

**Conversion
from R22 to
RS45**



Direct replacement (Drop-in) From R22 to RS45 with Flooded evaporator system

FRAMACOLD, official distributor of GAS SERVEI in France, would like to thank LABEYRIE, manufacturer of frozen food, from Castelsarrasin, for their agreement to the conversion of their facility. We also want to thank QUERCY REFRIGERATION for their professionalism in the conversion and management of this CO₂ / RS-45 cascade installation, with holding tank and flooded evaporator.

Factory in Castelsarrasin
230 people

Production of frozen food:

- Desserts and Pastries
- Aperitif Snacks
- and the famous macaroons



INSTALLATION

Description:

Operates five major freezers in the factory:
Low-pressure stage in CO₂ with 564kW capacity for temperatures -42°C / -10°C.
High-pressure stage on R22, to be converted to R434A (RS45), with the following characteristics:

- Central "IMEF" with BP holding tank and pump for flooded evaporator VAHTERUS between CO₂ and RS45
- Cooling capacity: 689kW
- 1 screw compressor SABROE SAB128HF MK2, 110kW
- 1 screw compressor SABROE SAB163HF MK2, 200kW
- BP holding tank
- 1 pump brand Hermetic-Pumpen GmbH
- Original refrigerant R22: 990kg
- Oil: ZERICE S68 (Alkylbenzene)
- Temperature: 35°C / -15°C



HP IMET unit and roof mounted condensers

PROBLEMS & SOLUTIONS

Problems encountered:

Because recycled R22 was banned on 31/12/2014, and the main installation operates in two cascade systems, HP in R22 and BP in CO₂, a choice had to be made.

The solution should fulfil the following requirements:

- To preserve the process without any loss of capacity.
- To minimise production stoppage time (max. 48h).
- To comply with the legislation.
- Not to penalize the company's profitability.

Solutions proposed:

The customer has two solutions:

- To completely change the IMEF High-Pressure installation working on R22, which represents an estimated investment of more than 500,000€.
- To keep the existing installation replacing only the R22 refrigerant with RS45 (R434A).

The second solution is around **10 times less expensive**.

Given the state of the installation, its complex operation with holding tank and flooded evaporator, LABEYRIE has wisely decided to maintain the existing installation and to replace R22 with RS45.



REPLACEMENT PROCESS OF R22 WITH RS-45 (R434A)

QUERCY REFRIGERATION, represented by Benoît Duparc, having significant experience with this refrigerant in this application, carried out the conversion.

How did the refrigerant replacement go?

Benoît Duparc: after some arrangements on the previous days, the conversion took place on Friday 28th of February:

6H: we start reclaiming R22 from the system

9H: once this process was finished, we charged the system with RS45

14H: we started the system, checked tightness, oil return, pressures...

16H: gradual start-up of the CO2 unit and freezers. However, a previous problem, prior to the conversion (malfunction of the compressor's Solenoid valves during heat increase) did not allow completing any meaningful tests.

On Saturday 1st of March, we found the cause of the problem and carried out the necessary repairs. Full tests were organised for Monday 3rd of March.

Validation of tests:

B.D.: on Monday, at 8:00h, we gradually started up the IMEP HP system on R434A, then the CO2 unit and the freezers. After some minutes, the freezers reached a temperature of -42°C, the tests were validated without any question.

PRODUCTION STARTS...

Mr. Gilles Dupeyroux (responsible for energy management at the factory):

On Tuesday, March 4, at 1 am, automatic start of the R434A / CO2 cascade system with five production freezers.

Freezing temperatures were reached in the required time.

Have you noticed any changes with the RS-45?

G.D.: yes, during the tests I realized immediately that the Sabroe compressors' sound level was lower than with R22. Now, after several days working, I have noticed that:

- IMEF HP regulation is optimized.
- The COP has further improved.
- Suction temperature to the Sabroe compressors has gone from -14°C (in R22) to -19°C with RS45.
- Flooded evaporator for CO2 condensation and for RS evaporation has also improved.

RS45: MANDATORY TRANSITION?

Mr. Franck Krier, General Manager of Framacold:

Yes, RS45 (R434A) is the only temporary solution that allows the continuity of industrial installations with flooded evaporators on R22, without any changes and maintaining the same performances.

Europe must find solutions to increase productivity. The use of RS refrigerants is an extraordinary tool for our industry!

RS-45 meets the need to find an alternative to R22. In fact, it was formulated for this purpose. Now, with the new F-GAS regulation forbidding HFC with a GWP higher than 2500, RS-45 becomes a solution, surely temporary until 2020 -2024 in the event of a derogation- and in all cases until 2030 if used as regenerated gas. We are thus preparing for the following stage and we will certainly propose solutions to replace the refrigerants that will be reliable, efficient and complying with the legislations in force.



Getting ready for RS45 conversion



QUERCY REFRIRATION in action!