



INDUSTRIAL R22 RETRO-FIT USING GENETRON PERFORMAX[®] LT (R407F)

An Innovative R22 Refrigeration Solution for Italy's Leading Bonded Storage Specialist

Frigo Tecnica Internazionale S.p.a.
Refrigerazione Industriale
Sistemi per l'Agro Industria
Refrigerated Food Technology and Processing

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Investing in low carbon technology.

Eurofrigor was formed in 1974 and is situated in the industrial area of Controguerra in Italy, providing over 20,000m² of cold-storage rooms in a bonded warehouse area, enabling goods to be imported free from the usual customs clearance. The company is a clear leader in cold storage, with facilities that include 25 cold-storage rooms (with interior temperatures ranging from +5°C to -30°C), along with blast freezer applications (operating to -40°C).

Until recently, the company operated its facilities using R22 as a system refrigerant – however under F-Gas Regulations, R22 will be a prohibited refrigerant from the end of 2014. This phasing out, together with escalating costs and reducing availability, focused Eurofrigor on finding a replacement – and the company turned to Frigo Tecnica Int. Le Spa for professional support and an implementation plan that would introduce a new refrigerant while minimizing operational downtime.

The retrofit installation proved that Performax is the best performing low GWP (Global Warming Potential) refrigerant for direct expansion cold-store operations.



Frigo Tecnica Int. Le Spa, founded in 1980, has played a key role in the field of industrial refrigeration with significant and growing success. The company grew into industrial leaders active in Italy and across the world with more than 150 employees and over 60 million euro in total annual turnover.

Frigo Tecnica Int. Le Spa supports the realization of refrigeration systems for food applications and special production for oil, gas, chemical, petrochemical, pharmaceutical and shipbuilding.

Background: Choosing a Refrigerant for the Future

The partnership between Eurofrigor, its refrigeration specialist Frigo Tecnica Int. Le Spa and Honeywell distributor General Gas, was vital in developing a project plan that would see the removal of R22 refrigerant and its replacement with Genetron Performax[®] LT.

A number of alternative refrigerants were considered, but in the case of ammonia/cascade CO₂ this would have required a complete mechanical system replacement.

Results

- Successful and cost-effective two-phase switch-over to Genetron Performax[®] LT, minimizing operational disruption
- Blast Freezer room temperature improvement - reduced by 15% to -38 Deg C
- ODP compliant and proven best alternative to R22 providing similar capacity and efficiency
- Near 'drop-in' replacement offering significantly reduced environmental impact

System Technical Information

Suction / Evap Temperature	-35 Deg C Storage / -45 Deg C Blast Chillers Stal Compressors – 2 x Model 73 / 1 x Model 71 / 1 x Model 57 / 1 x Kobelco 19L
Discharge Pressure	13.5/14 Bar
Oil Temperature (@ Compressor)	45/50°C
Precautions	To ensure no liquid returns to the compressor 7°C Superheat was used. A PID controller was used to ensure the correct control of Superheat and thus prevent the return of liquid to the compressor. Additional security: Suction Vessel fitted with electric heater to ensure all liquid is boiled off before return to compressor.
Control	As part of the process, a Danfoss Electronic Valve was introduced into the Blast Freezer for improved control. The freezer is set at -45°C with a 100 metre pipe run to the plant room: however, Superheat was minimised to 4/5°C. Poultry is entering at 0/+2°C and is snap-frozen to -25°C

Other R22 alternatives assessed included R422A (but Eurofrigor had a prior poor experience with condensing and mass flow with this refrigerant) and R404A – but with its high GWP, this is already targeted for phasing out. In addition, R422D has been shown to create oil issues with screw compressors, and was therefore discounted.

Consequently, Performax LT was selected for its cost effectiveness, well-matched capacity, good availability and impressive efficiency.

Installation: Optimizing Business Benefits

The project plan for Eurofrigor focused on minimizing the business impact on company during the transition. The near 'drop-in' qualities of Honeywell's Performax LT reduced the engineering work required to introduce the new refrigerant.

