

## Arkema's Forane<sup>®</sup> 427A Refrigerant – The Easy Retrofit™

### Control Air of Southern Nevada, Henderson, NV



#### BACKGROUND

As the HVACR industry continues to move away from R-22 due to regulatory pressures, Arkema's Forane<sup>®</sup> 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<sup>®</sup> 427A 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.

Control Air of Southern Nevada, LLC provides service, repair, installation, and maintenance of residential and light commercial air conditioning equipment in the greater Las Vegas Valley. Control Air of Southern Nevada services a popular shopping center near Las Vegas, in Henderson, NV. In June 2015, with record temperatures exceeding 110°F on consecutive days, an 11-year-old packaged unit required service. Joe Aguinaga, owner of Control Air of Southern Nevada, heard about Forane<sup>®</sup> 427A refrigerant and wanted to give it a try.

#### RETROFIT APPLICATION

The unit was a 2003 6-ton packaged unit with a charge of 9 lbs. of R-22. It was used to cool an electrical room. Joe followed the retrofit instructions for Forane<sup>®</sup> 427A refrigerant, evacuated the R-22, checked for leaks and repaired a leak that was discovered. He replaced the filter dryer, then charged the system with 95% of the R-22 charge of Forane<sup>®</sup> 427A refrigerant (8.25lbs). The oil was not changed because the packaged unit is a close coupled system, where proper oil return is not an issue.

#### RESULTS

System performance was in-line with the customer's expectations. The ambient temperature was climbing so fast that a direct comparison of run performance between the two gases just before and after the retrofit was not feasible, although a comparison at respective ambient temperatures is provided in Table 1 (see back page). Las Vegas has since experienced several record-breaking heat waves, with Forane<sup>®</sup> 427A refrigerant performing as well as R-22. The system ran well through at least 11 consecutive days of temperatures over 105°F and a record high of 115°F.

#### Project

Control Air of Southern Nevada, LLC

#### Location

Henderson, NV

#### Application

Air Conditioning (AC) – High Ambient

#### Refrigerant

Forane<sup>®</sup> 427A (R-427A)

#### Lubricant

Mineral Oil



## RESULTS (CONT.)

The Forane® 427A refrigerant has continued to perform closely to R-22 under these extreme conditions while many other R-22 retrofits would not have performed as well.

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](http://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/ft <sup>3</sup> )	0.29	0.30
Density of Saturated Liquid @ NBP (lb/ft <sup>3</sup> )	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

RETROFIT RESULTS: 6-T PACKAGED UNIT	R-22	R-427A
Charge (lb)	9	8.25
Expansion Device	Fixed Orifice	Fixed Orifice
Lubricant	Mineral Oil	Mineral Oil
Ambient Temperature (°F)	90.4	95.4
Suction Pressure (psig)	61.1	59.6
Suction Temperature (°F)	41.0	43.1
Discharge Pressure (psig)	278	313
Discharge Temperature (°F)	119	109
Supply Air at Evaporator (°F)	43.1	43.9
Return Air at Evaporator (°F)	66.7	67.5

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