Freon™ 134a
Refrigerant (R-134a)

Thermodynamic Properties (ENG Units)

Tables of the thermodynamic properties of HFC-134a have been developed and are presented here. These tables are based on experimental data from the database at the National Institute of Standards and Technology (NIST). Equations have been developed, based on the Modified Benedict-Webb-Rubin (MBWR) equation of state, which represent the data with accuracy and consistency throughout the entire range of temperature, pressure, and density.

Physical Properties

Chemical Formula	CH_2FCF_3
Molecular Weight	102.03
Boiling Point at One Atmosphere	–14.9 °F (–26.06 °C)
Critical Temperature	213.9 °F (101.08 °C) 673.6 °R (374.23 K)
Critical Pressure	588.9 psia (4060.3 kPa [abs])
Critical Density	32.17 lb/ft³ (515.3 kg/m³)
Critical Volume	0.031 ft³/lb (0.00194 m³/kg)

Units and Factors

t = Temperature in °F

T = Temperature in °R = °F + 459.67

P = Pressure in lb/in² absolute (psia)

v_f = Volume of saturated liquid in ft³/lb

v_g = Volume of saturated vapor in ft³/lb

V = Volume of superheated vapor in ft³/lb

d_f = $1/v_f$ = Density of saturated liquid in lb/ft³

d_g = $1/v_g$ = Density of saturated vapor in lb/ft³

h_f = Enthalpy of saturated liquid in Btu/lb

h_{fg} = Enthalpy of vaporization in Btu/lb

h_g = Enthalpy of saturated vapor in Btu/lb

H = Enthalpy of superheated vapor in Btu/lb

s_f = Entropy of saturated liquid in Btu/(lb)(°R)

s_g = Entropy of saturated vapor in Btu/(lb)(°R)

S = Entropy of superheated vapor in Btu/(lb)(°R)

C_p = Heat capacity at constant pressure in Btu/(lb)(°F)

C_v = Heat capacity at constant volume in Btu/(lb)(°F)

v_s = Velocity of sound in ft/sec

The gas constant, R = 10.732 (psia)(ft³)/(°R)(lb-mole) for Freon™ 134a, R = 0.1052 (psia)(ft³)/lb·°R

One atmosphere = 14.696 psia

Conversion factor from work units to heat units:
  J = 0.185053
  Btu/lb = (psia·ft³)/lb·J

Reference point for enthalpy and entropy:
  h_f = 0.0 Btu/lb at -40 °F (-40 °C)
  s_f = 0.0 Btu/lb·°R at -40 °F (-40 °C)

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Equations

The MBWR equation of state was used to calculate the tables of thermodynamic properties. It was chosen as the preferred equation of state because it provided the most accurate fit of the thermodynamic data over the entire range of temperatures and pressures presented in these tables. The data fit and calculation of constants for HFC-134a were performed for Chemours at the NIST under the supervision of Dr. Mark O. McLinden.

The constants were calculated in SI units. For conversion of thermodynamic properties to Engineering (ENG) units, properties must be calculated in SI units and converted to ENG units. Conversion factors are provided for each property derived from the MBWR equation of state.

Equation of State (MBWR)

$$\frac{P}{100} = \sum_{n=1}^{9} a_n/V^n + \exp(-V_c^2/V^2) \sum_{n=10}^{15} a_n/V^{2n-17}$$

where the temperature dependence of the coefficients is given by:

$a_1 = RT$

$a_2 = b_1 T + b_2 T^{0.5} + b_3 + b_4/T + b_5/T^2$

$a_3 = b_6 T + b_7 + b_8/T + b_9/T^2$

$a_4 = b_{10} T + b_{11} + b_{12}/T$

$a_5 = b_{13}$

$a_6 = b_{14}/T + b_{15}/T^2$

$a_7 = b_{16}/T$

$a_8 = b_{17}/T + b_{18}/T^2$

$a_9 = b_{19}/T^2$

$a_{10} = b_{20}/T^2 + b_{21}/T^3$

$a_{11} = b_{22}/T^2 + b_{23}/T^4$

$a_{12} = b_{24}/T^2 + b_{25}/T^3$

$a_{13} = b_{26}/T^2 + b_{27}/T^4$

$a_{14} = b_{28}/T^2 + b_{29}/T^3$

$a_{15} = b_{30}/T^2 + b_{31}/T^3 + b_{32}/T^4$

where T is in K = °C + 273.15, V is in liters/mole (= m³/kg ∞ MW), V_c = 0.199334 liters/mole, P is in kPa, and R = 0.08314471 bar (absolute) ∞ liters/mole ∞ K.

