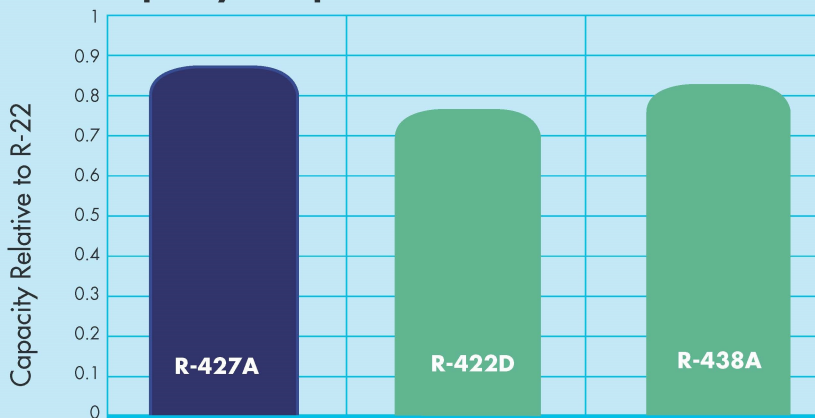


Forane<sup>®</sup> Refrigerants R-22 Alternative

# FORANE<sup>®</sup> 427A – THE EASY RETROFIT<sup>™</sup>

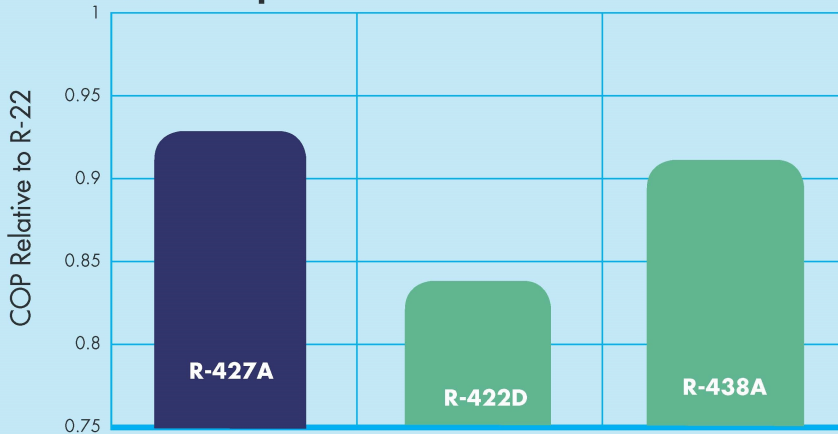
Forane<sup>®</sup> 427A is an R-22 retrofit for air conditioning, heat pumps, and refrigeration systems. R-427A out performs other common R-22 retrofits in most applications.

### Capacity Comparison



Note: Box Temperature 25°F, Ambient 100°F

### COP Comparison



Note: Box Temperature 25°F, Ambient 100°F



### Minimize the work for R-22 retrofits

- One refrigerant for three applications: air conditioning, heat pumps, and refrigeration
- No TXV replacement required
- Comparable capacity to R-22
- Better efficiency than most R-22 retrofits
- Nearly identical operating pressures to R-22
- Copeland Discus<sup>™</sup> and Bitzer Approved

**NO OIL CHANGE NEEDED**  
in many installations



iPhone<sup>®</sup>



Android<sup>™</sup>

### New! Forane<sup>®</sup> P/T App

- Interactive pressure/temperature charts
- Pressure/temperature calculator
- Product finder
- Subcooling and superheat calculator
- Toggle between 8 different languages

# Forane® 427A Retrofit Guides

## Step 1: Establish baseline performance

Check the system for leaks and identify any needed repairs. Run the system using the correct OEM charge of R-22 and record performance parameters using an Arkema Retrofit Data Sheet.

## Step 2: Recover existing R-22

Recover existing R-22 refrigerant (DO NOT vent to the atmosphere) and make sure not to mix with other refrigerant gases. Record the weight of refrigerant removed.

