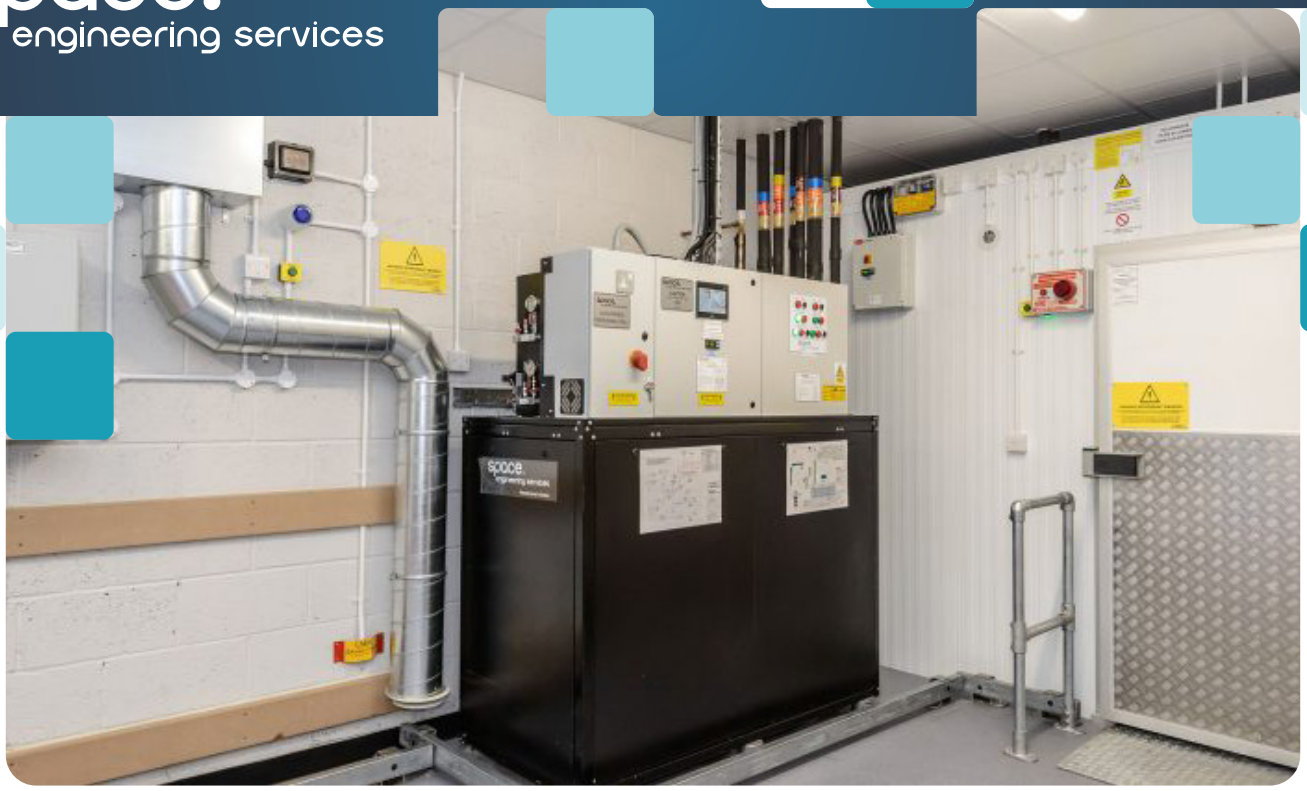
space. engineering services

Project case study



Industry Leading CO_2 Convenience Cooling

Services: **Combined Refrigeration, Mechanical and Electrical Package**

Project Overview

We were set the challenge of devising a refrigeration solution suitable for a convenience store format which offered a comparable life cycle cost option to our customer's previously installed HFC systems, but which delivered a more environmentally sound and future-proof investment.

With existing HFC systems on the market being economical, energy efficient and requiring little maintenance, we needed to deliver a solution which could match or better them and offer impressive environmental credentials.

