

## Cooling Post

# Fruit store harvests benefits of R1234ze

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FRANCE: The new low GWP HFO refrigerant R1234ze is being used in an innovative application to replace R22 in a French fruit store.

Planavergne SA, a fruit producer focusing largely on apple production and based in Escazals in the Lot region of France, gathers 3,500 tonnes of fruit per year and exports throughout the world.

The apples are stored for between four and 12 months in cold rooms in a controlled atmosphere. The storage facility has more than 12 cold rooms, most of which are cooled by units operating on R404A. Two of these rooms, however, were still relying on R22 units, and in need of replacement in view of the European ban on HCFCs.

Moissac-based contractor Quercy Réfrigération investigated a number of solutions based on a unit with three direct expansion-type compressors and two cubic evaporators for supplying the two 1,400m<sup>3</sup> cold rooms, each storing around 300 tonnes of apples at +1°C.

The CO<sub>2</sub> solution was considered but found to be unsuitable for fruit storage for a number of reasons. Technically, the evaporating temperatures would be quite high, varying from +4°C to +8°C and exceeding the operating range for currently available compressors. The most intense operating period would be during the summer and autumn, when the CO<sub>2</sub> output would be at its lowest and, finally, the investment cost was considered to be too high.

Costings were also drawn up for R134a versus R407F, but Planavergne considered these solutions to be too temporary and inconsistent with their investment plan. The aim was to find a long-term solution to avoid the need for repeated retrofits.

In response to this, Quercy Réfrigération came up with a solution using Honeywell's Solstice R1234ze and a suitable hygrometry control system. R1234ze is a single molecule, A2L "mildly flammable" HFO with a GWP of less than 1.



A Pecomark unit incorporating three Bitzer semi-hermetic compressors was supplied complete with a speed regulator connected to one of the compressors and to the condenser fans. Two evaporators, manufactured according to very precise specifications and incorporating a control system developed by Quercy Réfrigération, were supplied with Carel's electronic stepping regulators for R1234ze refrigerant.

Stainless steel piping was used to minimise any leaks from the system which was charged with 218kg of R1234ze from Climalife.

Measurements taken on startup showed that a lot less energy was being consumed compared to the other three units operating on R404A.

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