## Step 3: Check lubricant

A lubricant change may not be required, but POE is always recommended for optimal performance. Confirming oil quality is important. Check the oil for moisture, acidity, and metal shavings or sediments. If the oil does not meet the desired specification, a complete oil change using POE is recommended.

Systems with complex piping schemes could impede proper oil return. In these cases, adding or changing over to POE is recommended.

## Step 4: Replace the filter dryer and seals

Replace the filter dryer and, if necessary, elastomeric seals and gaskets, such as Schrader valve cores.

## Step 5: Leak check and evacuate the system

Conduct a pressure test using dry nitrogen to determine if the system has a leak, staying below the system pressure limitations. Repair any leaks as necessary.

Pull a minimum vacuum of 500 microns and ensure that it maintains a vacuum. If the system does not hold vacuum, leaks may still be present.

## Step 6: Charge the system with Forane® 427A

Remove refrigerant as a liquid only from the cylinder, being careful not to damage the compressor. The initial weight should be approximately 95% of the original charge for R-22, charging up to 100% if necessary.

## Step 7: Start the system and check performance

Start system and record system performance, noting superheat and subcooling. Adjust TXV set-point and/or refrigerant charge to achieve the desired superheat. Low side pressure control settings may also need to be adjusted.

## Step 8: Label the system

Properly label the system as being retrofitted with Forane® 427A. For Forane® 427A system labels, call Arkema's customer service at (800) 245-5858.



Customer Service: 800-245-5858  
Technical Service: 800-738-7695

[www.r22retrofits.com](http://www.r22retrofits.com)

The chemical, physical, and toxicological properties of these chemicals may not have been fully investigated. You must use due caution in handling of any such material and follow appropriate, good industrial hygiene and safety precautions to prevent human exposure. Carefully read and understand the information on the Material Safety Data Sheet (MSDS) before beginning work with the material described in this brochure.

Please consult Arkema's disclaimer regarding the use of Arkema's products on <http://www.arkema.com/en/products/product-safety/disclaimer/index.html>

Forane® is a registered trademark of Arkema

Forane® is a registered trademark of Arkema.

iPhone® is a registered trademark of Apple Inc.

Android™ is a trademark of Google Inc.

Discuss™ is a trademark of Emerson Climate Technologies Inc.

[forane.com](http://forane.com)

**Arkema Inc.**  
900 First Avenue  
King of Prussia, PA 19406  
USA  
Tel.: (+1) 610-205-7000

**ARKEMA**  
INNOVATIVE CHEMISTRY

**Headquarters: Arkema France**  
420, rue d'Estienne d'Orves  
92705 Colombes Cedex – France  
Tel.: +33 (0)1 49 00 80 80  
Fax: +33 (0)1 49 00 83 96  
[arkema.com](http://arkema.com)