MBWR Coefficients for HFC-134a

b_1	= −6.545	523	5227	E−02
b_2	= 5.889	375	1817	E+00
b_3	= −1.376	178	8409	E+02
b_4	= 2.269	316	8845	E+04
b_5	= −2.926	261	3296	E+06
b_6	= −1.192	377	6190	E−04
b_7	= −2.721	419	4543	E+00
b_8	= 1.629	525	3680	E+03
b_9	= 7.294	220	3182	E+05
b_{10}	= −1.172	451	9115	E−04
b_{11}	= 8.686	451	0013	E−01
b_{12}	= −3.066	016	8246	E+02
b_{13}	= −2.566	404	7742	E−02
b_{14}	= −2.438	183	5971	E+00
b_{15}	= −3.160	316	3961	E+02
b_{16}	= 3.432	165	1521	E−01
b_{17}	= −1.015	436	8796	E−02
b_{18}	= 1.173	423	3787	E+00
b_{19}	= −2.730	176	6113	E−02
b_{20}	= −6.633	850	2898	E+05
b_{21}	= −6.475	479	9101	E+07
b_{22}	= −3.729	521	9382	E+04
b_{23}	= 1.261	473	5899	E+09
b_{24}	= −6.474	220	0070	E+02
b_{25}	= 1.236	245	0399	E+05
b_{26}	= −1.569	919	6293	E+00
b_{27}	= −5.184	893	2204	E+05
b_{28}	= −8.139	632	1392	E−02
b_{29}	= 3.032	516	8842	E+01
b_{30}	= 1.339	904	2297	E−04
b_{31}	= −1.585	619	2849	E−01
b_{32}	= 9.067	958	3743	E+00

Ideal Gas Heat Capacity Equation (At Constant Pressure)

C_p^o (J/mole·K) = cp1 + cp2 T + cp3 T^2

cp1 = 1.94006 E+01   cp3 = −1.29665 E−04

cp2 = 2.58531 E−01   R = 8.314471 J/mole·K

MW = 102.03

Properties calculated in SI units from the equation and constants listed above can be converted to ENG units using the conversion factors shown below. Please note that in converting enthalpy and entropy from SI to ENG units, a change in reference states must be included (from H = 200 and S = 1 at 0 °C for SI units to H = 0 and S = 0 at –40 °C for ENG units). In the conversion equation below, H (ref) and S (ref) are the saturated liquid enthalpy and entropy at –40 °C. For HFC-134a, H (ref) = 148.4 kJ/kg and S (ref) = 0.7967 kJ/kg·K.

P (psia)	= P (kPa)·0.14504
T (°F)	= (T [°C]·1.8) + 32
D (lb/ft³)	= D (kg/m³)·0.062428
V (ft³/lb)	= V (m³/kg)·16.018
H (Btu/lb)	= (H [kJ/kg] – H (ref)·0.43021)
S (Btu/lb·°R)	= (S [kJ/kg·K] – S (ref))·0.23901
C_p (Btu/lb·°F)	= C_p (kJ/kg·K)·0.23901
C_v (Btu/lb·°F)	= C_v (kJ/kg·K)·0.23901
v_s (ft/sec)	= v_s (m/sec)·3.2808

Martin-Hou Equation of State (Fit from MBWR Data)

As previously stated, the thermodynamic properties presented in these tables are based on the MBWR equation of state. Coefficients for the Martin-Hou equation of state are presented below for the convenience of those who may have existing computer programs based on this equation of state. While not as accurate as the data from the MBWR equation of state, particularly in the superheated region, data calculated using these Martin-Hou coefficients should be sufficient for most engineering calculations.

$$P = RT/(V-b) + \sum_{i=2}^{5}(A_i + B_iT + C_i\exp[-kT/T_c])/(V-b)^i$$

For SI Units

T and T_c are in K = °C + 273.15 , V is in m³/kg, and P is in kPa (abs).

