CB REFRIGERATION

Greener Solutions

Helping you achieve Net Zero

Excellence in Engineering

Helping you achieve Net Zero

CB asset F-Gas phase down

65% F-Gas reduction for customers by 2030.

CB Refrigeration has been providing innovative solutions since 1952.

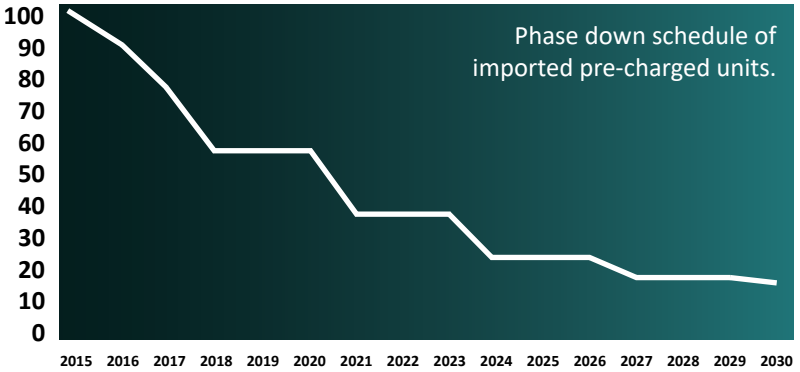
Since our founding, we've always adapted to match the current industry direction. We are able to provide alternative, bespoke solutions for our customers. Unable to find a solution that's best for you? We will design and install a product that's best for your business.

We offer

- In-house consultancy
- CO_2 trained field-based engineers
- Innovative, bespoke designs tailored to your business
- Low and ultra low GWP refrigerant solutions

We are proud to be challenging ourselves to achieve 65% of customers using utlra low GWP refrigerants by 2030. Together we can achieve **'Excellence in Engineering'**.

The **F-gas regulation** was implemented on January 1, 2015. The regulation put in place an HFC phase-down from 2015 to 2030 by means of a quota system and sectorial bans on high GWP refrigerants.[1]



[1] - Danfoss F-Gas Regulation [EU]

BELOW: Key dates for achieving net zero

Kigali Agreement sees reduction in the manufacture and use of (HFCs) by roughly 80-85% from their respective baselines, till 2045

Limiting global warming to 1.5°c entails

Net Zero CO_2

Net Zero GHG

2020 | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** | **2090**

Limiting global warming to 2.0°c entails

Phase down of FGas usage from 45% to 21% by 2030

CB Refrigeration target customer carbon reduction of 65% by 2030

Wales to have reduced GHG emissions by 95% by 2050

Net Zero CO_2

Net Zero GHG

Working with you

When approached by a customer to undertake project or service, we will work closely with all stakeholders to ensure the greenest solution can be achieved, to meet the application.

Our experienced team will follow our **customer road map** to develop the optimal solution.

We source our supply partners not just on the quality of the materials, but also by their environmental impacts. Our partners include, amongst others:

- **Arctic Circle**
- **Beacon Engineering**
- **Danfoss**
- **SCM Frigo S.P.A.**
- **Kelvion**

We also develop and manufacture bespoke equipment where off the shell solutions are not suitable or available, through our in-house design services.