Forane® Refrigerant Pressure Temperature Chart

PRESSURE (PSIG)																		
Sat. Temp (°F)	R-22	R-407C Liquid Pressure	R-407C Vapor Pressure	R-410A Liquid Pressure	R-427A Liquid Pressure	R-427A Vapor Pressure	R-407A Liquid Pressure	R-407A Vapor Pressure	R-123	R-12	R-134a	R-409A Liquid Pressure	R-409A Vapor Pressure	R-401A Liquid Pressure	R-401A Vapor Pressure	R-401B Liquid Pressure	R-401B Vapor Pressure	Sat. Temp (°C)
-50	<b>6.2</b>	<b>2.9</b>	<b>11.4</b>	5.3	<b>3.8</b>	<b>11.9</b>	<b>0.8</b>	<b>9.0</b>	<b>29.2</b>	<b>15.4</b>	<b>18.7</b>	<b>12.4</b>	<b>17.2</b>	<b>13.5</b>	<b>17.9</b>	<b>12.2</b>	<b>16.8</b>	-45.6
-45	<b>2.7</b>	0.4	<b>8.5</b>	8.0	<b>0.1</b>	<b>9.0</b>	1.7	<b>5.7</b>	<b>29.0</b>	<b>13.3</b>	<b>16.9</b>	<b>9.7</b>	<b>15.2</b>	<b>11.1</b>	<b>16.0</b>	<b>9.6</b>	<b>14.7</b>	-42.8
-40	0.5	2.5	<b>5.2</b>	11.0	1.9	<b>5.9</b>	3.9	<b>2.0</b>	<b>28.9</b>	<b>11.0</b>	<b>14.8</b>	<b>6.8</b>	<b>13.1</b>	<b>8.4</b>	<b>13.8</b>	<b>6.7</b>	<b>12.4</b>	-40.0
-35	2.6	4.8	<b>1.5</b>	14.2	4.1	<b>2.4</b>	6.4	1.0	<b>28.7</b>	<b>8.4</b>	<b>12.5</b>	<b>3.5</b>	<b>10.7</b>	<b>5.3</b>	<b>11.4</b>	<b>3.4</b>	<b>9.7</b>	-37.2
-30	4.9	7.3	1.3	17.8	6.6	0.8	9.2	3.3	<b>28.4</b>	<b>5.5</b>	<b>9.8</b>	0.0	<b>8.1</b>	<b>2.0</b>	<b>8.7</b>	0.1	<b>6.8</b>	-34.4
-25	7.4	10.1	3.6	21.8	9.3	2.9	12.2	5.8	<b>28.1</b>	<b>2.3</b>	<b>6.9</b>	2.0	<b>5.1</b>	0.8	<b>5.6</b>	2.0	<b>3.5</b>	-31.7
-20	10.1	13.1	6.1	26.1	12.2	5.3	15.6	8.5	<b>27.8</b>	0.6	<b>3.7</b>	4.1	<b>1.9</b>	2.9	<b>2.2</b>	4.1	0.1	-28.9
-15	13.2	16.5	8.8	30.8	15.4	7.9	19.2	11.5	<b>27.4</b>	2.4	<b>0.1</b>	6.5	0.8	5.1	0.7	6.5	2.0	-26.1
-10	16.5	20.1	11.9	35.9	18.9	10.8	23.2	14.9	<b>27.0</b>	4.5	1.9	9.0	2.8	7.5	2.8	9.1	4.2	-23.3
-5	20.0	24.0	15.2	41.5	22.8	14.0	27.5	18.5	<b>26.5</b>	6.7	4.1	11.8	4.9	10.1	5.0	11.9	6.6	-20.6
0	23.9	28.3	18.9	47.5	26.9	17.5	32.2	22.5	<b>25.9</b>	9.1	6.5	14.8	7.2	13.0	7.4	14.9	9.2	-17.8
5	28.2	33.0	22.9	54.1	31.4	21.2	37.3	26.9	<b>25.3</b>	11.8	9.1	18.1	9.7	16.1	10.1	18.2	12.1	-15.0
10	32.8	38.0	27.3	61.2	36.3	25.4	42.8	31.6	<b>24.6</b>	14.6	11.9	21.7	12.5	19.5	13.0	21.8	15.2	-12.2
15	37.7	43.5	32.0	68.8	41.5	29.9	48.7	36.7	<b>23.7</b>	17.7	15.0	25.5	15.4	23.1	16.2	25.7	18.6	-9.4
20	43.0	49.3	37.2	77.1	47.2	34.7	55.1	42.3	<b>22.8</b>	21.0	18.4	29.6	18.7	27.1	19.6	29.9	22.3	-6.7
25	48.7	55.7	42.7	86.0	53.3	40.0	62.0	48.3	<b>21.8</b>	24.6	22.1	34.0	22.2	31.4	23.4	34.4	26.3	-3.9
30	54.9	62.5	48.7	95.5	59.8	45.7	69.3	54.8	<b>20.7</b>	28.4	26.0	38.7	26.0	36.0	27.4	39.3	30.6	-1.1
