R-448A

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

PRESSURE-TEMPERATURE CHART

	National R-448A	
TEMP (˚F)	Liquid (psig)	Vapor (psig)
-40	4.9	0.0
-35	7.5	2.1
-30	10.4	4.4
-25	13.5	7.0
-20	17.0	9.8
-15	20.8	13.0
-10	24.9	16.4
-5	29.3	20.2
0	34.2	24.3
5	39.4	28.8
10	45.1	33.6
15	51.2	38.9
20	57.8	44.6
25	64.8	50.7
30	72.3	57.3
35	80.4	64.4
40	89.0	72.1
45	98.2	80.3
50	108	89.0
55	118	98.4
60	129	108
65	141	119
70	154	130
75	167	142
80	181	155
85	195	169
90	211	183
95	227	198
100	244	214
105	262	231
110	281	249
115	300	268
120	321	288
125	343	309
130	365	331
135	389	355
140	414	379
145	440	405
150	467	433

Values from NIST Refprop 8.0

Physical Properties of Refrigerants	NATIONAL R-448A
Refrigerant Classification	HFC
Molecular Weight	86.3
Boiling Point (1atm, ˚F)	-50.7
Critical Pressure (psia)	675.6
Critical Temperature (˚F)	182.6
Critical Density (lb./ft^3)	30.0
Liquid Density (70˚F, lb./ft^3)	68.2
Vapor Density (bp.lb./ft^3)	0.294
Heat of Vaporization (bp, BTU/lb.)	103.8
Specific Heat Liquid (70 ˚F, BTU/lb. ˚F)	0.37
Specific Heat Vapor (1atm, 70 ˚F, BTU/lb. ˚F)	0.28
Ozone Depletion Potential (CFC 11 = 1.0)	0
Global Warming Potential (CO_2 = 1.0)	1274
ASHRAE Standard 34 Safety Rating	A1
Temperature Glide (˚F)	**7**

AVAILABLE SIZES

Type	Size
Cylinder	25 lb
	100 lb

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R-448A Retrofit Guidelines

General Considerations:

R-22 Applications

- **TXVs.** R-22 expansion valves will likely have the proper capacity range for R-448A. Some adjustment of superheat will be necessary after retrofit.
- **Performance.** R-448A 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-448A. Valves should be closed down 1-2 turns to avoid flood back. Superheat should be adjusted after retrofit.
- **Performance.** R-448A 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-448A.

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-448A. 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-448A refrigerant and the POE used.

Servicing Considerations:

- R-448A can be added to a system during servicing, if required, without recovering the existing R-448A 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-448A 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_RetroftHndBk.pdf

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