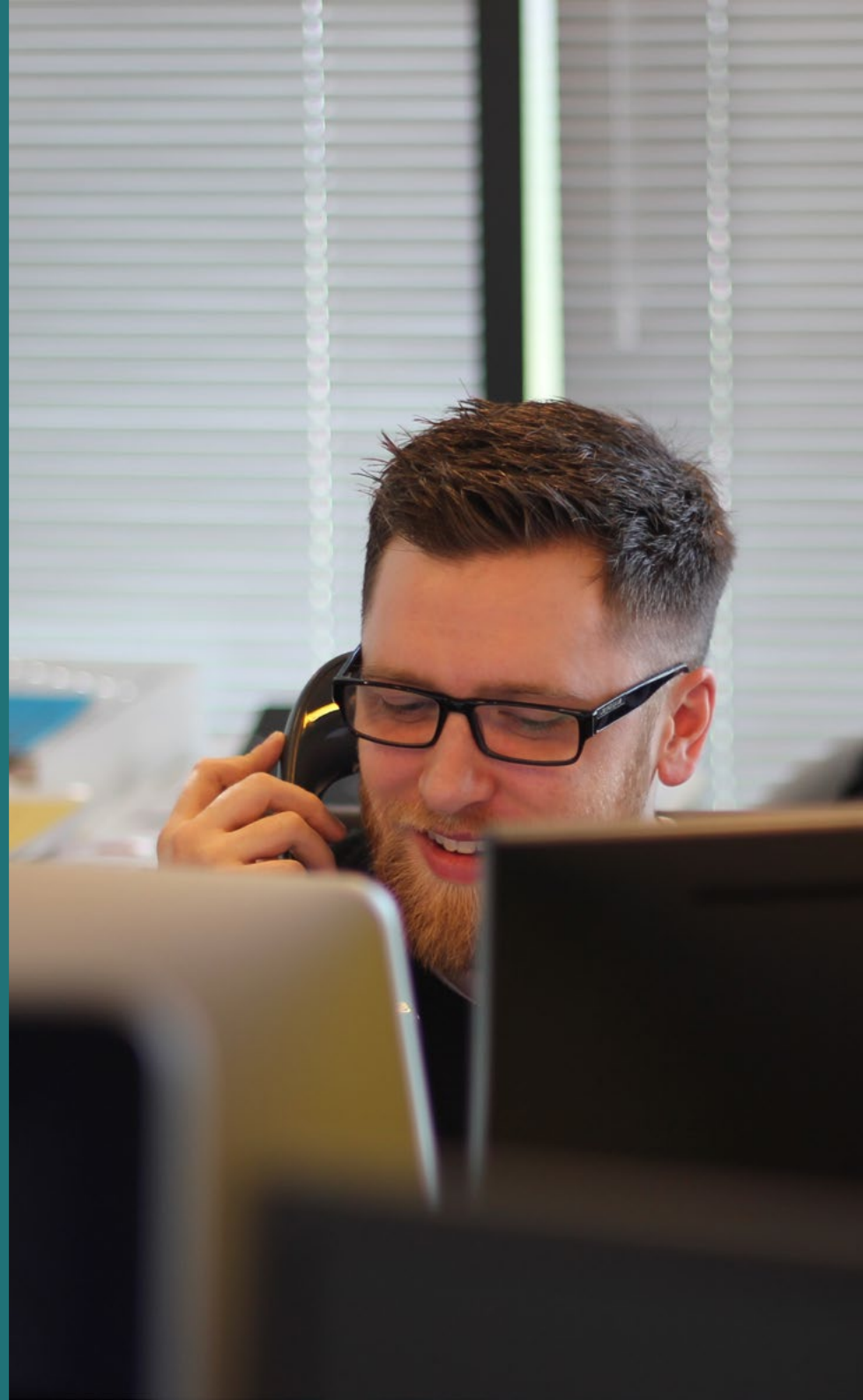
We are not invested in one technology, this helps us create a bespoke package that's best for your business.

Available to you, when you need us

With industry leading knowledge in FGas and natural refrigerants such as CO_2 (R-744) and hydrocarbons, our back office technical support and field-based engineering team is available to support you 24/7, 365 days a year. Equipment can breakdown unexpectedly and without warning, having implications on your stock and your customers.

Whatever the requirement, whether emergency or a routine service maintenance check, our engineers will make sure your equipment is protected and always in good working order. Our field-based engineering team is available to support businesses across South Wales, the Midlands and the South West, with installations nationwide.

Contact the team today -



Understanding you

All businesses have the challenge of achieving net zero. We understand these changes can be costly, time consuming and so we offer real-world support. With in-house consultancy and design available, we are able to support you and help you reach your goals within your budget. We offer cost and feasibility studies, enabling us to tailor and create sustainable and optimised engineering solutions. Once we have an understanding of your needs, we will collaborate with industry and governing bodies to ensure we provide the most up to date advice and support. Everything we do for you will be transparent and measurable to ensure a value driven service.

