CASE STUDY



PROJECT CASE STUDY: CO2 Food Service Cooling & Heating System Installed

at Canary Wharf London:

Project Objective

The clients objective was to create a new 1,500 cover restaurant to cater for a refurbished office complex located in a high rise tower at the Canary Wharf business area in London's docklands.

The main contractor Overbury provided project management and overall coordination for the client whilst food service contractor Berkeley Projects provided all of the contract elements relating to the catering facility design & installation.

Working with the consultants on the project Green Cooling provided the food service refrigeration system design and also the hot water pre heat system design along with a complete project management and installation service.

By its nature the project brief was of a very high specification, one of the main project requirements being to achieve BREEAM accreditation (UK sustainable building design standard), this was required in order to satisfy the planning/design demands for the project as a whole.

The BREEAM scheme scores a building using an accumulated points system based on the level of sustainability & efficiency that is incorporated within the installed design.

Due to this requirement the Food Service consultant Humble Arnold turned to CO2 Refrigeration specialists Green Cooling and its Technical Director Dave Blinkhorn to provide a refrigeration system design, which would satisfy the design scope that called for a high level of both efficiency and sustainability.

When the design brief was considered it became clear that the maximum level of BREEAM points needed to be achieved from the refrigeration system and also the hot water system design.

The refrigeration system was also required to provide the highest levels of operational performance & efficiency.

For this reason Green Cooling specified CO2 as the refrigerant operating within a system which was designed with operational performance and reliability as a priority.

At the heart of the system sit 2 x dual output CO2 packaged units manufactured by Enex of Italy.

Green Cooling is the exclusive partner & distributor for the Enex range of CO2 equipment within the UK providing a complete CO2 refrigeration support service to specifiers & installers from design to completion.





45kW Green Cooling - Enex CO2 Twin Energy packaged refrigeration system with simultaneous heating & cooling.

Project equipment & specification:

Based on the high level of specification required on this project and also taking into account the specific requirements that must be considered within a HORECA refrigeration system design, a twin refrigeration Enex CO2 pack design was specified utilising a total of 6 x Dorin compressors.

Additionally a 4,500 litre hot water production system was incorporated within the CO2 system design in order to 'upcycle' and deliver the waste heat from the refrigeration system into hot water production which provided an increased level of overall system efficiency.

The Green Cooling system comprises of the following equipment:

- 2 x 30kW Enex packaged CO2 Twin Energy dual output refrigeration systems with a multi compressor system design which provides the maximum levels of reliability and contingency
- Variable speed compressor controls to provide maximum part load
 efficiency with minimum running costs
- Auxiliary air-cooled remote condenser providing capacity to reject any waste heat should the hot water system be satisfied.
- Dual output heat exchanger system to provides the ability to deliver 100% of the available waste heat from refrigeration
- 3 x 1,500 litre hot water accumulation tanks with circulation pumps, valves and control system
- Delivery plate heat exchanger integrates the CO2 hot water accumulation system with the incoming mains water supply
- CO2 system delivery pipework supplying 45 x cold rooms and kitchen refrigeration units along with with associated valves and controls
- 520m of refrigeration pipework servicing both medium temperature chilled storage at 4°C and low temperature freezer storage at -18°C
- Green Optimisation automated temperature monitoring and reporting system with web based access
- Web based Green Optimisation maintenance and control system enabling remote intervention and system control for ease of maintenance
- Complete suite of alarms and cold room control systems to ensure that the system as a whole provides efficient and reliable operation.



PROJECT OUTCOME

The Green Cooling CO2 Twin Energy refrigeration system installed within this restaurant application provides the facility with a high efficiency and sustainable cooling system that matches the flexible and variable load conditions that are found within a busy restaurant environment. The system delivers cooling to cold storage, kitchen and display refrigeration, so providing a complete demand based and efficient system.

Additionally the continuous delivery of thermal energy into hot water production also achieved the required result for the client in terms of significantly reducing hot water production costs and reducing carbon emissions.

Cold rooms and kitchen refrigeration systems are satisfied by the BREEAM compliant GC CO2 system on this project, which enables the complete food service facility to benefit from an efficient and sustainable design.

This CO2 refrigeration system is seen as a major step forward within the hotel & restaurant market within the UK as this type of sustainable approach to refrigeration is normally only the preserve of the large capacity retail sector. This application strongly communicates the benefits and also the practicality of using CO2 within the restaurants and hotel sector. However it is very important to note that the same technology and system design incorporated here could be utilised in other industry sectors particularly food production and processing.

An interesting aspect of this project was that cooling was integrated with hot water production.

This may well seem logical but in practice can be challenging due to the fact that the two disciplines of refrigeration design and mechanical services design do not normally communicate.

However Green Cooling have unique skills that are not normally found within the refrigeration sector, in that they are able to design and specify integrated cooling & heating systems using their in-house design team which combine food service design and mechanical services design.

Within the field of CO2 system application this is a key requirement where the benefits of simultaneous heating and cooling must be considered within the context of the integrated project as a whole.