FORANE® REFRIGERANTS BY ARKEMA

CASE STUDY

Arkema's Forane® 427A Refrigerant – The Easy Retrofit™

Solar Supply Warehouse, Lake Charles, LA

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 retrofit candidate for air conditioning and refrigeration applications. R-427A is an easy to use, non-ozone depleting HFC refrigerant, which, in addition to having comparable performance to R-22, has one of the lowest global warming potentials of any R-22 retrofit refrigerants available today.

Forane® 427A was recently used to retrofit the air-conditioning unit for Solar Supply's warehouse office in Lake Charles, LA. Solar Supply, Inc. is a wholesale heating, ventilation, air conditioning, and refrigeration supply company with 57 sales offices located in Alabama, Arkansas, Louisiana, Mississippi, and Texas. Paul Brame, local branch manager for Solar Supply, was interested in learning more about R-22 retrofits and relating his first-hand experience with these products to his customers. Given the similarity of Forane® 427A to R-22 in air conditioning applications, it seemed like a natural fit.

RETROFIT APPLICATION

Brent Miller's Heating and A/C performed the retrofit, with Arkema's technical service personnel on-site for support. The system consisted of a 3.5-ton heat pump, utilizing an orifice as the expansion device. The air-handler was connected to the rooftop-mounted condensing unit via a 10-ft. vertical riser.

Initial readings were taken in the morning to verify system performance with R-22 before the original refrigerant charge was recovered. The existing mineral oil was not changed or replaced. The filter-drier and Schrader valve caps and cores were replaced per standard maintenance procedures. A deep vacuum was drawn on the system before recharging with R-427A. Charge weight of the new refrigerant was optimized and readings were taken to compare to R-22's system performance.

Project
Solar Supply Warehouse Office

Location
Lake Charles, LA

Application
Office Air Conditioning (AC)

Refrigerant
Forane® 427A (R-427A)

Lubricant
Mineral Oil (MO) - *No oil change*

CLASSIFIED UL®

RESULTS

The system is operating as expected, with no significant differences in system performance observed. Office temperatures are cool and comfortable. As seen in the table above, the operating pressures of Forane® 427A closely matched those of R-22, while the compressor ran at lower amps and discharge temperatures. The overall impression from Paul Brame of Solar Supply was that the retrofit "was quick and simple."

This retrofit is a good example of the success Arkema's customers have with Forane® 427A refrigerant. 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.

RETROFIT RESULTS	R-22	R-427A
Ambient Temperature	84.0	86.5
Refrigerant Charge (oz.)	116	106
Refrigerant Oil	Mineral Oil	Mineral Oil
Suction Pressure (psig)	78	76
Discharge Pressure (psig)	267	278
Discharge Temperature (°F)	168	165
Superheat (°F)	3	11
Compressor Amp Draw (A)	14.3	13.5

NOTE: *A lubricant change may not be required, but POE is always recommended for optimal performance. See retrofit guidelines at www.forane-us.com before any refrigerants retrofit; consult your OEM for complete warranty considerations.*

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 Temp (°F)	205.1	185.6
Critical Pressure (psia)	723.7	637.0
Density of Saturated Vapor @ NBP (lb/ft^3)	0.29	0.30
Density of Saturated Liquid at 77°F (lb/ft^3)	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)	0.055	0
Global Warming Potential (GWP)	1,760	2,024
ASHRAE Safety Group Classification	A1	A1
Occupational Exposure Limits (8 hr time/wt. Avg.) (ppm)	1,000	1,000

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