R = 0.0815 kJ/kg·K

b, A_i, B_i, C_i, and k are constants:

A_2 = -8.909485 E-02	A_4 = 1.778071 E-05
B_2 = 4.408654 E-05	B_4 = -4.016976 E-08
C_2 = -2.074834 E+00	C_4 = -2.977911 E-04
A_3 = -1.016882 E-03	A_5 = -7.481440 E-08
B_3 = 2.574527 E-06	B_5 = 1.670285 E-10
C_3 = 2.142829 E-02	C_5 = 1.255922 E-06
b = 3.755677 E-04	k = 4.599967 E+00

For ENG Units

T and T_c are in °R = °F + 459.67, V is in ft³/lb, and P is in psia.

R = 0.1052 (psia)(ft³)/lb·°R

b, A_i, B_i, C_i, and k are constants:

A_2 = -3.315708 E+00	A_4 = 1.697907 E-01
B_2 = 9.115011 E-04	B_4 = -2.131040 E-04
C_2 = 7.721597 E+01	C_4 = -2.843653 E+00
A_3 = -6.061984 E-01	A_5 = -1.144381 E-02
B_3 = 8.526469 E-04	B_5 = 1.419396 E-05
C_3 = 1.277414 E+01	C_5 = 1.921091 E-01
b = 6.016014 E-03	k = 4.599967 E+00

Ideal Gas Heat Capacity (At Constant Volume)

$$C_v^o = a + bT + cT^2 + dT^3 + f/T^2$$

For SI Units

C_v^o = kJ/kg·K

T is in K = °C + 273.15

a, b, c, d, and f are constants:

a = 3.154856 E+00	d = -3.754497 E-08
b = -1.656054 E-02	f = -3.023189 E+04
c = 4.353378 E-05	

For ENG Units

C_v^o = Btu/lb·°R

T is in °R = °F + 459.67

a, b, c, d, and f are constants:

a = 7.540287 E-01	d = -1.538660 E-09
b = -2.198925 E-03	f = -2.341093 E+04
c = 3.211365 E-06	

Vapor Pressure

$$\log_{10} P_{sat}\ A + B/T + C \log_{10} T + DT + E\ ([F-T]/T)\ \log_{10} (F-T)$$

For SI Units

T is in K = °C + 273.15 and P is in kPa

A, B, C, D, E, and F are constants:

A = 4.069889 E+01	D = 7.616005 E-03
B = -2.362540 E+03	E = 2.342564 E-01
C = -1.306883 E+01	F = 3.761111 E+02

For ENG Units

T is in °R = °F + 459.67 and P is in psia

A, B, C, D, E, and F are constants:

A = 4.325629 E+01   D = 4.231114 E-03

B = -4.293056 E+03   E = 2.342564 E-01

C = -1.306883 E+01   F = 6.770000 E+02

Density of the Saturated Liquid

$$d_f = A_f + B_f(1-T_r)^{(1/3)} + C_f(1-T_r)^{(2/3)} + D_f(1-T_r) + E_f(1-T_r)^{(4/3)}$$

For SI Units

$T_r = T/T_c$, both in K = °C + 273.15 and d_f is in kg/m^3

A_f, B_f, C_f, D_f, and E_f are constants:

A_f = 5.281464 E+02 D_f = -9.491172 E+02

B_f = 7.551834 E+02 E_f = 5.935660 E+02

C_f = 1.028676 E+03

For ENG Units

$T_r = T/T_c$, both in °R = °F + 459.67 and d_f is in lb/ft^3

A_f, B_f, C_f, D_f, and E_f are constants:

A_f = 3.297110 E+01 D_f = -5.925145 E+01

B_f = 4.714456 E+01 E_f = 3.705512 E+01

C_f = 6.421816 E+01

Table 1. Freon™ 134a Saturation Properties—Temperature Table

Temp [°F]	Pressure	Volume [ft³/lb]		Density [lb/ft³]		Enthalpy [Btu/lb]			Entropy [Btu/lb·°R]		Temp [°F]
	psia	Liquid v_f	Vapor v_g	Liquid d_f	Vapor d_g	Liquid h_f	Latent h_{fg}	Vapor h_g	Liquid s_f	Vapor s_g	
−150	0.073	0.0101	454.5455	98.86	0.0022	−31.2	112.1	80.9	−0.0859	0.2761	−150
−149	0.077	0.0101	416.6667	98.76	0.0024	−30.9	112.0	81.1	−0.0850	0.2754	−149
−148	0.082	0.0101	400.0000	98.67	0.0025	−30.6	111.8	81.2	−0.0841	0.2747	−148
−147	0.087	0.0101	384.6154	98.57	0.0026	−30.3	111.7	81.4	−0.0832	0.2740	−147
−146	0.092	0.0102	357.1429	98.48	0.0028	−30.1	111.6	81.5	−0.0823	0.2733	−146
−145	0.098	0.0102	333.3333	98.38	0.0030	−29.8	111.4	81.6	−0.0815	0.2726	−145
−144	0.104	0.0102	322.5806	98.29	0.0031	−29.5	111.3	81.8	−0.0806	0.2720	−144
−143	0.110	0.0102	303.0303	98.19	0.0033	−29.2	111.1	81.9	−0.0797	0.2713	−143
−142	0.116	0.0102	285.7143	98.10	0.0035	−28.9	111.0	82.1	−0.0788	0.2706	−142
−141	0.123	0.0102	270.2703	98.00	0.0037	−28.7	110.9	82.2	−0.0780	0.2700	−141
−140	0.130	0.0102	256.4103	97.91	0.0039	−28.4	110.7	82.3	−0.0771	0.2693	−140
−139	0.137	0.0102	243.9024	97.81	0.0041	−28.1	110.6	82.5	−0.0763	0.2687	−139
−138	0.145	0.0102	232.5581	97.72	0.0043	−27.8	110.5	82.6	−0.0754	0.2681	−138
−137	0.153	0.0102	222.2222	97.62	0.0045	−27.6	110.3	82.8	−0.0745	0.2674	−137
−136	0.162	0.0103	208.3333	97.53	0.0048	−27.3	110.2	82.9	−0.0737	0.2668	−136
−135	0.171	0.0103	200.0000	97.43	0.0050	−27.0	110.1	83.1	−0.0728	0.2662	−135
−134	0.180	0.0103	188.6792	97.34	0.0053	−26.7	109.9	83.2	−0.0720	0.2656	−134
−133	0.190	0.0103	181.8182	97.24	0.0055	−26.5	109.8	83.3	−0.0712	0.2650	−133
−132	0.200	0.0103	172.4138	97.15	0.0058	−26.2	109.7	83.5	−0.0703	0.2644	−132
−131	0.211	0.0103	163.9344	97.05	0.0061	−25.9	109.6	83.6	−0.0695	0.2639	−131
−130	0.222	0.0103	156.2500	96.96	0.0064	−25.6	109.4	83.8	−0.0686	0.2633	−130
−129	0.234	0.0103	149.2537	96.86	0.0067	−25.4	109.3	83.9	−0.0678	0.2627	−129
−128	0.246	0.0103	140.8451	96.77	0.0071	−25.1	109.2	84.1	−0.0670	0.2621	−128
−127	0.259	0.0103	135.1351	96.67	0.0074	−24.8	109.0	84.2	−0.0661	0.2616	−127
−126	0.273	0.0104	128.2051	96.58	0.0078	−24.5	108.9	84.4	−0.0653	0.2610	−126
−125	0.287	0.0104	121.9512	96.48	0.0082	−24.3	108.8	84.5	−0.0645	0.2605	−125
−124	0.301	0.0104	116.2791	96.39	0.0086	−24.0	108.6	84.6	−0.0637	0.2600	−124
