SOLSTICE® 449A (R-449A)

TECHNICAL DATA SHEET

Solstice® 449A is designed for low and medium temperature commercial refrigeration, helping customers replace legacy refrigerants while maintaining dependable cooling performance and reducing transition complexity. It provides reliable refrigeration performance with a practical path for the transition to lower global warming potential (GWP) refrigerants.

PHYSICAL PROPERTIES

Solstice® N40 (R-448A)	
Class/Type	Zeotropic blend
Formula"	24.3%/24.7%/25.7%/25.3% R-32/R-125
Appearance	Colorless
ODP (ODP-R11=1)	0
GWP 4th/5th IPCC	1397 / 1282
Flammability Limits – ASTM E681-04 @ 21°C	Nonflammable
ASHRAE Std. 34 Safety Class	A1
LFL (% vol)	Nonflammable

PROPERTIES	
Molecular weight	87.2 g/mol
Boiling temperature @ 101.325kPa	-45.7°C
Critical temperature	82.1°C
Critical pressure	4,499.7 kPA (abs)
Critical volume	2.09 m^3/kg
Critical density	479.4 kg/m^3
Saturated liquid pressure @ 25°C	1,570.8 kPA (abs)
Saturated vapor pressure @ 25°C	1,112.3 kPA (abs)
Vapor density @ 101.325 kPa boiling pt	3.63 kg/m^3
Vapor density @ 25°C	49.3 kg/m^3
Vapor pressure @ 25°C	1,112.3 kPA (abs)
Liquid density @ 0°C	1,197.6 kg/m^3
Liquid density @ 25°C	1,097.1 kg/m^3
Liquid heat capacity @ 25°C	1.55 KJ/kg-K
Vapor heat capacity @ 25°C	1.16 KJ/kg-K
Liquid thermal conductivity @ 25°C	80.5 W/m-K
Vapor thermal conductivity @ 25°C	14.7 W/m-K
Liquid viscosity @ 25°C	54.4 µPa-s
Vapor viscosity @ 25°C	20.0 µPa-s87.2 lbm/lb-mol
Boiling temperature @ 0 psig	-50.3°F
Critical temperature	179.7°F
Critical pressure	652.6 psia
Critical volume	0.03 ft^3/lbm
Critical density	29.9 lbm/ft^3
Saturated liquid pressure @ 77°F	227.8 psia
Saturated vapor pressure @ 77°F	161.3 psia
Vapor density @ 0 psig boiling point	0.23 lbm/ft^3
Vapor density @ 77°F	3.1 lbm/ft_3
Vapor pressure @ 77F	161.3 psia
Liquid density @ 32F	74.8 lbm/ft^3
Liquid density @ 77°F	68.5 lbm/ft_3
Liquid heat capacity @ 77°F	0.37 Btu/lbm-R
Vapor heat capacity @ 77°F	0.28 Btu/lbm-R
Liquid thermal conductivity @ 77°F	0.046 Btu/(h-ft-R)
Vapor thermal conductivity @ 77°F	0.0085 Btu/h-ft-F
Liquid viscosity @ 77°F	0.000093 lbm/ft-sec
Vapor viscosity @ 77°F	0.0000083 lbm/ft-sec

BENEFITS

- Zero Ozone Depletion Potential (ODP)
- Non-flammable and low toxicity (ASHRAE Safety Group A1), suitable for use in occupied spaces
- Stable performance across a wide range of temperatures and pressures
- High-performance, lower GWP alternative for both new installations and retrofits.
- As a retrofit, Solstice 449A offers:
  - Improved performance
  - Significant GWP reduction:
    - 67% lower than R-404A and R-507
    - 33% lower GWP than R-407A
    - 30% lower than R-22

APPLICATIONS

- Low and medium temperature industrial direct expansion (DX) refrigeration and DX chillers
- Food service condensing units
- Cold storage
- Self-contained systems
- Supermarkets
- Centralized rack systems
- Distributed systems
- Walk-in coolers/freezers and prep rooms
- Ice rink systems

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MATERIALS COMPATIBILITY

Solstice does not recommend the use of chlorinated solvents to clean refrigeration systems or components.

