

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.

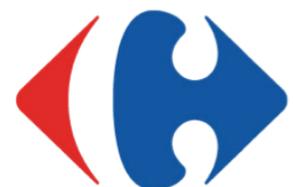
Project
Carrefour Express

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

The statements, technical information and recommendations contained herein are believed to be accurate as of the date hereof. Since the conditions and methods of use of the product and of the information referred to herein are beyond our control, Arkema expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information; NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE CONCERNING THE GOODS DESCRIBED OR THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specific product designated and may not be applicable when such product is used in combination with other materials or in any process. The user should thoroughly test any application before commercialization. Nothing contained herein constitutes a license to practice under any patent and it should not be construed as an inducement to infringe any patent and the user is advised to take appropriate steps to be sure that any proposed use of the product will not result in patent infringement. See SDS for Health & Safety Considerations.

Arkema has implemented a Medical Device Policy regarding the use of Arkema products in medical device applications that are in contact with the body or circulating bodily fluids: (<http://www.arkema.com/en/social-responsibility/responsible-product-management/medical-device-policy/index.html>). Arkema has designated Medical grades to be used for such medical device applications. Products that have not been designated as medical grades are not authorized by Arkema for use in medical device applications that are in contact with the body or circulating bodily fluids. In addition, Arkema strictly prohibits the use of any Arkema products in Medical Device applications that are implanted in the body or in contact with bodily fluids or tissues for greater than 30 days. The Arkema trademarks and the Arkema name shall not be used in conjunction with customers' medical devices, including without limitation, permanent or temporary implantable devices, and customers shall not represent to anyone else, that Arkema allows, endorses or permits the use of Arkema products in such medical devices. It is the sole responsibility of the manufacturer of the medical device to determine the suitability (including biocompatibility) of all raw materials, products and components, including any medical grade Arkema products, in order to ensure that the final end-use product is safe for its end use; performs or functions as intended; and complies with all applicable legal and regulatory requirements (FDA or other national drug agencies) It is the sole responsibility of the manufacturer of the medical device to conduct all necessary tests and inspections and to evaluate the medical device under actual end-use requirements and to adequately advise and warn purchasers, users, and/or learned intermediaries (such as physicians) of pertinent risks and fulfill any postmarket surveillance obligations. Any decision regarding the appropriateness of a particular Arkema material in a particular medical device should be based on the judgment of the manufacturer, seller, the competent authority, and the treating physician.

© 2019 Arkema Inc. All rights reserved.

UL® is a registered trademark of Underwriters Laboratories, Inc.

Forane® is a registered trademark of Arkema. The Easy Retrofit™ is a trademark of Arkema.

Customer Service: 800 245 5858

Technical Service: 800 738 7695

forane.com

Arkema Inc. (Americas)

900 First Avenue

King of Prussia, PA 19406

Tel.: +31 610 205 7000

Fax: +31 610 205 7497

arkema-americas.com

Headquarters: Arkema France

420, rue d'Estienne d'Orves

92705 Colombes Cedex - France

Tel.: +33 1 49 00 80 80

Fax: +33 1 49 00 83 96

arkema.com

ARKEMA
INNOVATIVE CHEMISTRY