Understanding refrigerants and their global warming potential (GWP)

We are ambitious in leading 65% of customers assets to an ultra-low GWP target

GWP Group	GWP Range	Example Refrigerant
Ultra-low	0 to 10	Natural Refrigerants (R-744)
Low	10 to 200	R152A
Moderate	200 to 1,400	R448A, R449A
High	1,400 to 2,500	R407A, R407F
Very High	>2,500	R404A

To help futureproof your business, we would advocate the use of utlra low Global Warming Potential refrigerants such as CO_2 (R-744).

> "Having worked in partnership with CB Refrigeration for many years, I am always impressed with their innovative and creative solutions that ensure the materials and refrigerant solutions chosen are best suited for the customer and the environment. We have forged a long-standing relationship with the team, and we look forward to continuing our partnership for years to come."

Andrew Hall, Managing Director
Ayjay Group

The Journey

We want to take our customers on a journey.
From initial conversations, we become invested in securing the most ethical and environmentally sustainable solution. We have adopted engineering solutions to transition our customers from using high GWP to low or even ultra low GWP, including CO_2 and Hydrocarbons. These solutions can be tailored to your needs, making sure your business is in the best place to move towards a net zero target at its own pace.

4-stage customer Road map

Working alongside our customers, we strive to provide the highest standard of service and solution. We created our 4-stage road map to outline the customer journey and enables us to achieve high standards with each customer throughout every project and installation.

1 Getting to know you

We work closely with our customers to identify and understand each business and gather the key information required to deliver a service solution that exceeds expectation.

2 Create our plan

Understanding your business clearly from the start enables us to develop a tailored and efficient service package that adresses all key objectives and defines an effective, transparent strategy to work towards.

3 Actions

Our service and engineering teams will implement the strategy created and provide clear and consistent information, with measured performance to reflect ROI.

4 Outcomes

We pride ourselves on delivering a service that encapsulates excellence in engineering and optimal delivery, achieving outcomes and proven results that benefit your business.

Case Study: Suntory

LUCOZADE RIBENA SUNTORY

CB Refrigeration were contacted by Suntory in June 2020 to present a proposal to design and supply a new refrigeration system to replace their existing dilapidated equipment. The system cooled two Ribena concentrate storage rooms at their Royal Forest factory in Coleford. Suntory highlighted that they wanted a system that was future proof and supported green technology, in line with their ambitions for cleaner, renewable factories across their Asian, Americas and European buildings by 2022.1

With this in mind, the team put forward two proposals:

1. A natural refrigerant HC chiller with pumped mono-propylene / water secondary system.
2. A direct expansion trans-critical CO_2 system.

SOLUTION

CB Refrigeration decommissioned and removed the existing and equipment whilst maintaining operations and supplied and installed a twin compressor 120kW R744 (CO2) pack (both compressors were inverter driven on the pack) compressor 120kW R744 (CO2) pack (both compressors were inverter driven on the pack) feeding eight dual discharge evaporators with four evaporators in each room for balanced air distribution.

The team installed a CO_2 audible and visual alarm system by CPC at each entrance and exit to the cold storage rooms. The alarms were set for two different concentration levels of CO_2 (2,000 and 5,000 parts per mil). In addition, early indicator beacons/warning signals were installed as an additional safety precaution. The team undertook a comprehensive risk assessment prior to the CO_2 alarm design and placement, an integral part of the process. This assessment ensured the alarms were correctly placed to provide a critical safety solution for the cold store, to protect people.

CHALLENGES AND OUTCOMES

There were various challenges to overcome during the installation process, including asbestos within Cold Store 1. To combat this, the team manufactured and erected eight steel gantries which were colour matched to the room to support four of the evaporators. During the installation, the team also had to work within extremely tight spaces to mount the evaporators due to an abundance of existing M&E services. To reduce risk to staff and new equipment, the team carried out a thorough method and risk assessment, looking at all safety and operational implications.Within the programme the project managers overcame crane lifts, operational risk to the sites stock as there was no shutdown period along with a tight timeframe to complete the project due to peak blackcurrant picking season approaching.