−123	0.317	0.0104	111.1111	96.29	0.0090	−23.7	108.5	84.8	−0.0628	0.2594	−123
−122	0.333	0.0104	106.3830	96.20	0.0094	−23.4	108.4	84.9	−0.0620	0.2589	−122
−121	0.349	0.0104	102.0408	96.10	0.0098	−23.2	108.2	85.1	−0.0612	0.2584	−121
−120	0.366	0.0104	97.0874	96.01	0.0103	−22.9	108.1	85.2	−0.0604	0.2579	−120
−119	0.385	0.0104	92.5926	95.91	0.0108	−22.6	108.0	85.4	−0.0596	0.2574	−119
−118	0.403	0.0104	88.4956	95.82	0.0113	−22.3	107.8	85.5	−0.0588	0.2569	−118
−117	0.423	0.0104	84.7458	95.72	0.0118	−22.1	107.7	85.7	−0.0580	0.2564	−117
−116	0.443	0.0105	81.3008	95.63	0.0123	−21.8	107.6	85.8	−0.0571	0.2559	−116
−115	0.465	0.0105	77.5194	95.53	0.0129	−21.5	107.4	86.0	−0.0563	0.2554	−115
−114	0.487	0.0105	74.6269	95.44	0.0134	−21.2	107.3	86.1	−0.0555	0.2549	−114
−113	0.510	0.0105	71.4286	95.34	0.0140	−20.9	107.2	86.2	−0.0547	0.2545	−113
−112	0.534	0.0105	68.0272	95.25	0.0147	−20.7	107.1	86.4	−0.0539	0.2540	−112
−111	0.558	0.0105	65.3595	95.15	0.0153	−20.4	106.9	86.5	−0.0531	0.2535	−111
−110	0.584	0.0105	62.5000	95.06	0.0160	−20.1	106.8	86.7	−0.0523	0.2531	−110
−109	0.611	0.0105	60.2410	94.96	0.0166	−19.8	106.7	86.8	−0.0515	0.2526	−109
−108	0.639	0.0105	57.4713	94.87	0.0174	−19.6	106.5	87.0	−0.0507	0.2522	−108
−107	0.668	0.0106	55.2486	94.77	0.0181	−19.3	106.4	87.1	−0.0500	0.2517	−107
−106	0.698	0.0106	52.9101	94.68	0.0189	−19.0	106.3	87.3	−0.0492	0.2513	−106
−105	0.729	0.0106	51.0204	94.58	0.0196	−18.7	106.1	87.4	−0.0484	0.2509	−105
−104	0.761	0.0106	48.7805	94.49	0.0205	−18.4	106.0	87.6	−0.0476	0.2505	−104
−103	0.795	0.0106	46.9484	94.39	0.0213	−18.2	105.9	87.7	−0.0468	0.2500	−103
−102	0.830	0.0106	45.0450	94.30	0.0222	−17.9	105.7	87.9	−0.0460	0.2496	−102
−101	0.866	0.0106	43.2900	94.20	0.0231	−17.6	105.6	88.0	−0.0452	0.2492	−101
−100	0.903	0.0106	41.6667	94.11	0.0240	−17.3	105.5	88.2	−0.0444	0.2488	−100
−99	0.942	0.0106	40.0000	94.01	0.0250	−17.0	105.3	88.3	−0.0437	0.2484	−99
−98	0.982	0.0106	38.4615	93.92	0.0260	−16.7	105.2	88.5	−0.0429	0.2480	−98
−97	1.024	0.0107	37.0370	93.82	0.0270	−16.5	105.1	88.6	−0.0421	0.2476	−97
−96	1.067	0.0107	35.5872	93.73	0.0281	−16.2	104.9	88.8	−0.0413	0.2472	−96
−95	1.111	0.0107	34.2466	93.63	0.0292	−15.9	104.8	88.9	−0.0406	0.2468	−95
−94	1.157	0.0107	33.0033	93.54	0.0303	−15.6	104.7	89.1	−0.0398	0.2465	−94
−93	1.205	0.0107	31.7460	93.44	0.0315	−15.3	104.5	89.2	−0.0390	0.2461	−93
−92	1.254	0.0107	30.5810	93.34	0.0327	−15.1	104.4	89.4	−0.0383	0.2457	−92
−91	1.305	0.0107	29.4985	93.25	0.0339	−14.8	104.3	89.5	−0.0375	0.2454	−91

