital controls in practice

The Carel iJW controller is a fantastic example of manufacturers using Bluetooth and Near Field Connectivity (NFC) to enhance control and reporting capabilities. Designed for both field replacements and new installations, installers can use their smartphone for easy configuration, testing and maintenance of the controller, while end users can optimise everyday tasks including viewing temperature logs and downloading HACCP records.





Legislative updates

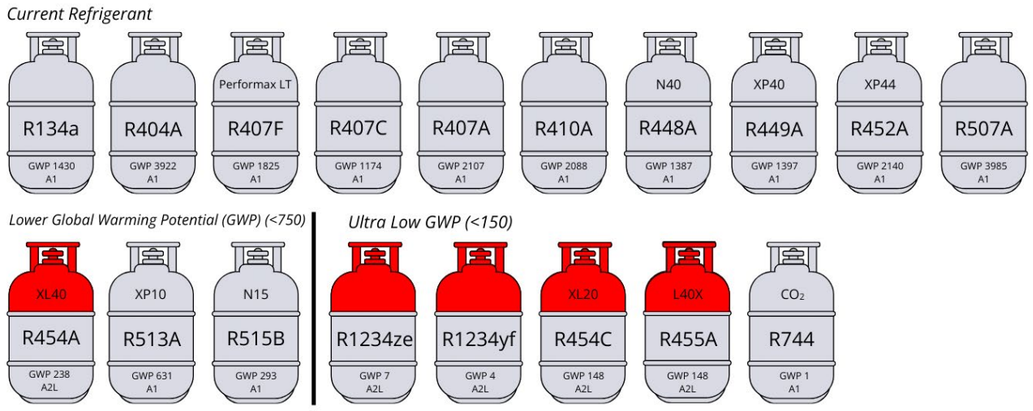
F-gas Regulation

The third wave of updates to the F-gas Regulation are now in force, adopted in the EU in January 2024 and setting the stage for further restrictions in the coming years. And although the UK is no longer bound by EU rules, the direction of travel remains similar.

DEFRA has been consulting on a UK-specific version of F-Gas III, expected to take effect in 2027, which means it is likely to follow a similar model to the EU regulation.

What you need to know:

- By 2030, the average GWP of refrigerants placed on the market must fall below 400. To hit this target, commercial and industrial sectors must now adopt lower GWP refrigerants across all applications.
- In commercial refrigeration, blends such as R455A and R454C – both under 150 GWP – are key alternatives. In heavier commercial systems, R454A, with a GWP of 238, provides a viable solution. All three belong to the A2L category.
- When selecting the right refrigerant, both thermodynamic properties and system compatibility must be considered.
- A2L refrigerants like R454C, R455A, and R454A are blends with glide ranging from 5K to 10K. This has important implications when selecting and sizing equipment. Unlike azeotropic refrigerants like R32, which evaporate at a single temperature and have zero glide, A2Ls require consideration of midpoint temperatures to ensure correct evaporator sizing.
- If incorrectly selected, systems may exhibit lower air-off temperatures, leading to increased latent cooling and unintended product dehydration. This is particularly important in applications like blast chilling of meat, where product integrity is paramount. In such settings, a refrigerant with low glide – such as R454A – may be preferred.
- The use of flammable refrigerants introduces added responsibility. While A2L types are low-flammability and need much more energy to ignite (typically over 1,000 times more than A3s) installers must still follow safety protocols, including risk assessments based on charge size, room volume, ventilation, and equipment placement per EN378.



Information supplied is for guidance purposes only. For specific product or technical information, please contact A-Gas or the equipment manufacturer. Global Warming Potential (GWP) values are according to IPCC AR4.

PED/PESR

Under the Pressure Equipment Directive 2014/68/EU (PED) and the UK equivalent Pressure Equipment (Safety) Regulations 2016 (PESR) since Brexit, refrigerants are classified into Group 1 (hazardous) or Group 2 (non-hazardous) based on their properties.

Non-flammable A1 refrigerants are typically Group 2, while A2L refrigerants have low flammability, which means they fall into Group 1 under PED/PESR.

Moving from A1 to A2L (and the resulting classification from Group 2 to Group 1) typically bumps equipment from PES/PESR Category I to II or higher. This triggers more stringent conformity assessment requirements, including more documentation, stricter pressure testing and sign-off from a Notified Body.