OUTCOME

From procurement, planning, management and engineering the project was delivered on time and within the client's budget. The new trans-critical CO2 plant and equipment assisted Suntory in their ambitions for cleaner, renewable energies. Delivered a uniform air flow and temperature with a robust engineering solution to control the temperature for long periods of high value, large volume Ribena concentrate.

"CB Refrigeration is proud to have worked with Suntory Beverage and Food GB&I with the fitting of their new, sustainable cooling technology that will ensure the critical stages of the cooling process for the two Ribena concentrate storage rooms will be seamless. The team faced numerous challenges throughout the install, but with our expertise in engineering and ability to create bespoke solutions to meet the needs of our clients, we were able to complete the project successfully, much to the delight of the client."

Tom Hannaby, Managing Director
CB Refrigeration

Technical information

Beyond Refrigeration

The Institute of Refrigeration (IOR) is an independent charity that encourages invention and research in all matters relating to the science and practice of regrigeration. We are proud to have experienced colleagues within the team with advanced knowledge of the Institute and their ambitions. This allows us to be leaders in the field of refrigeration, cooling and air conditioning.

The IoR's Seven Critical areas for addressing Climate Change[1] identifies ways in which refrigeration can help reduce a business's carbon footprint. The document also provides guidance on what you can do as a business to improve your refrigeration and air conditioning solutions, in line with UK Government's Net Zero 2050 target.

[1] - IoR Seven Critical Areas for Addressing Climate Change.

Innovation[2]

Like ASHRAE standard 34, standard ISO817 *"Refrigerants —Designation and safety classification"* provides an unambiguous system for assigning designations to refrigerants' toxicity and flammability.In this case, A2L has lower flammability and toxicity compared to other classifications—making it the second safest refrigerant category.

A = Non-toxic
2 = Flammable
L = Low burning velocity

[2] - Danfoss - A2L refrigerants in commercial refrigeration
[3] - ACS - F Gas Regulations

Key phrases and Abbreviations

Carbon Dioxide (CO_2)

Carbon Dioxide (CO_2) is a popular refrigerant in the many sectors, including food and retail. With the introduction of the F-Gas regulative, the need for alternative refrigerants is accelerating and CO_2 is being seen as the viable, natural solution for refrigeration applications.

Global Warming Potential (GWP)

The GWP was developed to allow comparisons of the global warming impacts of different gases. Specifically, it is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of CO_2.

Hydrofluorocarbons (HFCs)

HFCs are powerful man-made greenhouse gases that are rapidly building up in the atmosphere. HFCs will rapidly grow with action. Under the Kigali Amendment, countries have agreed to reduce the production and use of these gases by 85% by 2050.

F-Gas Regulations[3]

From 1st January 2020, the EU Fluorinated Greenhouse Gases Regulation (also known as the EU F-Gas Regulation) will ban the use of refrigerants with a GWP of 2,500 or more in certain refrigeration units. It will also ban refrigeration technicians from servicing these units. All retailers, including convenience stores, are required to comply with the EU F-Gas Regulation. The Regulation will also phase down the use of HFCs that can be sold in the EU by 79% by 2030. This means that some refrigerants (including the most common refrigerant R404a) will become increasingly harder to obtain and more expensive.

Figure: Refrigerant classes

Flammability	Lower Toxicity	Higher Toxicity
No flame Propagation	***A1**: CFC, HCFC, most HFC's*	***B1**: Seldom used*
Lower Flammability	***A2L**: Most HFOs, R32*	***B2L**: Ammonia*
Flammable	***A2**: R152*	***B2**: Seldom used*
Higher Flammability	***A3**: Hydrocarbons*	***B3**: No refrigerants*

Toxicity

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