Table 1. Freon™ 134a Saturation Properties—Temperature Table (continued)

Temp [°F]	Pressure	Volume [ft³/lb]		Density [lb/ft³]		Enthalpy [Btu/lb]			Entropy [Btu/lb·°R]		Temp [°F]
	psia	Liquid v_f	Vapor v_g	Liquid d_f	Vapor d_g	Liquid h_f	Latent h_fg	Vapor h_g	Liquid s_f	Vapor s_g	
−90	1.358	0.0107	28.4091	93.15	0.0352	−14.5	104.1	89.6	−0.0367	0.2450	−90
−89	1.413	0.0107	27.3973	93.06	0.0365	−14.2	104.0	89.8	−0.0360	0.2446	−89
−88	1.469	0.0108	26.3852	92.96	0.0379	−13.9	103.9	89.9	−0.0352	0.2443	−88
−87	1.527	0.0108	25.4453	92.87	0.0393	−13.6	103.7	90.1	−0.0344	0.2439	−87
−86	1.587	0.0108	24.5098	92.77	0.0408	−13.4	103.6	90.2	−0.0337	0.2436	−86
−85	1.649	0.0108	23.6407	92.68	0.0423	−13.1	103.5	90.4	−0.0329	0.2433	−85
−84	1.713	0.0108	22.8311	92.58	0.0438	−12.8	103.3	90.5	−0.0322	0.2429	−84
−83	1.779	0.0108	22.0264	92.49	0.0454	−12.5	103.2	90.7	−0.0314	0.2426	−83
−82	1.848	0.0108	21.2766	92.39	0.0470	−12.2	103.1	90.8	−0.0306	0.2423	−82
−81	1.918	0.0108	20.5339	92.29	0.0487	−11.9	102.9	91.0	−0.0299	0.2419	−81
−80	1.991	0.0108	19.8413	92.20	0.0504	−11.6	102.8	91.1	−0.0291	0.2416	−80
−79	2.066	0.0109	19.1571	92.10	0.0522	−11.4	102.7	91.3	−0.0284	0.2413	−79
−78	2.143	0.0109	18.5185	92.01	0.0540	−11.1	102.5	91.4	−0.0276	0.2410	−78
−77	2.222	0.0109	17.8891	91.91	0.0559	−10.8	102.4	91.6	−0.0269	0.2407	−77
−76	2.304	0.0109	17.3010	91.82	0.0578	−10.5	102.3	91.7	−0.0261	0.2404	−76
−75	2.389	0.0109	16.7224	91.72	0.0598	−10.2	102.1	91.9	−0.0254	0.2401	−75
−74	2.476	0.0109	16.1812	91.62	0.0618	−9.9	102.0	92.0	−0.0246	0.2398	−74
−73	2.565	0.0109	15.6495	91.53	0.0639	−9.6	101.8	92.2	−0.0239	0.2395	−73
−72	2.658	0.0109	15.1286	91.43	0.0661	−9.4	101.7	92.4	−0.0232	0.2392	−72
−71	2.753	0.0109	14.6413	91.33	0.0683	−9.1	101.6	92.5	−0.0224	0.2389	−71
−70	2.850	0.0110	14.1844	91.24	0.0705	−8.8	101.4	92.7	−0.0217	0.2386	−70
−69	2.951	0.0110	13.7174	91.14	0.0729	−8.5	101.3	92.8	−0.0209	0.2383	−69
−68	3.055	0.0110	13.2802	91.05	0.0753	−8.2	101.2	93.0	−0.0202	0.2381	−68
−67	3.161	0.0110	12.8700	90.95	0.0777	−7.9	101.0	93.1	−0.0195	0.2378	−67
−66	3.271	0.0110	12.4688	90.85	0.0802	−7.6	100.9	93.3	−0.0187	0.2375	−66
−65	3.384	0.0110	12.0773	90.76	0.0828	−7.3	100.7	93.4	−0.0180	0.2373	−65
−64	3.499	0.0110	11.6959	90.66	0.0855	−7.0	100.6	93.6	−0.0173	0.2370	−64
