R-401A and R-401B

R-401A
R-401B

Composition:
R-401A: (R-22 / 152a / 124) • (53 / 13 / 34 wt%)
R-401B: (R-22 / 152a / 124) • (61 / 11 / 28 wt%)

Replaces:
R-401A: R-12
R-401B: R-12 & R-500

Application:
R-401A: Medium and low temperature commercial and industrial direct expansion refrigeration
R-401B: Low temperature commercial and industrial direct expansion refrigeration; R-12 air conditioning; R-500 systems

Performance:
- Very similar capacity, higher temperature glide
- Similar evaporator pressure when average evaporator temperature is the same as R-12
- Head pressure runs 20 psi to 30 psi higher than R-12

Lubricant:
Compatible with a combination of mineral oil and alkylbenzene or polyolester lubricants

Retrofitting:
- Consult the comments on Pages 9 and 10
- See Section II, pages 92-98 for detailed discussion

[PHYSICAL PROPERTIES OF REFRIGERANTS]	National R-401A	National R-401B
Environmental Classification	HCFC	HCFC
Molecular Weight	94.4	92.8
Boiling Point (1atm, ˚F)	-29.9	-32.3
Critical Pressure (psia)	669	679.1
Critical Temperature (˚F)	221	218.3
Critical Density (lb./ft^3)	30.9	31.1
Liquid Density (70˚F, lb./ft^3)	74.6	74.6
Vapor Density (bp.lb./ft^3)	0.306	0.303
Heat of Vaporization (bp, BTU/lb.)	97.5	98.2
Specific Heat Liquid (70 ˚F, BTU/lb. ˚F)	0.3037	0.3027
Specific Heat Vapor (1atm, 70 ˚F, BTU/lb. ˚F)	0.1755	0.1725
Ozone Depletion Potential (CFC 11 = 1.0)	0.037	0.039
Global Warming Potential (CO2 = 1.0)	1182	1288
ASHRAE Standard 34 Safety Rating	A1	A1
Temperature Glide (˚F) (see section 2)	8	8

[PRESSURE-TEMP CHART]

R401A Liquid (psig)	R401A Vapor (psig)	TEMP. (˚F)	R401B Liquid (psig)	R401B Vapor (psig)
8.1″	*13.2″*	**-40**	*6.5″*	*11.8″*
5.1″	*10.7″*	**-35**	*3.3″*	*9.1″*
1.7″	*7.9″*	**-30**	0.2	*6.1″*
1.0	*4.8″*	**-25**	2.1	*2.8″*
3.0	*1.4″*	**-20**	4.3	0.5
5.2	1.2	**-15**	6.6	2.5
7.7	3.3	**-10**	9.2	4.7
10.3	5.5	**-5**	12.0	7.1
13.2	8.0	**0**	15.1	9.7
16.3	10.7	**5**	18.4	12.6
19.7	13.7	**10**	22.0	15.8
23.4	16.9	**15**	25.9	19.2
27.4	20.4	**20**	30.1	23.0
31.7	24.2	**25**	34.6	27.0
36.4	28.3	**30**	39.5	31.4
41.3	32.8	**35**	44.8	36.1
46.6	37.6	**40**	50.4	41.1
52.4	42.7	**45**	56.4	46.6
58.5	48.2	**50**	62.8	52.4
65.0	54.1	**55**	69.6	58.7
71.9	60.4	**60**	76.9	65.4
79.3	67.2	**65**	84.7	72.5
87.1	74.4	**70**	92.9	80.1
95.4	82.1	**75**	102	88.2
104	90.2	**80**	111	96.8
114	98.9	**85**	121	106
123	108	**90**	131	116
134	118	**95**	142	126
145	128	**100**	153	137
156	139	**105**	166	148
169	151	**110**	178	160
181	163	**115**	192	173
195	176	**120**	206	187
209	189	**125**	220	201
224	203	**130**	236	216
239	218	**135**	252	231
255	234	**140**	269	248
272	250	**145**	287	265
290	267	**150**	305	283

[AVAILABLE IN SIZES]

REFRIGERANT	Type	Size
R-401A	Cylinder	30 lb.
		125 lb.
R-401B	Cylinder	30 lb.
		125 lb.