As pioneers in the refrigeration industry and with almost 30 years' experience, we tackled this challenge head on and devised the ECO_2 Booster Integrated Solution (BIS) (pat. pend.).

Using advanced technology, the ECO_2 BIS combines a highly efficient chilled and frozen refrigeration system with high performing space heating (with the potential for cooling too), in one package, with an extremely low global warming potential (GWP) of just one. It's where optimum performance meets sustainability.

Our world-class Design team used Revit® building information modelling (BIM) software to precision design the combined solution, working closely with a dedicated and experienced Project Manager to ensure all our customer's requirements were met.

The entire system was successfully installed and commissioned within a standard three-week programme in March 2016.

Our Solution

We developed a fully-customised solution combining our turnkey refrigeration offering with mechanical and electrical services. At the heart of this was our market-leading natural refrigeration solution, the ECO_2 BIS.

The ECO_2 BIS is a 3-in-1 system that uses advanced technology to recover waste heat from the refrigeration process, and turns it into space heating at the most efficient conditions. Operating using the natural refrigerant R744 (CO_2), it has a very low GWP of just one, making it a refrigeration solution with a far lower environmental impact than equivalent HFC systems.

As a low noise pack with a compact footprint, the ECO_2 BIS was ideal for our customer's convenience

application and was located inside (but is equally suited to outdoor use). It's also been developed to operate on standard control platforms used in the convenience market to keep service and maintenance costs down. The ECO_2 BIS' noise reduction features, including anti-vibration mounts and a sound attenuated enclosure, provide a quieter store environment and more pleasurable shopping experience.

Services Delivered

We delivered the following services:

- Design and build of a pioneering dual temperature booster system using CO_2 to deliver store refrigeration and comfort heating for the sales floor
- Supply and installation of refrigerated display cases, cold rooms, a remote gas cooler and evaporators
- Comprehensive mechanical design and installation solution including plumbing, drainage and a standalone air conditioning system for the cash office
- Supply and installation of heating cassettes, powered using reclaimed heat from the refrigeration process Electrical services for all refrigeration and HVAC assets
- Standard control platform with refrigeration priority settings which is recognised and fully supported across the industry
- Full technical and commissioning support provided by our expert in-house teams Comprehensive service and compliance package delivered by our team of CO_2 trained Engineers
- Dedicated project management throughout delivering a collaborative and problem-solving approach to achieve the specific requirements of this customer

Key Benefits

- The ECO_2 BIS offers a sustainable solution without compromising performance, reliability or safety, delivered at an attractive life cycle cost
- Our investigations have found that the ECO_2 BIS offers greater energy-efficiency, cost savings, and safety credentials when compared to other natural solutions on the market that use flammable (hydrocarbon) refrigerants
- By opting for CO_2, a naturally occurring gas which isn't subject to F Gas regulations, our customer has successfully future-proofed their asset
- The ECO_2 BIS' integrated heat pump negated the need for a separate, fossil-fuel powered, heating system for the store, enabling our customer to reduce its carbon footprint and free-up precious retail space
- Through fine tuning of the system, and working with the customer and our supply chain partners, we have optimised performance improvements including the heating cassettes by integrating speed controls
- We mapped the entire system using BIM software to including plant, display cabinets, pipework and store heating. This enabled us to identify obstacles before the build which we then quickly worked to resolve, saving build time and therefore cost for our customer
- By integrating the refrigeration, mechanical and electrical services into the design phase, we optimised the energy usage of the combined solution throughout the life cycle and a simple, single-trade installation
- Our highly-trained Service Engineers delivered maintenance of the system using their in-depth knowledge of both our plant and CO_2 applications, contributing to driving system efficiencies from day one

Challenges Faced

This was a pioneering refrigeration solution installed following an 18-month testing period at our dedicated facility in Bristol. This was the system's first live retail environment, and since every store has differing environmental factors, we embarked on an enlightening learning curve which has given us a deeper understanding of the system's capabilities and strengths, which will enable us to deliver additional system efficiencies to future customers choosing the ECO_2 BIS.