



Balancing **energy** consumption against **profit** margins

The latest refrigerants are addressing retailers' demands for improved energy efficiencies whilst reducing their carbon footprints and long term running costs as John Ormerod, business director A-Gas (UK) Ltd explains.

Few industries have such a high profile as the retail trade and the great advances the supermarkets are taking to balance their business needs with environmental concerns. The trade is heavily reliant on refrigeration and the supermarkets are at the vanguard of the drive to cut HCFCs and refrigerants with a high GWP. But this is tempered with the need for increased energy efficiencies and lowering of their carbon footprints. Manufacturers are responding with new refrigerants but end users need to carefully assess the options and make the right choices for their equipment.

Steadily rising energy prices and the need for more environmentally friendly refrigerant solutions have helped steer supermarkets down a path of balancing energy consumption with profit margins. At the same time they have also placed stringent demands on refrigerant manufacturers to develop solutions that can work in retrofits and new installations as well as low and medium temperature applications.

This has shifted the focus onto HFOs and new lower GWP refrigerants. HFOs could replace HFCs but they have the drawback of being slightly flammable whereas the most common HFCs are non-flammable. HFO-HFC blends with no flammability are likely to appear in the near future.

HFO-HFC blends

One of the latest and lower GWP refrigerants is Genetron Performax LT (R407F). An HFC blend, it is an A1 rated refrigerant has a low toxicity and is non flammable.

Performax offers a low GWP of 1824 – the lowest of all common blends, is specifically designed to replace R404A and provides similar performance to R22. It can also be used to replace R22 but not as a drop-in for commercial applications with an oil type change. Advantages include fewer equipment modifications and improved energy efficiency. In addition it offers a significant reduction in total greenhouse gas emission with the added benefit of lower operating costs.

Genetron® Performax™ LT has been successfully trialled in a number of supermarkets as it is

such a close match to R22 and suitable for low temperature applications. It is also a superior alternative to R404A and R470A in both low and medium temperature supermarket applications, offering higher capacity and efficiencies than R404A. Conversion to Performax offers considerable benefits as trials indicate that plants use less power; operating costs are significantly lower and overall carbon footprint improvements.

Trials of Performax are being conducted in many countries as well as here in the UK. One of the Britain's leading supermarkets ran two identical systems. One ran on R407A, the other R404A. The latter was converted to Performax with data collected over a 12 month period. The pilot study showed that after conversion 13% less power was being used than the R407A system and around 20% less than the R404A system CO₂ emissions were also reduced as were the operating costs.

We have already added Genetron® Performax™ LT to our portfolio as part of our commitment to offering customers the widest possible choice. We are closer to one solution for existing equipment than we have been in many years, but recent trials indicate that Performax offers a good combination of capacity, efficiency and GWP. Using our expertise in the reclamation and reuse of refrigerants A-Gas can offer to take back the existing refrigerant as part of the commercial package when changing over to Performax.

Benefits of Performax

- Potential R404A replacement in medium and low temperature commercial applications
- Zero ODP
- Comparable capacity to R22
- Lower GWP than R407A and better low temperature capacity
- Potential R404A replacement where GWP reduction is the driver
- Half the GWP of R404A
- Comparable capacity to R404A at low temp
- Better energy efficiency than R404A

Refrigerant Comparison

	R22	R407A	R404A	R422D	Performax LT
Capacity* kJ/m ³	1005	949	954	778	1020
ODP	0.05	0	0	0	0
GWP	1810	2107	3622	2729	1825

* Evaporating -32°C, 35°C condensing

A-GAS™

Deciding factors

Although GWP is a significant factor, it should not be the only criterion and with the availability of ever more refrigerants, end users need to make informed decision with the help of their supply chain and that means taking into account the following:

- Good thermodynamic and other properties
- Good heat transfer
- Low pressure ratio
- High volumetric refrigeration capacity
- Non-corrosive
- Oil compatibility
- Stability
- Toxicity
- Flammability
- Availability
- Cost

Containment and reducing leakages should also be part of any strategy. Businesses need to adopt comprehensive maintenance programmes with a more rigorous approach for the reduction and elimination of leakages and charging losses. By working closely with the supply chain more businesses will move towards the use of energy-efficient lower GWP refrigerants and accept as the norm that environmental interests and commercial interests go hand in hand.