35	61.5	69.8	55.2	105.7	66.8	51.9	77.2	61.8	<b>19.5</b>	32.5	30.3	43.8	30.1	40.9	31.8	44.5	35.2	1.7
40	68.5	77.6	62.1	116.6	74.3	58.7	85.6	69.4	<b>18.1</b>	36.9	35.0	49.2	34.5	46.2	36.5	50.1	40.2	4.4
45	76.0	86.0	69.5	128.3	82.3	65.6	94.6	77.4	<b>16.6</b>	41.6	40.0	54.9	39.2	51.8	41.6	56.0	45.6	7.2
50	84.0	94.9	77.5	140.8	90.8	73.3	104.2	86.1	<b>15.0</b>	46.7	45.4	61.0	44.3	57.9	47.0	62.4	51.4	10.0
55	92.5	104.5	86.0	154.1	99.9	81.5	114.4	95.3	<b>13.1</b>	52.0	51.1	67.6	49.8	64.3	52.8	69.2	57.5	12.8
60	101.6	114.6	95.1	168.2	109.6	90.3	125.2	105.2	<b>11.2</b>	57.7	57.3	74.5	55.6	71.2	59.0	76.5	64.1	15.6
65	111.2	125.4	104.8	183.2	119.9	99.6	136.7	115.7	<b>9.0</b>	63.7	63.9	81.8	61.9	78.5	65.7	84.2	71.2	18.3
70	121.4	136.9	115.2	199.2	130.8	109.6	148.8	127.0	<b>6.6</b>	70.2	71.0	89.5	68.6	86.3	72.8	92.3	78.7	21.1
75	143.6	149.1	126.2	216.1	142.4	120.3	161.7	138.9	<b>4.0</b>	76.9	78.6	97.7	75.8	94.5	80.3	101.0	86.7	23.9
80	143.6	162.1	137.8	234.0	154.6	131.6	175.3	151.6	<b>1.2</b>	84.1	86.6	106.4	83.4	103.2	88.4	110.2	95.2	26.7
85	155.7	175.8	150.2	253.0	167.6	143.7	189.7	165.1	0.9	91.7	95.1	115.5	91.5	112.4	96.9	119.8	104.2	29.4
90	168.4	190.2	163.4	273.0	181.2	156.4	204.8	179.3	2.5	99.7	104.2	125.2	100.2	122.2	106.0	130.1	113.8	32.2
95	181.8	205.5	177.4	294.1	195.6	170.0	220.8	194.4	4.2	108.2	113.8	135.3	109.4	132.5	115.6	140.9	123.9	35.0
100	195.9	221.6	192.1	316.4	210.8	184.4	237.6	210.4	6.1	117.1	124.1	146.0	119.2	143.3	125.7	152.3	134.7	37.8
105	210.7	238.5	207.8	339.9	226.8	199.6	255.3	227.4	8.1	126.5	134.9	157.2	129.6	154.8	136.5	164.3	146.0	40.6
110	226.3	256.4	224.4	364.6	243.6	215.7	273.9	245.2	10.3	136.4	146.3	169.0	140.6	166.8	147.8	176.9	158.0	43.3
115	242.7	275.1	241.9	390.5	261.2	232.7	293.5	264.1	12.6	146.7	158.4	181.4	152.3	179.4	159.8	190.1	170.6	46.1
120	259.9	294.7	260.5	417.7	279.7	250.6	314.0	284.0	15.1	157.6	171.1	194.4	164.7	192.7	172.4	204.0	183.9	48.9
125	277.9	315.2	280.1	446.3	299.1	269.5	335.4	305.0	17.7	169.0	184.5	208.0	177.8	206.6	185.7	218.6	197.9	51.7
130	296.8	336.7	300.9	476.3	319.4	289.5	357.9	327.1	20.6	180.9	198.7	222.3	191.6	221.2	199.7	233.9	212.6	54.4
135	316.5	359.2	322.9	507.6	340.7	310.5	381.5	350.5	23.6	193.5	213.6	237.2	206.3	236.5	214.5	250.0	228.1	57.2
140	337.2	382.6	346.2	540.5	362.9	332.6	406.2	375.1	26.8	206.5	229.3	252.9	221.8	252.5	229.9	266.7	244.3	60.0
145	358.8	407.0	370.8	574.8	386.1	355.9	431.9	401.0	30.2	220.2	245.7	269.3	238.2	269.3	246.2	284.3	261.4	62.8
150	381.5	432.4	396.9	610.6	410.3	380.4	458.9	428.3	33.8	234.5	263.0	286.4	255.5	286.8	263.2	302.6	279.3	65.6

