THE LINDE GROUP

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# IBL Cold Stores: finding the right alternative to R22.

## Business benefits

When IBL Coldstores replaced the refrigerant in their existing equipment with a non ozone depleting HFC alternative, they were able to:

- Meet the legal requirement for phase out of HCFCs
- Achieve the change at 10% of the cost of plant replacement
- Minimise downtime for the coldstores
- Reduce energy consumption by 17%
- Cut compressor running loads
- Lower average compressor running amps from 31.4A to 27.6A
- Reduce discharge temperature by 40 °C
- Reduce the refrigerant charge volume

European legislation is leading to a phase out of HCFC refrigerant gases. This poses a number of challenges for the coldstore sector. Linde's specialist refrigeration expertise has helped IBL Coldstores identify and implement a cost effective solution.

### The customer

IBL Cold Stores, a Division of International Bulk Liquids (S&T) Ltd, are based on a 1.6 hectare site at Knowsley, near Liverpool, where they have 10,000m$^2$ of temperature controlled storage, in number of units at temperatures ranging from +10 to –24 °C. Most of the company's business is involved in providing services to the food industry.

Like the rest of the refrigerated storage sector, IBL Cold Stores faced a potentially costly and time-consuming process of moving to a non HCFC based refrigerant system.

From 1 January 2010, virgin HCFC refrigerants (including R22) were banned throughout Europe and although there are some recycled HCFC products available these are increasingly in short supply and expensive.

The alternatives were to find a 2010 compliant alternative or to replace the existing plant with expensive new machinery using natural refrigerants such as ammonia, carbon dioxide and hydrocarbons.

### The challenge

IBL Cold Stores was aware of the need to find a cost-effective solution to the issue of HCFC phaseout. The company considered the options available to it in consultation with its servicing and maintenance contractors Concept Cooling Services Ltd of Formby, near Liverpool. IBL Cold Stores have some 30 units on the Knowsley site and a decision would have to be made on all of them in advance of the 2010 deadline.

Concept Cooling Services were able to draw up a series of proposals for IBL by drawing on the technical expertise of their gases provider BOC, a member of The Linde Group. The choice of replacement depended on a number of factors at each location. As the largest provider of industrial gases in the UK, BOC has access to a full range of the most effective HCFC replacements and the relevant technical expertise to advise on particular installations.

The company was therefore able to develop a range of options with Concept Cooling Services who, in turn, were able to advise IBL Cold Stores on the most efficient solution to the challenge they were facing.

## The Linde solution

It was decided that the optimum solution would be to replace the existing R22 HCFC refrigerant with an HFC based alternative in one unit at the Knowsley site. Concept Cooling Services had been called in to inspect an R22 Dx system operating on a –20 °C chamber, with a Bitzer 6G.2 open drive compressor.

Following inspection and service, the system was recharged with R22. The system was then commissioned and run for one week. Data loggers monitored:

- Suction temperature and pressure
- Discharge temperature and pressure
- Air temperature on and off the evaporator
- Ambient temperature
- Energy consumed (kWh)

In addition, the run amps of the compressor were recorded over a one hour period.

After one week, Concept Cooling Services recovered the R22 and changed the solenoid, sightglass, discharge non return valve, liquid line ball valves, receiver inlet valve, pressure relief valves – and a replacement R404A expansion valve was installed. The system was pressure-tested, evacuated and charged with ISCEON® MO79 (R422A). A modern refrigeration controller was fitted to manage the evaporator and a compressor/condenser manager was installed.

ISCEON® MO79 is an easy to use, non ozone depleting HFC refrigerant for replacing R22, R502, and HCFC-containing refrigerant blends in low temperature commercial and industrial direct expansion refrigeration systems (it can also be used for medium temperature applications). In most cases no change of lubricant type during retrofit is required and the refrigerant is compatible with traditional and new lubricants. Its use enables continued use of existing equipment and it can be topped off during service without removing the entire refrigerant charge. It has 20% lower Global Warming Potential (GWP) th an R404A or R507.

## The results

Comparing the pre and post HFC performance, IBL Cold Stores has found that:

- Discharge temperatures have been reduced, putting less strain on the compressor and giving improved operating reliability
- Plant efficiency has improved
- The compressor is projected to have a longer working life
- The issue of HCFC replacement was solved well in advance of the 2010 deadline
- It was possible to complete the transition from HCFC gases for the whole site
- By replacing the refrigerant gases instead of the cold stores themselves, the company has avoided the major disruption such a capital project would involve
- The whole project was achieved at a fraction of the cost of replacing capital plant.

**Graham Jones** Director,
Concept Cooling Services Ltd

"With the 2010 deadline fast approaching, our business could not afford to delay any longer. There were effective alternatives to HCFCs available and a rapidly increasing number of successful installations. Working together with specialist gas suppliers, engineering services contractors are able to assess an individual site, recommend a cost effective alternative and implement the solution with only minor alterations to equipment. That is what we achieved at IBL Cold Stores Ltd, working together with BOC to beat the deadline and allow the company to smoothly continue its operations."

**Ian Desmonde** Director, IBL Cold Stores

"We found a cost effective way of dealing with the phasing out of HCFC refrigerants. In addition, the solution adopted allowed us to continue operations with virtually no disruption while the changeover was being implemented. The savings to the business were worth hundreds of thousands of pounds."


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