



R-409A

Technical Guidelines

Physical Properties of Refrigerants	R-409A
Environmental Classification	HCFC
Molecular Weight	97.4
Boiling Point (1 atm, °F)	-31.8
Critical Pressure (psia)	680.7
Critical Temperature (°F)	224.4
Critical Density, (lb./ft ³)	31.7
Liquid Density (70 °F, lb./ft ³)	76.1
Vapor Density (bp, lb./ft ³)	0.313
Heat of Vaporization (bp, BTU/lb.)	94.75
Specific Heat Liquid (70 °F, BTU/lb. °F)	0.2908
Specific Heat Vapor (1 atm, 70 °F, BTU/lb. °F)	0.1685
Ozone Depletion Potential (CFC 11 = 1.0)	0.047
Global Warming Potential (CO ₂ = 1.0)	1585
ASHRAE Standard 34 Safety Rating	A1
Temperature Glide (°F) (see section 2)	13

Available in the following sizes

R-409A
30 LB. CYLINDER
125 LB. CYLINDER

R-409A (R-22 /124/142b)
(60 / 25 / 15 wt%)

Replaces: R-12 and R-500

Applications: Medium and low temperature commercial and industrial direct expansion refrigeration and non-centrifugal air conditioning

Performance:

- Pressure and system capacity match R-12 when operating at an average evaporator temperature 10°F to 20°F.
- Discharge pressure and temperature are higher than R-12
- Capacity match to R-500 at air conditioning temperatures

Lubricant

Recommendation: Compatible with mineral oil, alkylbenzene and polyolester lubricant

Retrofitting: from R-12 page 90,92
from R-500 page 97

Pressure-Temp Chart

Temp (°F)	R-409A	
	Liquid (psig)	Vapor (psig)
-30	0.2"	9.8"
-25	1.8	7.0"
-20	3.9	3.8"
-15	6.2	0.3"
-10	8.7	1.7
-5	11.4	3.8
0	14.4	6.1
5	17.6	8.6
10	21.1	11.4
15	24.9	14.4
20	29.0	17.6
25	33.4	21.2
30	38.1	25.0
35	43.2	29.2
40	48.6	33.6
45	54.4	38.5
50	60.6	43.6
55	67.2	49.2
60	74.2	55.2
65	81.7	61.5
70	89.6	68.4
75	98.0	75.6
80	107	83.4
85	116	91.6
90	126	100
95	137	110
100	148	120
105	159	130
110	172	141
115	184	153
120	198	165
125	212	178
130	227	192
135	242	207
140	258	222



THERMODYNAMIC PROPERTIES OF R-409A

Temp [°F]	Pressure Liquid [psia]	Pressure Vapor [psia]	Density Liquid [lb/ft ³]	Density Vapor [lb/ft ³]	Enthalpy Liquid [Btu/lb]	Enthalpy Vapor [Btu/lb]	Entropy Liquid [Btu/R-lb]	Entropy Vapor [Btu/R-lb]
-40	11.9	8.0	87.87	0.1779	0.000	94.00	0.00000	0.2287
-35	13.6	9.3	87.38	0.2030	1.295	94.64	0.00306	0.2274
-30	15.4	10.6	86.90	0.2308	2.594	95.28	0.00609	0.2262
-25	17.4	12.1	86.41	0.2616	3.899	95.92	0.00910	0.2250
-20	19.5	13.8	85.92	0.2954	5.209	96.55	0.01209	0.2239
-15	21.9	15.7	85.42	0.3326	6.524	97.18	0.01505	0.2229
-10	24.6	17.7	84.92	0.3734	7.846	97.81	0.01799	0.2219
-5	27.4	20.0	84.41	0.4180	9.174	98.43	0.02092	0.2209
0	30.5	22.5	83.90	0.4666	10.51	99.05	0.02382	0.2200
5	33.9	25.2	83.38	0.5196	11.85	99.67	0.02670	0.2191
10	37.5	28.2	82.86	0.5771	13.20	100.3	0.02957	0.2182
15	41.5	31.4	82.34	0.6395	14.55	100.9	0.03242	0.2174
20	45.7	34.9	81.80	0.7070	15.91	101.5	0.03525	0.2167
25	50.3	38.7	81.26	0.7800	17.28	102.1	0.03807	0.2159
30	55.2	42.8	80.72	0.8588	18.66	102.6	0.04088	0.2152
35	60.5	47.3	80.17	0.9437	20.05	103.2	0.04367	0.2145
40	66.1	52.0	79.61	1.035	21.44	103.8	0.04645	0.2139
45	72.1	57.2	79.04	1.133	22.84	104.4	0.04921	0.2132
50	78.5	62.7	78.47	1.239	24.25	104.9	0.05197	0.2126
55	85.4	68.6	77.89	1.352	25.67	105.5	0.05471	0.2120
60	92.6	74.9	77.30	1.473	27.11	106.0	0.05744	0.2115
65	100.3	81.7	76.70	1.603	28.55	106.5	0.06017	0.2109
70	108.5	88.9	76.09	1.742	30.00	107.0	0.06288	0.2104
75	117.2	96.6	75.48	1.891	31.46	107.5	0.06559	0.2099
80	126.3	104.8	74.85	2.050	32.93	108.0	0.06829	0.2093
85	136.0	113.4	74.21	2.219	34.42	108.5	0.07089	0.2088
90	146.2	122.7	73.56	2.401	35.92	109.0	0.07367	0.2083
95	157.0	132.4	72.90	2.594	37.43	109.4	0.07636	0.2078
100	168.3	142.7	72.22	2.801	38.95	109.9	0.07904	0.2074
105	180.2	153.7	71.54	3.022	40.49	110.3	0.08172	0.2069
110	192.7	165.2	70.83	3.258	42.04	110.7	0.08440	0.2064
115	205.9	177.4	70.11	3.510	43.61	111.1	0.08708	0.2059
120	219.6	190.2	69.38	3.779	45.19	111.4	0.08977	0.2054
125	234.1	203.7	68.62	4.068	46.80	111.8	0.09245	0.2049
130	249.2	217.9	67.85	4.376	48.42	112.1	0.09515	0.2043
135	265.0	232.9	67.05	4.707	50.06	112.4	0.09785	0.2038
140	281.5	248.6	66.22	5.062	51.72	112.6	0.1006	0.2033
145	298.8	265.1	65.38	5.443	53.41	112.9	0.1033	0.2027
150	316.8	282.5	64.50	5.853	55.13	113.1	0.1060	0.2021
155	335.6	300.7	63.58	6.296	56.87	113.2	0.1088	0.2014
160	355.2	319.8	62.63	6.775	58.65	113.4	0.1116	0.2008