Red Numerals (in bold and italics) - Inches Hg. Below 1 ATM

## Forane® Refrigerant Basic Property Data Chart

Properties	R-410A	R-427A	R-407A	R-407C	R-134a	R-404A	R-507A	R-22	R-408A	R-409A	R-123
Average Molecular Weight (g/mol)	72.6	90.4	90.1	86.2	102.0	97.6	98.8	86.5	87.0	97.4	152.9
Normal Boiling Point (NBP) (°F)	-61.9	-44.8	-49.0	-46.1	-14.9	-51.5	-52.8	-41.3	-47.9	-30.1	82.1
Latent Heat of Vaporization at NBP (BTU/lb)	116.7	102.0	101.3	107.4	92.8	86.0	84.3	100.5	97.6	94.6	73.7
Critical Temp (°F)	162.0	185.6	180.1	187.2	214.1	161.6	159.8	204.8	182.6	224.2	362.7
Critical Pressure (psia)	717.9	637.1	654.9	670.1	590.3	539.5	539.5	722.3	629.5	667.2	532.9
Density of Saturated Vapor @ NBP (lb/ft³)	0.26	0.30	0.30	0.29	0.33	0.34	0.34	0.29	0.30	0.31	0.40
Density of Saturated Liquid at 77°F (lb/ft³)	66.3	71.9	71.5	71.1	75.3	65.2	65.0	74.5	66.3	75.9	91.3
Specific Heat of Saturated Vapor at NBP (BTU/lb °R)	0.17	0.18	0.18	0.17	0.19	0.18	0.18	0.14	0.16	0.15	0.16
Specific Heat of Saturated Liquid at 77°F (BTU/lb °R)	0.44	0.38	0.36	0.38	0.34	0.39	0.39	0.30	0.37	0.30	0.23
Ozone Depletion Potential (ODP) (CFC-11 = 1.0)	0	0	0	0	0	0	0	0.055	0.026	0.05	0.02
ASHRAE Safety Group Classification	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	B1
Occupational Exposure Limits (8 hr time/wt. Avg.) (ppm)	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	50
Global Warming Potential (GWP)	2,100	2,130	2,100	1,800	1,430	3,900	4,000	1,810	2,650	1,290	77

The information contained in this document is based on trials carried out by Arkema Research Centers and data selected from literature, but shall in no event be held to constitute or imply any warranty, undertaking, express or implied commitment from our part. Our formal specifications define the limit of our commitment. No liability whatsoever can be accepted by Arkema with regard to the handling, processing or use of the product or products concerned which must in all cases be employed in accordance with all relevant laws and/or regulations in force in the country or countries concerned.

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 MSDS for Health & Safety Considerations  
 Forane® is a registered trademark belonging to Arkema  
 © 2009 Arkema Inc. All rights reserved.



Arkema Inc.  
 2000 Market Street  
 Philadelphia, PA 19103-3222  
 Tel.: 215-419-7000  
 www.arkema-inc.com