DESICCANTS

Desiccant driers compatible with Solstice® 449A (R-449A) are commercially available. Contact individual drier manufacturers for specific recommendations.

LUBRICANTS

Polyolester (POE) oil is recommended for using Solstice 449A. Compressor manufacturers typically qualify specific lubricants for use with their products. Users should check with the equipment manufacturer for the recommended lubricants for their system.

PLASTICS AND ELASTOMERS

Solstice 449A is compatible with most common materials. In the case of retrofit systems that may contain chlorinated materials, please contact your Solstice sales representative for specific information.

SAFETY AND STORAGE

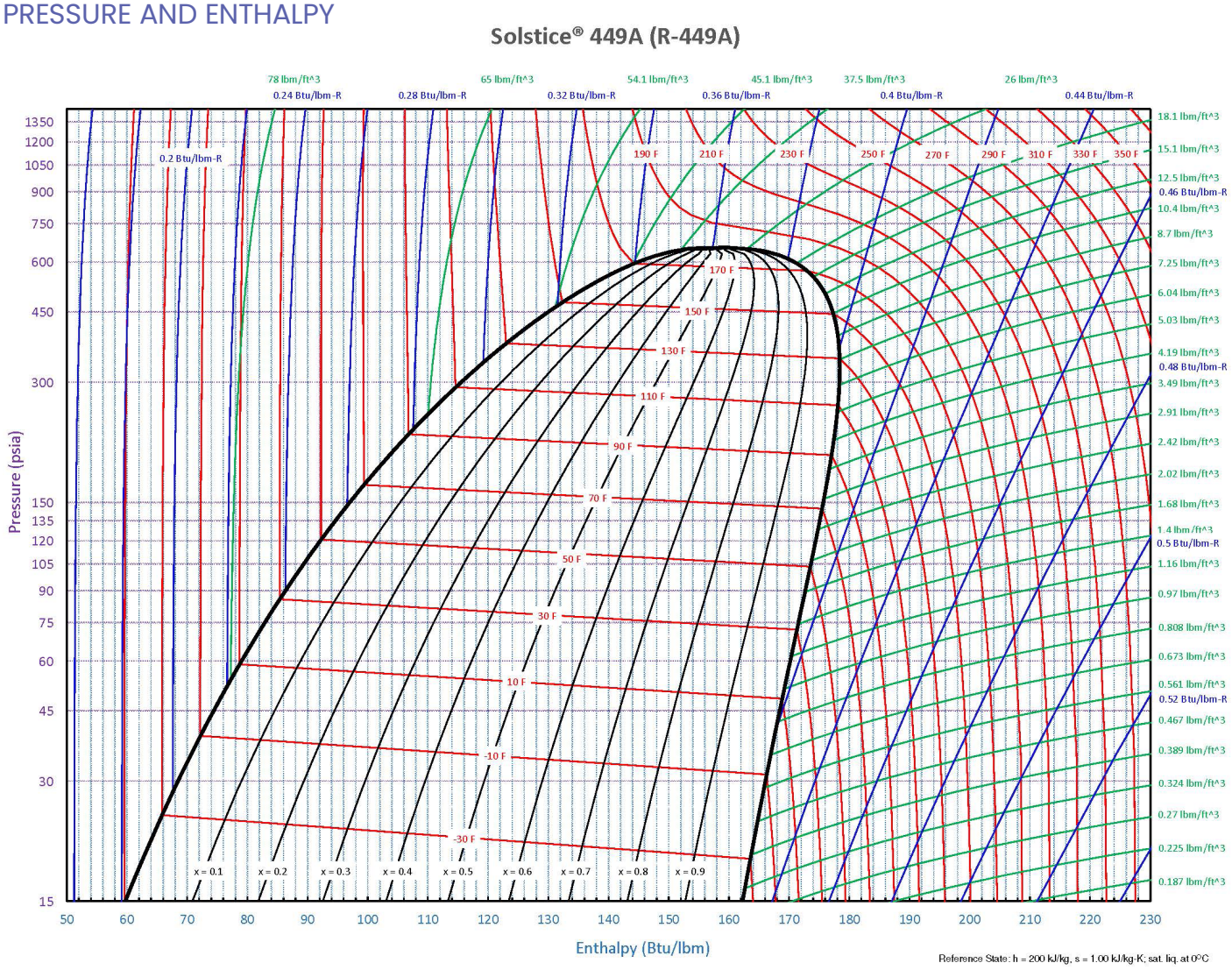
According to the compressed gas classification, Solstice 449A is nonflammable. It has similar storage and handling requirements to R-404A in bulk and cylinder.

