

## KIWI CONTAINERS

### Conversion from R22 to RS45 (R434A) Flooded evaporators with a pumped recirculation system

FRAMACOLD would particularly like to thank **QUERCY REFRIGERATION** and especially their director **Benoît Duparc** for their professionalism in managing the installation of this thermosyphon with an HFC RS-45 recirculation pump.

#### Installation:

- Cold storage with a recirculation pump dating from 1986
- Refrigerating capacity: 450 kW
- 2 SAMIFI BABCOCK compressors with 37 kW motors
- 3 SAMIFI BABCOCK compressors with 55 kW motors
- 3 m<sup>3</sup> BP recirculation tank
- 3 Hermetic-Pumpen GmbH pumps dating from 1986
- 16 PROFOID flooded evaporators - type ADM779
- Original fluid R22: from 1,500 kg to 3,000 kg
- Oil: ZERICE S 100 (alkylbenzene)
- Liquid line: more than 800 m
- Suction/discharge temperature: +28°C/-13°C

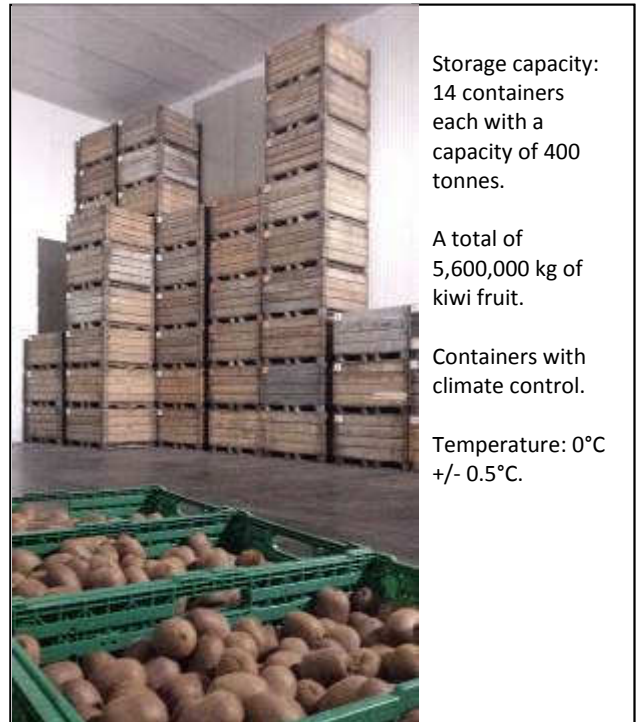
#### What was your client's problem?

Benoît Duparc: My client's concern was to get a number of his kiwi storage containers back into operation quickly to cope with the forecast of a large harvest. He was looking for an efficient and cost-effective solution.

Although the installations themselves are impressive because of their size, our clients cannot allow superfluous costs to be incurred in this tense economic climate.

#### What solution was offered?

BD: After having studied various possibilities for this facility over a number of years, I put forward the most economical solution to my client: simply substituting an HFC fluid miscible in R22, without modifications, for the existing AB oil and without any loss of performance features. RS-45 (R434A) fluid covers all of these prerequisites. This is backed up by my experience over four years working with this fluid. Thus, after extracting the R22, 3,000 kg were introduced into the circuits.



Storage capacity:  
14 containers  
each with a  
capacity of 400  
tonnes.

A total of  
5,600,000 kg of  
kiwi fruit.

Containers with  
climate control.

Temperature: 0°C  
+/- 0.5°C.

#### Implementing the conversion R22+RS-45

##### What precautions did you take?

BD: In the primary circuit (compressor/BP tank), we monitored the correct discharge of oil to the compressors, the discharge temperatures and, obviously, any leaks.

In the secondary circuit (BP tank/pump/flooded evaporators), due to the length of the pipes, the leaks were monitored. Given that there are automatic compensations for the evaporation phase settings, the only thing I did was check that it was working properly.

##### Did any technical problems arise?

BD: To be honest, no, neither in this case nor with any other conversion to RS-45 of this type. It really is the ideal solution:

- Technically, R22 systems, which are often antiquated, are sorted out with this gradual transition.
- At a chemical level, RS-45 behaves very uniformly due to its low level of glide (1.5).

The fact that the mineral oil is retained also helps to protect the joints and I've had no cause to complain of leaks for that reason.



Benoît Duparc in front of the BP tank and recirculation pump

# KIWI CONTAINERS (47)

## Conversion from R22 to RS45 (R434A)

### Feedback

#### What do you think about this solution?

BD: I've been able to test RS-45 as a substitute for R22 over the last four years. I was surprised at first at how simple it was to implement this update and in low temperature systems with direct expansion.

It was my supplier who suggested it, and its use as a simple substitute for R22 paved the way to profits for my clients. On that level, I immediately saw the great advantages of RS-45 fluid.

#### How have you formalized this solution?

BD: As a cold storage professional and a member of SNEFCCA (*National Union of Refrigeration Companies, Professional Kitchen Equipment and Air-Conditioning*), I am obliged to adhere to environmental legislation.

So, the indelible label on the system (in line with article R. 543-77 of the French environmental code) states:

TYPE OF GAS: R434A (RS45)

TOTAL WEIGHT: 3,000 kg

The installation's log book details all the interventions, the material added, quantities, dates, any sign of leaks, etc.

#### What does your client think of the RS45 solution?

BD: As you know, my clients have complete confidence in my work based on the fact that I offer honest, straightforward, dependable solutions that work and that are, above all, economical.

My client puts a particular emphasis on this last point, given that he was able to get his old containers back into operation quickly and simply and hence increase his seasonal production. All of this was achieved, most importantly, without potentially very high levels of investment such as changing the whole installation (which works perfectly well) for an ammonia-based system.

Other cold storage companies, often much bigger than mine, find it more difficult to put themselves in the position of the user as they have ulterior interests. They don't put forward simple solutions like I do.

Right now, many clients are suffering as they can't invest in new installations before the current ones have been amortized. Environmental legislation is developing more rapidly than the industry and I have to find honest and pragmatic industrial solutions to be able to keep working in this sector.

#### F-GAS: What is the shelf life of RS-45?

The European Council and Parliament is currently working on HFC legislation with a GWP > 2,500. As it stands today, the negotiations have still not finished. Whatever happens, what we do know is that HCFCs, including recycled ones, will be banned from 31/12/2014.

The latest European Council negotiations propose a complete exemption in respect of GWP for fluids that substitute HCFCs up until 2022 or 2030 (if they are recycled). R434A (RS45) would fall directly into this category.

<http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+REPORT+A7-2013-0240+0+DOC+XML+V0//EN> (article 11 paragraph 3).



3 Hermetic-Pumpen GmbH pumps



5 SAMIFI BABCOCK compressors 1986