NATIONAL FOODSERVICE DISTRIBUTION CENTRE

As part of competitive tender process by a leading foodservice provider, Orwell Design Associates were awarded the refrigeration design for a new RDC in the Midlands. This was going to be the biggest of its kind for our customer.

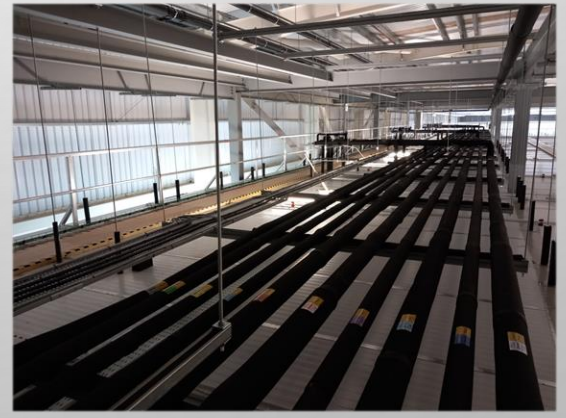
The client is committed to an environmentally considerate operation, so we selected CO_2 (R-744) systems with heat reclaim as a balanced refrigeration plant solution. This direct expansion system incorporates heat reclaim for a cold storage underfloor glycol heater mat and site hot water use.

The facility consists of a large -25°C cold store, +4°C chill store and +4°C chilled marshalling area.

Two dual temperature systems were selected with a calculated cooling duty covering 70% per system at each temperature level. Each booster system has an adiabatic enhanced gas cooler. As part of each compressor pack, a discharge plant heat exchanger and pump set was included, to serve the glycol underfloor heater mat.

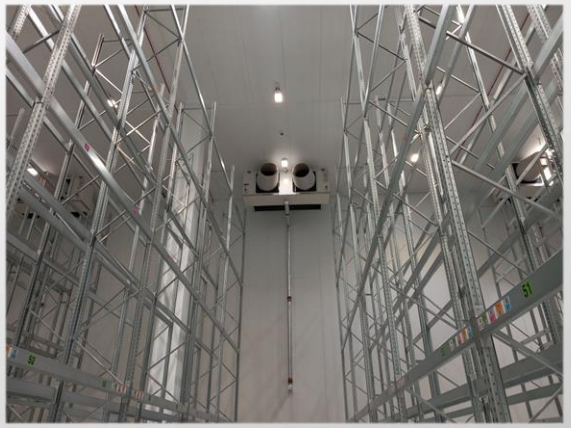
The dual temperature R-744 compressor packs were designed with an LT discharge de-superheater to ensure LT gas is tempered before entering the HT suction line. Key design criteria being:

- Moto Duty capacity to be based upon LT compressor selection and required outlet temperature.
- Maximum 36°C ambient dry bulb temperature.
- Fitted fans were EC with appropriate controls and software to maximise energy efficiency.



The walk-in housed multi-compressor packaged units includes oil management, vessels and interconnected pipework. Key requirements included:

- Leak detection with automatic and manual emergency extract ventilation (a manual start push button on the external of the plant housing for emergency extract).
- Motor inverter drives fitted to the lead machines at each stage.
- Parallel compressor to manage vessel pressure regulation.
- Maintenance friendly accessibility for housed components.
- High and low temperature suction line accumulators.
- Replaceable liquid line filter drier, and oil filter.
- Electronic oil Management System, complete with high pressure oil separator, reservoir, and individual compressor oil injection control solenoids.
- Dual PRV's with changeover valves, at all pressure stages.



The adiabatic enhanced V-Block gas cooler component of the refrigeration system enables the rejection of thermal energy from the temperature-controlled environment and compressors to the external ambient. Both were installed with maintenance friendly spacing.

The Heat reclaim on each compressor pack was fitted with a PHX in the HT discharge. Each has a variable bypass valve to control the amount of mass flow through the PHX or fully divert the discharge directly to the gas cooler. The PHX also provides 100% calculated heating required for the underfloor heater mat.

There were a total of 14 evaporators across the three temperature-controlled areas – six in the cold store, two in the chill store and six in the chilled marshalling area. Soft gas defrost were selected for the chill and cold store evaporators, with electric defrost on the marshalling evaporators.

Glycol pump sets with multiple parallel pumps were selected. Each sized for the full required flow rate, complete with shut off valves, commissioning sets and strainers. There was also an expansion tank and pressurisation unit, dosing pot, flow and return pressure gauges and temperature monitors.

A dehumidification system was required, with extract ducts above the external dock doors and internal rapid doors, with outlet nozzles directed at the rapid rise doors to the cold store.

An RDM control and monitoring system were selected, with a remote dial out facility and full back up.

Working to a tight programme, the project was successfully handed over to the client, ready for instant use.

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