

ARKEMA'S FORANE® 427A REFRIGERANT

Fiesta Food Warehouse, Fontana, CA



BACKGROUND

As the refrigeration industry continues to move away from R-22 due to regulatory pressure, Arkema's Forane® 427A refrigerant has positioned itself as an excellent replacement candidate in low and medium temperature refrigeration applications. Forane® 427A is an easy-to-use, non-toxic, non-flammable, and non-ozone depleting HFC refrigerant. In addition to having comparable performance to R-22, Forane® 427A refrigerant has one of the lowest global warming potentials of any R-22 refrigerant retrofits available on the market today.

Fiesta Foods is a full-service supermarket chain based in California, with 10 food warehouses throughout the state. Fiesta Foods' HVAC engineering supervisor, Tim Grant, was made aware of Forane® 427A refrigerant by his local refrigerant supplier, RSD, who promoted it based on its easy retrofits, good performance, and low GWP. Tim Grant was proactively looking for a "greener" substitute for R-22 at all of the Fiesta warehouses, anticipating its future phase-out. Fiesta decided to test Forane® R-427A at its warehouse in Fontana, CA.

Project:

Fiesta Food Warehouse

Location:

Fontana, California

Application:

Refrigeration

Low to medium temperatures



RETROFIT APPLICATION

Fiesta decided to convert all of the store's refrigeration systems from R-22 to Forane® 427A refrigerant. This included systems operating at -25°F, +15°F, and +35°F, with a total of 12 Copeland compressors and older Hill-Phoenix

racks divided among the 3 suction groups with 2 receivers. The compressors used alkyl benzene (AB) oil, and a decision was made to keep the same type of oil with Forane® 427A refrigerant after the retrofit.

All the work was performed by Fiesta personnel and was supervised by the company's in-house engineers. No components were changed during the retrofit, except for filter-dryers. In particular, the TXVs were not replaced during the retrofit. Except for minor setting adjustments to the TXV and controls to optimize the systems, everything was essentially the same as before the retrofit.

RESULTS

The refrigeration racks at the store reached their set temperatures quickly after the retrofit, which was important to Fiesta in order to avoid downtime or food spoilage. Operating pressures in the systems were at similar levels with Forane® 427A refrigerant as they were with R-22. In addition, compressor discharge temperatures were significantly reduced after the retrofit, which indicates the compressors are now running cooler than before.

After moving to Forane® 427A refrigerant, the systems have been operating well, and there have been no problems with the changeover. Fiesta's Grant is very satisfied with how easy the retrofit went and how well the refrigerant has performed so far. He indicated that "... if Forane® 427A maintains this level of performance, we will definitely consider it for future retrofits at other Fiesta Food warehouses." He also is happy with the level of technical assistance he has available from Arkema's engineers.

This retrofit is a good example of the success Arkema's customers have with Forane® 427A refrigerant. If you have questions regarding your refrigerant plans, please contact Arkema to allow our technical service team the opportunity to help you through the R-22 transition. **Our technical service hotline is (800) 738-7695. More information can be found on our website, www.Forane427A.com.**

FORANE® REFRIGERANT BASIC PROPERTY DATA		
	R-427A	R-22
Average Molecular Weight (g/mol)	90.4	86.5
Normal Boiling Point (NBP) (°F)	-44.8	-41.3
Latent Heat of Vaporization at NBP (BTU/lb)	102.0	100.5
Critical Temp (°F)	185.6	204.8
Critical Pressure (psia)	637.1	722.3
Density of Saturated Vapor @ NBP (lb/ft³)	0.30	0.29
Density of Saturated Liquid at 77°F (lb/ft³)	71.9	74.5
Specific Heat of Saturated Vapor at NBP (BTU/lb °R)	0.18	0.14
Specific Heat of Saturated Liquid at 77°F (BTU/lb °R)	0.38	0.30
Ozone Depletion Potential (ODP) (CFC-11=1.0)	0	0.055
ASHRAE Safety Group Classification	A1	A1
Occupational Exposure Limits (8 hr time/wt. Avg.) (ppm)	1,000	1,000
Global Warming Potential (GWP)	1,830	1,500

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