−63	3.619	0.0110	11.3379	90.56	0.0882	−6.8	100.5	93.7	−0.0165	0.2367	−63
−62	3.741	0.0111	10.9890	90.47	0.0910	−6.5	100.3	93.9	−0.0158	0.2365	−62
−61	3.867	0.0111	10.6610	90.37	0.0938	−6.2	100.2	94.0	−0.0151	0.2362	−61
−60	3.996	0.0111	10.3306	90.27	0.0968	−5.9	100.0	94.2	−0.0143	0.2360	−60
−59	4.129	0.0111	10.0200	90.17	0.0998	−5.6	99.9	94.3	−0.0136	0.2357	−59
−58	4.265	0.0111	9.7182	90.08	0.1029	−5.3	99.8	94.5	−0.0129	0.2355	−58
−57	4.405	0.0111	9.4340	89.98	0.1060	−5.0	99.6	94.6	−0.0122	0.2352	−57
−56	4.549	0.0111	9.1491	89.88	0.1093	−4.7	99.5	94.8	−0.0114	0.2350	−56
−55	4.696	0.0111	8.8810	89.78	0.1126	−4.4	99.3	94.9	−0.0107	0.2348	−55
−54	4.848	0.0111	8.6207	89.69	0.1160	−4.1	99.2	95.1	−0.0100	0.2345	−54
−53	5.003	0.0112	8.3752	89.59	0.1194	−3.8	99.1	95.2	−0.0093	0.2343	−53
−52	5.162	0.0112	8.1301	89.49	0.1230	−3.5	98.9	95.4	−0.0085	0.2341	−52
−51	5.326	0.0112	7.8989	89.39	0.1266	−3.2	98.8	95.5	−0.0078	0.2339	−51
−50	5.493	0.0112	7.6687	89.30	0.1304	−3.0	98.6	95.7	−0.0071	0.2336	−50
−49	5.665	0.0112	7.4516	89.20	0.1342	−2.7	98.5	95.8	−0.0064	0.2334	−49
−48	5.841	0.0112	7.2411	89.10	0.1381	−2.4	98.3	96.0	−0.0057	0.2332	−48
−47	6.022	0.0112	7.0373	89.00	0.1421	−2.1	98.2	96.1	−0.0050	0.2330	−47
−46	6.207	0.0112	6.8399	88.90	0.1462	−1.8	98.0	96.3	−0.0043	0.2328	−46
−45	6.397	0.0113	6.6489	88.81	0.1504	−1.5	97.9	96.4	−0.0035	0.2326	−45
−44	6.591	0.0113	6.4683	88.71	0.1546	−1.2	97.8	96.6	−0.0028	0.2324	−44
−43	6.790	0.0113	6.2893	88.61	0.1590	−0.9	97.6	96.7	−0.0021	0.2322	−43
−42	6.994	0.0113	6.1162	88.51	0.1635	−0.6	97.5	96.9	−0.0014	0.2320	−42
−41	7.203	0.0113	5.9488	88.41	0.1681	−0.3	97.3	97.0	−0.0007	0.2318	−41
−40	7.417	0.0113	5.7904	88.31	0.1727	0.0	97.2	97.2	0.0000	0.2316	−40
−39	7.636	0.0113	5.6338	88.21	0.1775	0.3	97.0	97.3	0.0007	0.2314	−39
−38	7.860	0.0113	5.4825	88.11	0.1824	0.6	96.9	97.5	0.0014	0.2312	−38
−37	8.090	0.0114	5.3362	88.01	0.1874	0.9	96.7	97.6	0.0021	0.2310	−37
−36	8.325	0.0114	5.1948	87.91	0.1925	1.2	96.6	97.8	0.0028	0.2308	−36
−35	8.565	0.0114	5.0582	87.81	0.1977	1.5	96.4	97.9	0.0035	0.2306	−35
−34	8.811	0.0114	4.9261	87.71	0.2030	1.8	96.3	98.1	0.0042	0.2304	−34
−33	9.062	0.0114	4.7985	87.61	0.2084	2.1	96.1	98.2	0.0049	0.2303	−33
−32	9.319	0.0114	4.6729	87.51	0.2140	2.4	96.0	98.4	0.0056	0.2301	−32
−31	9.582	0.0114	4.5537	87.41	0.2196	2.7	95.8	98.5	0.0063	0.2299	−31

