



## PRESSURE-TEMPERATURE CHART

TEMP (°F)	National R-449A	
	Liquid (psig)	Vapor (psig)
-40	4.8	0.0
-35	7.4	2.0
-30	10.2	4.4
-25	13.3	6.9
-20	16.7	9.8
-15	20.5	12.9
-10	24.6	16.3
-5	29.0	20.1
0	33.8	24.1
5	39.0	28.6
10	44.6	33.4
15	50.6	38.6
20	57.1	44.3
25	64.0	50.4
30	71.5	56.9
35	79.5	64.0
40	88.0	71.6
45	97.1	79.7
50	107	88.4
55	117	97.7
60	128	108
65	140	118
70	152	129
75	165	141
80	179	154
85	193	167
90	208	182
95	224	197
100	241	213
105	259	229
110	278	247
115	297	266
120	318	286
125	339	307
130	362	329
135	385	352
140	410	376
145	435	402
150	462	429

Values from NIST Refprop 8.0

# R-449A

## APPLICATIONS:

- Low Temperature Refrigeration
- Medium Temperature Refrigeration

## PERFORMANCE:

### In R-22 Applications

- Higher System Pressures
- Lower Discharge Temperature
- Existing TXV is suitable (some adjustment will be required)
- Change lubricant to POE per manufacturer's instructions

### In R-404A (or similar) Applications

- Similar/Slightly Lower Pressures
- Increased Discharge Temperature
- Existing TXV is suitable, but close 1-2 turns then adjust superheat
- Existing POE lubricant is compatible

## Physical Properties of Refrigerants

Refrigerant Classification	HFC/HFO
Molecular Weight	87.2
Boiling Point (1atm, °F)	-50.7
Critical Pressure (psia)	655
Critical Temperature (°F)	178.7
Critical Density (lb./ft <sup>3</sup> )	29.06
Liquid Density (70 °F, lb./ft <sup>3</sup> )	69.5
Vapor Density (bp, lb./ft <sup>3</sup> )	0.297
Heat of Vaporization (bp, BTU/lb.)	101.1
Specific Heat Liquid (70 °F, BTU/lb. °F)	0.3635
Specific Heat Vapor (1atm, 70 °F, BTU/lb. °F)	0.2020
Ozone Depletion Potential (CFC 11 = 1.0)	0
Global Warming Potential (CO <sub>2</sub> = 1.0)	1282
ASHRAE Standard 34 Safety Rating	A1

## Temperature Glide (°F)

### NATIONAL R-449A

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Critical Pressure (psia)	655
Critical Temperature (°F)	178.7
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Specific Heat Vapor (1atm, 70 °F, BTU/lb. °F)	0.2020
Ozone Depletion Potential (CFC 11 = 1.0)	0
Global Warming Potential (CO <sub>2</sub> = 1.0)	1282
ASHRAE Standard 34 Safety Rating	A1
Temperature Glide (°F)	7

## AVAILABLE SIZES

Type	Size
Cylinder	25 lb
	110 lb



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## General Considerations:

### R-22 Applications

- **TXVs.** R-22 expansion valves will likely have the proper capacity range for R-449A. Some adjustment of superheat will be necessary after retrofit.
- **Performance.** R-449A will provide higher capacity than R-22 at similar operating conditions. This may result in shorter compressor run times.
- **Seals and O-Rings.** R-22 and mineral oil will affect elastomeric seals over time. When a new HFC refrigerant and POE lubricant are used, old seals may leak. Replacement is recommended during retrofit.
- **Lubricant.** POE lubricant is recommended. Follow manufacturer's guidelines for replacement of mineral oil with POE.

### R-404A Applications

- **TXVs.** R-404A expansion valves may appear over-sized for R-449A. Valves should be closed down 1-2 turns to avoid flood back. Superheat should be adjusted after retrofit.
- **Performance.** R-449A will have similar capacity to R-404A (or similar) refrigerants.
- **Seals and O-Rings.** HFC refrigerants and POE lubricants will affect elastomeric materials in a similar fashion. Any seals that are disturbed during retrofit should be replaced with fresh parts.
- **Lubricant.** The existing POE lubricant as required by the compressor manufacturer should be the same as required for R-449A.

## Retrofit Procedures:



1. Establish Baseline Data. While existing charge (R-22 or R-404A) is in the system, collect system operation data. Make note of any obvious performance problems with the system. Leak check the system and identify any repairs that should be made during system shutdown.
2. Disconnect electrical power from the system and recover the refrigerant charge. Record the weight of refrigerant recovered. (If the system contains mineral oil, replace the lubricant charge as well).
3. Perform any required maintenance or repairs as previously identified, including replacement of Schrader cores and filter driers.
4. Leak Check and/or Evacuate the System. If preferred, leak check the system by pressurization before final evacuation. Check to ensure vacuum is held at desired micron level.
5. Charge the system with R-449A. The refrigerant must be removed from the cylinder as a liquid to avoid fractionation of the blend. (The final charge will be about 95% of the R-22 charge, or about 105% of the R-404A charge.)
6. Restart the system and allow it to come to normal operating conditions. Refer to the pre-retrofit data sheet to confirm operating parameters. Adjust TXVs and pressure controls as necessary.
7. Document the retrofit with a label on the system indicating R-449A refrigerant and the POE used.

## Servicing Considerations:

- R-449A can be added to a system during servicing, if required, without recovering the existing R-449A charge. Verify system performance after adding refrigerant.
- This zeotropic refrigerant must be removed from the cylinder as a liquid.
- Follow industry approved best practices for recovery of refrigerant and achieve full vacuum on the system at the end of the recovery process. Avoid mixing refrigerants during recovery.
- Recovery of R-449A requires a recovery cylinder with a service pressure of 300 psig minimum.

For information on retrofitting, please refer to NRI's Retrofit Handbook at [www.refrigerants.com/pdf/NRI\\_RetrofitHndBk.pdf](http://www.refrigerants.com/pdf/NRI_RetrofitHndBk.pdf)



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