For example, for Category II installations:

- All pressure-bearing parts must be UKCA marked, have a Declaration of Conformity and be suitable for Group 1 fluids if required. This includes compressors, receivers, heat exchangers, safety valves, and pipework assemblies.
- Design calculations, risk assessments, assembly technical file and instructions for safe installation, operation and maintenance must all be prepared and kept for at least 10 years.
- Installations must be completed in accordance with PESR design requirements, including pressure testing witnessed by a UK Approved Body if Category II or above.



EN 378: 2026

Another change to be aware of is the imminent publication of EN 378:2026 (Safety and Environmental Requirements for Refrigerating Systems, Air Conditioning, and Heat Pumps), prepared in tandem with F-gas updates.

Full details are not yet known (the consultation is still under way at time of writing), but new installations will be required to comply from 2027 with key changes, which are expected to include:

- A new calculation method for charge limits of flammable refrigerants.
- Annex E (refrigerant safety classification) being separated into a new Part 5, to allow easier updates as new refrigerants emerge.
- Part 4 (operation, maintenance, repair, recovery) being withdrawn and replaced with EN ISO 5149-4, aligning the content with ISO standards but without technical changes.



Understanding your equipment

Our extensive range for refrigeration includes:

Refrigerants. A range of refrigerants used in refrigeration systems, together with expert advice on suitability and compliance under evolving F-gas Regulations.

Controls. These are responsible for regulating and optimising various parameters to ensure efficient cooling operation. They serve as the brain of the system, monitoring temperature, pressure, and other critical factors to maintain optimal conditions for food preservation, product storage, and industrial processes.

Evaporators. These cool the space or product within a refrigeration system by absorbing heat from the surrounding environment, causing the refrigerant to evaporate and transition from a liquid to a vapor state.

Compressors. Refrigeration compressors control the pressure of refrigerant gases used in cooling systems. This allows them to regulate the flow of gas around the system, which in turn regulates the level of cooling delivered by the refrigeration system.

A2L Condensing Units. They offer an integrated approach to efficient cooling. By combining compressors, condensers, fans, and controls within a single enclosed housing, these units optimise heat removal from the refrigerant, crucial for maintaining optimal system performance.

Condensers. A heat exchanger that removes heat from the refrigerant, causing it to condense from a high-pressure gas to a high-pressure liquid. This transfers heat from inside to the outside environment.

Pipework. Copper pipe and fittings to complete your refrigeration system.





Climate Centre’s top tips for pipe sizing:

- Planning is crucial. Consider pipe sizing at the earliest design stage.
- Tap into supply chain support. Take advantage of software and calculation support from distribution partners like Climate Centre.
- Remember, software calculations are only as good as the data inputted.
- Factor in future maintenance. Consider access to and longevity of piping systems.

Pipe sizing support

A large percentage of compressor failures – some believe up to 90% - result from issues caused by poor pipework design and installation. Remember, pipework is not just a means of connecting equipment, it’s an integral part of the system itself – and it’s vital to get it right.

If pipework is too narrow, it will create a pressure drop that impacts cooling capacity and may cause refrigerant slugging. If too wide, the oil needed for lubrication may not return effectively. Both scenarios put the compressor (the most expensive single piece of equipment in any refrigeration system) at risk.

To coin a phrase used commonly in the industry, ‘compressors don’t die, they’re killed’. In fact, historic data by Bitzer UK shows 95% of alleged warranty failures on compressors turned out to be caused by external influences from the refrigeration system, not the compressor itself. Of the remaining 5%, half show no faults, meaning that only 2.5% of the alleged failures cannot be attributed to external influences.

Sizing solutions for every project

Climate Centre’s experienced team works closely with customers to undertake pipe sizing calculations in accordance with CIBSE, BS EN guidelines, and manufacturers’ technical datasheets.

Each individual project based on factors such as capacity, refrigerant type, suction/discharge/liquid lines, pressure drop limits, velocity, vertical lifts and operating temperatures.

- TapXL, our internal software programme, for basic pipe sizing to optimise packaged systems
- Hot Chilli, for intricate sizing calculations on more complex systems

Copeland

With correct design and installation (including pipework design), compressors can operate efficiently and reliably for many years, sometimes well beyond their design lifetime’.

Removing your admin headaches

With evolving regulations, commercial refrigeration projects can be complex. Climate Centre simplifies account management, so you can focus on your clients and their needs.

