

Arkema's Forane® 427A Refrigerant – The Easy Retrofit™ Carrefour Argentina (medium temperature)



BACKGROUND

As the HVACR industry continues to move away from R-22 due to regulatory pressures, Arkema's Forane® 427A refrigerant (R-427A) has proven itself as an excellent, easy-to-use, non-ozone depleting HFC refrigerant for air conditioning, heat pump, and refrigeration applications. Forane® 427A refrigerant is a better match to R-22 than other retrofits over a wide range of applications, offering close capacity and pressures to R-22, with no oil change required in many installations.

In Argentina, in the area of supermarkets as well as others, measures have already been taken for equipment containing R-22 to consider retrofitting.

Carrefour Argentina, a French supermarket chain with more than 590 branches distributed throughout the country, contacted us to carry out the change of R22 in one of its Carrefour Express stores.

RETROFIT APPLICATION

After analyzing the technical information provided by the technical personnel and considering that the system was in perfect working order, it was decided to make a direct change from R-22 to Forane® 427A, without any modification in the system.

With the Forane® 427A, mechanical modifications are not necessary in most cases for both in pipes and expansion valves. This was a decisive factor for the customer in choosing R-427A as the retrofit refrigerant, since it was limited to a simple change of gas.

The system used a Scroll hermetic compressor with a nominal power of 10 HP, with air condensers located on the roof of the store. Lubrication was performed using mineral oil without separator at the outlet of the compressor. It was also decided to leave the system unchanged.

The equipment is used for the sale of refrigerated foods, with a temperature of around 6° Celsius.

Project
Carrefour Express

Location
Buenos Aires, Argentina

Application
Medium Temperature Equipment
Exhibitor Refrigerator

Refrigerant
Forane® 427A

Lubricant
Mineral Oil



RESULTS

After the application of Forane® 427A, the equipment quickly reached the desired operating parameters, with a big change in the discharge temperature of the compressor. In the medium and long term, this results in a longer compressor life and less oil degradation, which is very important when mineral lubricants are used without frequent changes. Currently, this equipment continues to reach excellent performance values.

When comparing both operating conditions, we can see the similarity between both gases, even with a higher ambient temperature when using Forane® 427A.

NOTE: While it was decided to keep the system unchanged in regards to lubrication, with satisfactory results, in medium to large installations with important pipe runs, it is advisable to use oil separators, either a system using R-22 or a retrofit.

For answers to your refrigerant related questions or retrofit concerns, please contact Arkema's Technical Service Team at (800) 738-7695. More information on R-427A and our other retrofit solutions is available through our website, www.r22retrofits.com.

TABLE 1

FORANE® REFRIGERANT BASIC PROPERTY DATA	R-22	R-427A
Average Molecular Weight (g/mol)	86.5	90.4
Normal Boiling Point (NBP) (°F)	-41.5	-45.3
Latent Heat of Vaporization at NBP (BTU/lb)	100.6	101.8
Critical Temperature (°F)	205.1	185.6
Critical Pressure (psia)	723.7	637.0
Density of Saturated Vapor @ NBP (lb/ft³)	0.29	0.30
Density of Saturated Liquid @ NBP (lb/ft³)	74.3	70.5
Specific Heat of Saturated Vapor at NBP (BTU/lb °R)	0.14	0.19
Specific Heat of Saturated Liquid at 77°F (BTU/lb °R)	0.30	0.36
Ozone Depletion Potential (ODP) (CFC-11 = 1)	0.055	0
Global Warming Potential (GWP) (100-yr)	1,760	2,024
ASHRAE Safety Group Classification	A1	A1
Occupational Exposure Limits (8 hr time/wt. Avg.) (ppm)	1,000	1,000

TABLE 2

RETROFIT RESULTS	R-22	427A
Lubricant	Mineral Oil	Mineral Oil
Environment Temperature (°C)	12	20
Suction Pressure (psig)	42	35
Discharge Pressure (psig)	145	150
Average Discharge Temperature (°C)	75.25	67
Equipment Temperature (°C)	7	7
Consumption (A)	11.1	11.7

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