



## PRESSURE-TEMPERATURE CHART

TEMP (°F)	R-513A psig
-40	12.1
-35	9.4
-30	6.5
-25	3.3
-20	0.1
-15	2.1
-10	4.2
-5	6.6
0	9.1
5	11.9
10	15.0
15	18.3
20	21.9
25	25.9
30	30.1
35	34.6
40	39.6
45	44.8
50	50.5
55	56.5
60	63.0
65	69.9
70	77.3
75	85.1
80	93.4
85	102
90	112
95	121
100	132
105	143
110	155
115	167
120	180
125	193
130	207
135	222
140	238
145	254
150	271

Values from NIST Refprop 8.0

Red Figures (IN Hg) Vacuum

# R-513A

## APPLICATIONS:

- ◆ Medium Temperature Refrigeration, AC Chillers, heat pumps

## PERFORMANCE:

- ◆ Similar properties to 134a, no temperature glide
- ◆ Existing TXV should be suitable (some superheat adjustment needed)
- ◆ POE lubricant — same as R-134a

## Physical Properties of Refrigerants

Refrigerant Classification	HFC / HFO
Molecular Weight	108.4
Boiling Point (1atm, °F)	-20.6
Critical Pressure (psia)	546
Critical Temperature (°F)	174
Critical Density (lb./ft <sup>3</sup> )	32.26
Liquid Density (70°F, lb./ft <sup>3</sup> )	74.0
Vapor Density (bp, lb./ft <sup>3</sup> )	0.3530
Heat of Vaporization (bp, BTU/lb.)	84.3
Specific Heat Liquid (70 °F, BTU/lb. °F)	0.3323
Specific Heat Vapor (1atm, 70 °F, BTU/lb. °F)	0.209
Ozone Depletion Potential (CFC 11 = 1.0)	0
Global Warming Potential (CO <sub>2</sub> = 1.0)	573
ASHRAE Standard 34 Safety Rating	A1

## NATIONAL R-513A

## AVAILABLE SIZES

Type	Size
Cylinder	30 lb
	125 lb



## National Refrigerants, Inc.

11401 Roosevelt Boulevard  
Philadelphia, PA 19154  
Tel: 800.262.0012  
fax: 215.698.7466  
web: www.refrigerants.com  
e-mail: info@refrigerants.com

## General Considerations:

- **Expansion Devices.** Existing R-134a expansion devices should work well with R-513A. Older systems may have R-12 rated expansion devices, which will also work well with R-513A. Superheat settings may need to be adjusted based on the difference between R-513A pressures compared to the refrigerant being replaced. Consult the pressure/temperature and valve manufacturer's literature for guidance.
- **Filter Dryer.** A filter drier should be added to a system as part of the retrofit process. If one already exists, the filter drier should be replaced with the same type currently in use.
- **Lubricant.** R-513A requires polyolester (POE) lubricant. When retrofitting R-134a, the existing POE lubricant should work fine. Systems running on an HCFC-based R-12 retrofit blend may contain mineral oil, and therefore it will be necessary to change the oil at least once with POE to ensure proper oil return. Follow all manufacturer guidelines when changing from mineral oil to POE.
- **Performance.** R-513A has a slightly higher capacity compared to R-134a. It should be a close match to the HCFC-based R-12 retrofit blends. System pressures will be slightly higher than R-134. There is no temperature glide to compensate for, but the different pressure/temperature relationship may require resetting of pressure-based controls.
- **Seals and O-Rings.** For any retrofit job it is recommended to change Schrader valve cores, o-rings on caps, and any seals found to be leaking before the retrofit takes place.

## Retrofit Procedures:



1. Collect baseline data for operation of the system with the existing refrigerant charge. Make note of any obvious performance problems with the system. Leak check the system as well, identifying any repairs to perform during the retrofit process.
2. Disconnect electrical power to system and properly recover the refrigerant charge. Do not top off a system that contains any other refrigerant with R-513A. Record the weight of the refrigerant recovered.
3. Perform any required maintenance or repair operations previously identified, including replacement of Schrader cores and filter drier. Add or change oil if required (follow equipment manufacturer's guidelines).
4. If desired, pressurize and leak check the system by preferred method. Evacuate the system down to 250 microns and confirm that it holds.
5. Remove liquid R-513A from the cylinder and charge the system to about 90% to 95% of the original R-134a charge size.
6. Restart the system and allow it to come to normal operation conditions. Compare the new operation data to the recorded baseline data. Adjust charge or system settings as needed.
7. Place a label on the system indicating that it contains R-513A refrigerant and the oil type.

## Servicing Considerations:

- R-513A can be added to a system during servicing, if required, without recovering the existing R-513A charge. Verify system performance. If the system has a critical charge, however, it is recommended that any remaining refrigerant be removed prior to servicing.
- Even though R-513A is considered an azeotrope, this blend should still be removed from the cylinder as a liquid. Be careful to allow the charge to flash before it enters the compressor.
- 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.

**Additional technical assistance is a phone call away.**  
For more detailed assistance call 800.262.0012



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