

## **FORANE<sup>®</sup> 427A**

### **Retrofit of central refrigeration unit from R-22 to Forane<sup>®</sup> 427A at Casino**

In April 2007, the Géant Casino hypermarket branch of the Casino group carried out the retrofit of a central refrigeration unit from R-22 to Forane<sup>®</sup> 427A at its Gap store (Hautes-Alpes, France). This retrofit operation was carried out overnight by the company Alpes Réfrigération in cooperation with Climalife, one of the Forane<sup>®</sup> 427A distributors in France, and was completed with measurements being taken to check the performances of the installation running on Forane<sup>®</sup> 427A for comparison with those previously recorded with R-22.

The 450 kW retrofitted central unit provides direct expansion refrigeration for the vast majority of the display refrigerators and refrigerated cabinets in this 5000 m<sup>2</sup> hypermarket as well as 26 cold stores containing meat, fish, dairy produce, etc.

#### ***Unit Description***

- 5 COPELAND semi-hermetic piston compressors (reference D6DJ3400AWM/D)
- FRIGA-BOHN air condensor (Model ECA 595 P10 06 P)
- ALFA LAVAL subcooler (Model 0376430H (D2-B23))
- Thermostatic expansion valve
- PROFROID air-cooled evaporator (CAE 42674P type)
- CARLY filter drier per compressor
- Refrigerant fluid charge: 500 kg
- Set temperature range in display refrigerators and cold rooms: 0 to 5°C

#### ***Retrofit procedure***

A non-toxic, non-flammable and zero-ODP refrigerant, FORANE<sup>®</sup> 427A usually requires one oil drainage and its replacement with a POE lubricant. Optimal performance close to R-22 can be achieved without long and costly rinsing of the circuit thanks to a high tolerance to residual original oil in the system. However, in view of the size and complexity of the installation, the customer decided to rinse the circuit twice.

After ensuring that the R-22 equipment was in good condition, and measuring the performance of the installation with the initial R-22 charge, the retrofit took place in 7 steps:

- 1- Recovery of the entire original R-22 charge
- 2- Draining of the original oil from the system (2 drainages and refills with POE oil had been carried out in the previous week while R-22 was still in place)
- 3- POE lubricant charge
- 4- Replacement of the filter driers
- 5- Complete drainage of the installation
- 6- Refill with FORANE<sup>®</sup> 427A
- 7- Re-start of the installation and performance measurement after running conditions had reached a steady state.

No modification of the installation was required. Thermostatic expansion valves were retained. Only a slight adjustment of the valves was necessary.

### Comparative data

Following the retrofit of the central refrigeration unit, the anticipated performances were reached very quickly with Forane<sup>®</sup> 427A:

- The set temperature in the instrumented cold store was reached quickly and easily.
- For comparable intake temperature, the discharge temperature is over 10 °C below with Forane<sup>®</sup> 427A, which is a major benefit in terms of the equipment's lifetime.
- Liquid volume flows are comparable for both fluids. Furthermore, as pressure levels are comparable too, the existing expansion valves did not need replacing.
- Power consumption is 5% less with Forane<sup>®</sup> 427A.

These results are in full agreement with those obtained during previous retrofit operations monitored by Arkema (e.g. low temperature refrigeration units in supermarkets and in the pharmaceutical industry, medium temperature refrigeration units in the agrofood industry, water cooling units, etc.)

Products		R-22	Forane <sup>®</sup> 427A
Date of measurements		22-Mar-07	01-Apr-07
Refrigerant fluid charge	kg	500	500
Average evaporation temperature	°C	-9	-9
Average evaporation pressure	bar	3.7	3.5
Average condensation temperature	°C	34.2	33.5
Average condensation pressure	bar	13.3	13.4
Average intake temperature	°C	4.8	3.5
Average discharge temperature	°C	83	70
Average temperature in instrumented cold store	°C	4	3

*Move a step forward with one of the lowest GWP on the market! Today, with Forane<sup>®</sup> 427A, you can combine performance with simplicity, and meet regulatory requirements.*

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