The plan devised by Frigo Tecnica Int. Le Spa saw a separate liquid receiver installed during the change-over and the system split in two in order to keep a percentage of the plant in operation at all times.

Frigo Tecnica Int. Le Spa then ran the R22 system with POE oil for 3 to 4 days on one system before recovering the R22,

removing the POE oil, evacuating the system (5 mBar) and then recharging with new POE oil and Performax LT. Having completed this on one system, the process was repeated for the second phase, before the temporary receiver was removed and the two systems restored to one.

In all, the switch over took 1.5 months to complete, but the methodical nature of the project management mitigated the economic impact on Eurofrigor. General Gas also took responsibility for the R22 reclaim/recycle.

Feedback: Innovative Technology for A Greener Solution

"The switch to Genetron Performax LT confirmed that its capacity was very similar to that of R22, but of course with significant environmental benefits. We are now strongly positioned for the future," commented the Eurofrigor Manager.

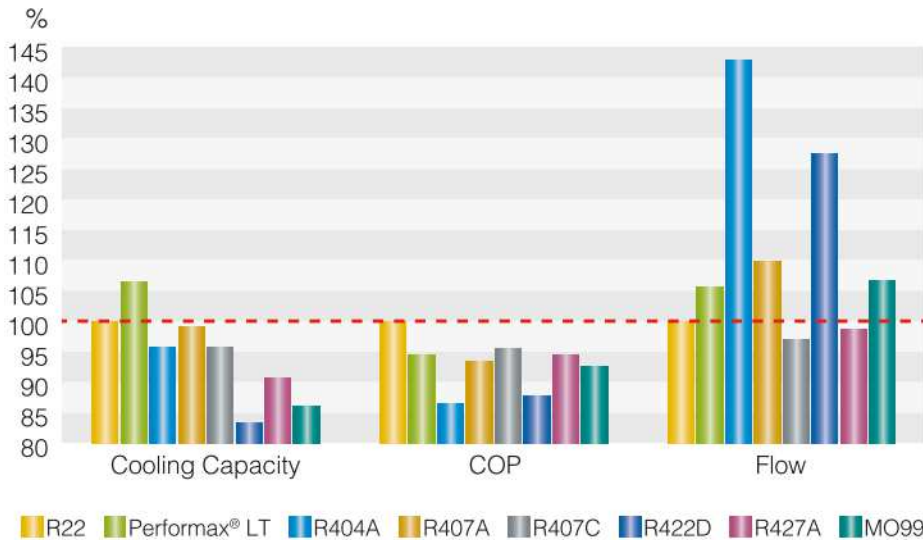
Sergio Marcozzi, Service Manager, Frigo Tecnica Int. Le Spa added, "In addition to the cost-effective transition to Genetron Performax LT, the new refrigerant was able to reduce the room temperature in the blast freezer by a further 15% (-38 Deg C), providing system advantages and energy efficient operation."

"Honeywell's Genetron Performax LT is proving to be a very effective replacement for R22 as the deadline for phasing out the refrigerant approaches. In the case of Eurofrigor, the near-drop in qualities of Genetron Performax LT helped deliver a cost effective and efficient solution that is environmentally sound and fit for the future."

Fiorino Danilo Coccagna,
Technical Sales Coordinator,
Frigo Tecnica Int. Le Spa



Genetron Performax® LT offers the best combination of capacity, efficiency, mass flow and GWP



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Sector Perspective: The Cool Benefits of Performax LT

Honeywell's Genetron Performax® LT offers the best combination of capacity, efficiency and mass flow in meeting R22 replacement performance in cool storage applications, when compared to R422D and R407A. It complies with ODP requirements and is 100% non-ozone depleting.

Download the free software from Honeywell Genetron Properties Suite at:
<https://www.honeywell-refrigerants.com>

Download the **PT calculation retrofit calculator applications for iOS and Android** free



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