- We stock a wide range of AC, refrigeration, accessories and spares across our national branchnetwork, plus next-day delivery from our 150,000 sq ft distribution hub.
- We have experts in every branch ready to support with advice on product selection, pipe sizing and aftersales.
- We've made it easier to manage trade accounts online, including the option to check the status of orders online, make payments and view/download/email e-documents.
- Customers can convert quotes to orders using our simple online system, and add products to an existing order.
- Our Partner Programme also gives SME contractors access to leading software from third parties that help them to run their business better, including take-offs and estimates.





Case study: Switching to A2L refrigerants

Recognising the need to adopt low GWP refrigerants, our customer SK Refrigeration worked with Walsh Mushrooms Group, one of the largest suppliers of fresh mushrooms and substrate in Ireland and the UK, to support the adoption of A2L Opteon XL40 refrigerant in large charge sizes, providing energy efficient solutions for the cold chain.

The move was driven by concerns over refrigerant pricing, particularly with the imminent changes to F-gas Regulations. Opteon refrigerants are a low-GWP and energy-efficient HFO/HFC blend and provide sufficient performance to replace legacy and interim replacements but with a GWP significantly lower. Opteon XL40 has a GWP of just 238.

Proposing the solution, SK Refrigeration was able to demonstrate the practical application of large charge sizes of A2L refrigerants in large commercial cold storage, whilst maintaining compliance with EN378 and PED/PESR. Products were supplied by Climate Centre.

Over the system lifetime of 15 years, this solution is predicted to save:

- 134 tonnes of direct CO_2
- 20 tonnes of indirect CO_2
- £54,000 total cost saving in operating costs

Scott Gibbins, Managing Director, SK Refrigeration

R-22 refrigerant alternatives are becoming harder to obtain or coming in at £75 - £100 a kilo in terms of cost (with a significantly high GWP); the customer requested options for replacement moving forward. They also wanted a solution or refrigerant that would be somewhat futureproof with the ever-increasing pressure on GWP and quota.

The future of refrigeration

Here are our predictions of what will be shaping commercial refrigeration in the coming months and years.

1. Rising ambient temperatures will impact design

As ambient temperatures continue to rise, there is no doubt this will impact system designs. For example, systems in Scotland were historically designed to work up to ambient temperatures of 25°C. Now, factoring in rising temperatures and the expected lifecycle of the system, they should be capable of working up to 35°C - and 42°C ambient temperature in central London. Systems must be designed to accommodate those elevated pressures, which makes capacity control even more important within refrigeration systems that are oversized for current ambient temperatures.

2. Innovation in connected devices will continue

Industry 4.0 is another shift in the way in which devices are controlled and connected. Enhanced monitoring, data and reporting will be key to optimising performance - expect to see a continuation of product development to make sure end users have the insights they need to maximise efficiency.

3. CO_2 will prove its role in reducing direct emissions

We've already written about the potential of CO_2 used as a low GWP refrigerant in large commercial and industrial systems, and this will only increase as the drive for low GWPs continues. CO_2 comes at a price – up to three times the cost of an A1 system at current levels – but this will even out as the F-gas quota bites.

4. Reclaimed refrigerant will prove vital as demand outstrips supply

Expect a trend for system designs that run on less refrigerant at the outset, by keeping kit on short runs, taking into account internal volumes and receiver sizes. This is partly because without change, refrigerant use will exceed demand as early as 2027. Reclaimed refrigerant will be vital to meet demand, particularly as price increases on higher GWP refrigerants become evident.

Adopting low GWP refrigerants, together with other developments such as advanced controls and innovative system designs, is essential to meet the regulatory, efficiency and customer demands of modern refrigeration systems.



One of the UK's leading specialists in air conditioning and HVAC, with the largest network of specialist cooling branches across the country.

Climate Centre

Range and availability
We stock a full range of air conditioning and refrigeration equipment, accessories and spares from the world's leading brands. Our national scale and supply quantity ensures that we always have stock available - when you need it, where you need it.

Service and expertise
Whatever size your project, our Climate Centre experts are on hand to support you with everything you need to get the job done. Whether that's product advice or bespoke delivery requirements, we're here to please.

Help and advice
Technical experts are always on hand to offer support and advice. Support includes everything from product selection, parts identification and duty calculations, to after sales service troubleshooting. Our engineers may even visit your site if required.



To find out more, scan the QR code

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