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ESPECIALISTAS EN GASES REFRIGERANTES
Y PRODUCTOS PARA A/A Y REFRIGERACIÓN

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 Mr. Guibert, owner of the Ice-skating rink in Vannes (France), for entrusting us with the adaptation of his installation. We also want to acknowledge CESBRON for their competence and skills in dealing with the management and replacement process of the flooded evaporator installation.

Private Ice-Skating Rink In Vannes (France)

Construction 1992

More than 50.000 persons per year

Skating rink of 45m x 20m

Open 365 days a year

INSTALLATION

Description:
The York system cools directly the ice from the rink by means of a flooded network of refrigerant:

- Refrigeration unit YORK, La Chevrolière, 1992
- 2 reciprocating compressors YORK 4VF
- 2 electric motors 37 kW 1500t/min
- Liquid tank BP
- Original refrigerant R22 : 990kg
- Oil : HAFA S 46 FRIGEX (Alkylbenzene)
- Evaporating temperature: -20°C

PROBLEMS & SOLUTIONS

Encountered problems:
Considering that the availability of reclaimed R22 ends on the 31/12/2014, and that the cost of building a new installation is not reasonable, CESBRON -branch from Vannes- proposed a simple and quick conversion which would allow the continuity of the installation at the lowest possible cost.

The solution should fulfil the following requirements:

- To preserve the existing installation without any loss of capacity.
- To minimise the stop time (max. 24h).
- To comply with the legislation.
- To avoid a decrease in the company's profitability due to a higher electricity bill.

Alternatives suggested:
-Adapt the installation to a compatible refrigerant like R404A, which would entail a complete change of oil (from mineral to synthetic oil, POE). This is a long and annoying process, given the complexity of the flooded network under the ice-rink.
-Preserve the existing installation and change only the refrigerant, from R22 to RS45 (R434A), since this one is compatible both with mineral and alkylbenzene oils.
This is the most economic solution.

Due to the conditions of the installation, the complicated system with LP tank and the flooded evaporator under the rink, PATINIUM chose to preserve the installation and to replace R22 with RS-45.

REPLACEMENT PROCESS OF R22 WITH RS-45 (R434A)

The company CESBRON, through its branch in Vannes (France), and its responsible Julien MICHEL, has supervised the process:

How did the refrigerant replacement go?
Julien Michel: after some works carried out during the previous days, the replacement took place on the morning of Tuesday 3 June:

1. Reclaim R22 into cylinders supplied by FRAMACOLD.
2. Maintenance procedure and substitution of Solenoid valve connections.
3. Filling with RS45.
4. Start-up and parameters control.
5. Oil return correct (without any addition).
6. Leakage monitoring.

Twelve hours after having stopped the installation, we were able to start it up again. Not a single problem occurred during this stage of the process.

Validation of tests:
J.M.: We restarted the installation in the afternoon, twelve hours after the stoppage. The following day the ice had already reached its original state, with temperature close to -5°C nominal. No leakage was observed. The tests were validated unequivocally.

From left to right: Mr Guibert, Manager of the Ice-skating rink and Mr. Michel, CESBRON branch responsible in Vannes

MAKE THE ICE!

Mr. Guibert (responsible and owner of the ice-rink):
In order to anticipate the replacement works, we had lightly thickened the ice-layer, foreseeing a long stop in our installations.

Have you noticed any changes with the RS-45?
M.G.: yes, during the start-up I realized immediately that the York compressors' sound level was lower than with R22. And now, after several days working, I've noticed that:

- The ice reaches temperature (-5°C) more easily.
- The amperage of motors is lower and the COP improves.
- The recovery exchanger during discharge is less demanded (lower discharge temperature), which results in lesser losses in the refrigeration system.
- One week after the works, there were high temperatures in Vannes. It's true that with R22, the condenser could have been « not enough », but now with RS45 there was no problem. I am confident about the future.

I want to thank the professionals that have provided a common sense solution!

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 evaporator in 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. It was conceived for this. With the new F-GAS regulation forbidding HFC with a GWP higher than 2500, RS-45 becomes a solution, surely temporary until 2020 or until 2030 if used as regenerated gas. We are preparing for the following stage and we will certainly propose solutions to replace the refrigerants which will be reliable, efficient and complying with the legislations in force.

For any application with direct expansion in R22 or in any of its substitutes, we propose a refrigerant with a GWP of 1664: RS70. It's compatible with mineral oils AB and synthetic oils POE. RS70 has the same mass flow as R22 and almost the same pressures.