Thermodynamic Properties of R-401A

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)
-60	6.5	4.7	88.18	0.1049	-5.371	94.93	-0.01309	0.2418
-55	7.5	5.5	87.71	0.1215	-4.035	95.60	-0.00977	0.2402
-50	8.7	6.4	87.24	0.1401	-2.694	96.26	-0.00648	0.2386
-45	9.9	7.4	86.77	0.1610	-1.350	96.93	-0.00323	0.2372
-40	11.4	8.6	86.29	0.1842	0.000	97.59	0.00000	0.2358
-35	12.9	9.9	85.82	0.2101	1.354	98.25	0.00320	0.2345
-30	14.7	11.3	85.33	0.2386	2.714	98.91	0.00637	0.2333
-25	16.6	12.9	84.85	0.2701	4.078	99.56	0.00952	0.2321
-20	18.7	14.7	84.36	0.3048	5.449	100.2	0.01265	0.2310
-15	21.0	16.6	83.86	0.3429	6.825	100.9	0.01575	0.2299
-10	23.6	18.8	83.37	0.3846	8.207	101.5	0.01882	0.2289
-5	26.4	21.2	82.86	0.4302	9.595	102.1	0.02188	0.2279
0	29.4	23.8	82.36	0.4799	10.99	102.8	0.02492	0.2269
5	32.7	26.6	81.84	0.5340	12.39	103.4	0.02793	0.2261
10	36.2	29.7	81.33	0.5927	13.80	104.0	0.03093	0.2252
15	40.1	33.1	80.80	0.6563	15.21	104.6	0.03391	0.2244
20	44.2	36.7	80.27	0.7251	16.64	105.2	0.03687	0.2236
25	48.7	40.7	79.74	0.7995	18.07	105.8	0.03982	0.2229
30	53.5	45.0	79.20	0.8798	19.51	106.4	0.04275	0.2221
35	58.6	49.6	78.65	0.9662	20.95	107.0	0.04566	0.2214
40	64.2	54.6	78.10	1.059	22.41	107.6	0.04857	0.2208
45	70.1	59.9	77.54	1.159	23.88	108.2	0.05145	0.2201
50	76.4	65.6	76.97	1.267	25.35	108.7	0.05433	0.2195
55	83.1	71.8	76.39	1.382	26.83	109.3	0.05720	0.2189
60	90.2	78.3	75.81	1.505	28.33	109.8	0.06005	0.2183
65	97.8	85.3	75.21	1.637	29.83	110.4	0.06290	0.2178
70	105.9	92.8	74.61	1.779	31.35	110.9	0.06573	0.2172
75	114.5	100.7	74.00	1.930	32.87	111.4	0.06856	0.2167
80	123.5	109.2	73.37	2.092	34.41	111.9	0.07138	0.2162
85	133.1	118.1	72.74	2.265	35.96	112.4	0.07420	0.2156
90	143.2	127.6	72.09	2.449	37.52	112.8	0.07701	0.2151
95	153.9	137.7	71.43	2.647	39.10	113.3	0.07981	0.2146
100	165.2	148.3	70.76	2.858	40.69	113.7	0.08261	0.2141
105	177.0	159.6	70.08	3.083	42.30	114.1	0.08541	0.2136
110	189.5	171.4	69.38	3.324	43.92	114.5	0.08822	0.2131
115	202.6	183.9	68.66	3.581	45.56	114.9	0.09102	0.2126
120	216.3	197.1	67.93	3.857	47.21	115.2	0.09382	0.2120
125	230.7	211.0	67.17	4.152	48.89	115.6	0.09663	0.2115
130	245.8	225.6	66.40	4.468	50.58	115.9	0.09945	0.2110
135	261.7	240.9	65.60	4.807	52.30	116.2	0.1023	0.2104
140	278.2	257.1	64.77	5.171	54.04	116.4	0.1051	0.2098
145	295.5	274.0	63.92	5.564	55.81	116.6	0.1080	0.2092
150	313.6	291.7	63.04	5.987	57.61	116.8	0.1108	0.2085
155	332.6	310.3	62.12	6.444	59.43	116.9	0.1137	0.2078