For the Safety Data Sheet and more information, visit solstice.com

LEAK DETECTION

Leak detectors can be used for pinpointing specific leaks or for monitoring an entire room on a continual basis. Leak detection is important for refrigerant conservation, equipment protection and performance, reduction of emissions and protection of those coming in contact with the system. Customers should consult the equipment manufacturer for appropriate detectors.

PRESSURE AND ENTHALPY



PRESSURE AND TEMPERATURE

PT CHARTS - R-449A			
Pressure (psig)	Average Temperature (°F)	Liquid (Bubble) Temperature (°F)	Vapor (Dew) Temperature (°F)
0	-43.1	-46	-40.3
0.5	-34.4	-37.3	-31.6
1.5	-22.3	-25.1	-19.6
2	-40.4	-45.5	-35.2
3	-38.1	-43.2	-33
3.5	-37.1	-42.2	-31.9
4	-36	-41.1	-30.9
4.5	-35	-40.1	-29.9
5	-34	-39.1	-28.9
5.5	-33	-38.1	-27.9
6	-32	-37.1	
6.5	-31	-36.1	-26
7	-30.1	-35.2	-25
7.5	-29.2	-34.3	-24.1
8	-28.3	-33.4	-23.2
8.5	-27.4	-32.5	-22.3
9	-26.5	-31.6	-21.5
9.5	-25.7	-30.7	-20.6
10	-24.8	-29.9	-19.8
10.5	-24	-29	-18.9
11	-23.2	-28.2	-18.1
11.5	-22.4	-27.4	-17.3
12	-21.6	-26.6	-16.5
12.5	-20.8	-25.8	-15.7
13	-20	-25	-15
13.5	-19.3	-24.3	-14.2
14	-18.5	-23.5	-13.5
14.5	-17.8	-22.8	-12.7
15	-17	-22.1	-12
15.5	-16.3	-21.3	-11.3
16	-15.6	-20.6	-10.6
16.5	-14.9	-19.9	-9.9
17	-14.2	-19.2	-9.2
17.5	-13.5	-18.5	-8.5

PT CHARTS - R-449A			
Pressure (psig)	Average Temperature (°F)	Liquid (Bubble) Temperature (°F)	Vapor (Dew) Temperature (°F)
18	-12.8	-17.8	-7.8
18.5	-12.2	-17.2	-7.2
19	-11.5	-16.5	-6.5
19.5	-10.8	-15.8	-5.9
20	-10.2	-15.2	-5.2
20.5	-9.6	-14.5	-4.6
21	-8.9	-13.9	-3.9
21.5	-8.3	-13.3	-3.3
22	-7.7	-12.7	-2.7
22.5	-7.1	-12	-2.1
23	-6.5	-11.4	-1.5
23.5	-5.9	-10.8	-0.9
24	-5.3	-10.2	-0.3
24.5	-4.7	-9.6	0.3
25	-4.1	-9.1	0.9
25.5	-3.5	-8.5	1.4
26	-2.9	-7.9	2
26.5	-2.4	-7.3	2.6
27	-1.8	-6.8	3.1
27.5	-1.3	-6.2	3.7
28	-0.7	-5.6	4.2
28.5	-0.2	-5.1	4.8
29	0.4	-4.6	5.3
29.5	0.9	-4	5.8
30	1.4	-3.5	6.4
30.5	2	-3	6.9
31	2.5	-2.4	7.4
31.5	3	-1.9	7.9
32	3.5	-1.4	8.4
32.5	4	-0.9	8.9
33	4.5	-0.4	9.5
33.5	5	0.1	10
34	5.5	0.6	10.4
34.5	6	1.1	10.9

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