Table 1. Freon™ 134a Saturation Properties—Temperature Table (continued)

Temp [°F]	Pressure	Volume [ft³/lb]		Density [lb/ft³]		Enthalpy [Btu/lb]			Entropy [Btu/lb·°R]		Temp [°F]
	psia	Liquid v_f	Vapor v_g	Liquid d_f	Vapor d_g	Liquid h_f	Latent h_{fg}	Vapor h_g	Liquid s_f	Vapor s_g	
−30	9.851	0.0115	4.4366	87.31	0.2254	3.0	95.7	98.7	0.0070	0.2297	−30
−29	10.126	0.0115	4.3234	87.21	0.2313	3.3	95.5	98.8	0.0077	0.2296	−29
−28	10.407	0.0115	4.2141	87.11	0.2373	3.6	95.4	99.0	0.0084	0.2294	−28
−27	10.694	0.0115	4.1068	87.01	0.2435	3.9	95.2	99.1	0.0091	0.2292	−27
−26	10.987	0.0115	4.0032	86.91	0.2498	4.2	95.1	99.3	0.0098	0.2291	−26
−25	11.287	0.0115	3.9032	86.81	0.2562	4.5	94.9	99.4	0.0105	0.2289	−25
−24	11.594	0.0115	3.8066	86.71	0.2627	4.8	94.8	99.6	0.0112	0.2288	−24
−23	11.906	0.0115	3.7120	86.61	0.2694	5.1	94.6	99.7	0.0119	0.2286	−23
−22	12.226	0.0116	3.6206	86.51	0.2762	5.4	94.5	99.9	0.0126	0.2284	−22
−21	12.553	0.0116	3.5323	86.41	0.2831	5.7	94.3	100.0	0.0132	0.2283	−21
−20	12.885	0.0116	3.4471	86.30	0.2901	6.0	94.2	100.2	0.0139	0.2281	−20
−19	13.225	0.0116	3.3625	86.20	0.2974	6.3	94.0	100.3	0.0146	0.2280	−19
−18	13.572	0.0116	3.2819	86.10	0.3047	6.6	93.9	100.5	0.0153	0.2278	−18
−17	13.927	0.0116	3.2031	86.00	0.3122	6.9	93.7	100.6	0.0160	0.2277	−17
−16	14.289	0.0116	3.1270	85.89	0.3198	7.2	93.6	100.8	0.0167	0.2276	−16
−15	14.659	0.0117	3.0525	85.79	0.3276	7.5	93.4	100.9	0.0174	0.2274	−15
−14	15.035	0.0117	2.9806	85.69	0.3355	7.8	93.3	101.1	0.0180	0.2273	−14
−13	15.420	0.0117	2.9104	85.59	0.3436	8.1	93.1	101.2	0.0187	0.2271	−13
−12	15.812	0.0117	2.8417	85.48	0.3519	8.4	92.9	101.4	0.0194	0.2270	−12
−11	16.212	0.0117	2.7762	85.38	0.3602	8.7	92.8	101.5	0.0201	0.2269	−11
−10	16.620	0.0117	2.7115	85.28	0.3688	9.0	92.6	101.7	0.0208	0.2267	−10
−9	17.037	0.0117	2.6490	85.17	0.3775	9.3	92.5	101.8	0.0214	0.2266	−9
−8	17.461	0.0118	2.5880	85.07	0.3864	9.7	92.3	102.0	0.0221	0.2265	−8
−7	17.893	0.0118	2.5291	84.97	0.3954	10.0	92.1	102.1	0.0228	0.2264	−7
−6	18.334	0.0118	2.4716	84.86	0.4046	10.3	92.0	102.3	0.0235	0.2262	−6
−5	18.784	0.0118	2.4155	84.76	0.4140	10.6	91.8	102.4	0.0241	0.2261	−5
−4	19.242	0.0118	2.3613	84.65	0.4235	10.9	91.7	102.5	0.0248	0.2260	−4
−3	19.709	0.0118	2.3084	84.55	0.4332	11.2	91.5	102.7	0.0255	0.2259	−3
−2	20.184	0.0118	2.2568	84.44	0.4431	11.5	91.3	102.8	0.0262	0.2258	−2
−1	20.669	0.0119	2.2065	84.34	0.4532	11.8	91.2	103.0	0.0268	0.2256	−1
0	21.163	0.0119	2.1580	84.23	0.4634	12.1	91.0	103.1	0.0275	0.2255	0
1	21.666	0.0119	2.1106	84.13	0.4738	12.4	90.9	103.3	0.0282	0.2254	1
2	22.178	0.0119	2.0644	84.02	0.4844	12.7	90.7	103.4	0.0288	0.2253	2
3	22.700	0.0119	2.0194	83.91	0.4952	13.0	90.5	103.6	0.0295	0.2252	3
4	23.231	0.0119	1.9755	83.81	0.5062	13.4	90.4	103.7	0.0302	0.2251	4
5	23.772	0.0119	1.9327	83.70	0.5174	13.7	90.2	103.9	0.0308	0.2250	5
6	24.322	0.0120	1.8911	83.60	0.5288	14.0	90.0	104.0	0.0315	0.2249	6
7	24.883	0.0120	1.8508	83.49	0.5403	14.3	89.9	104.2	0.0322	0.2248	7
8	25.454	0.0120	1.8113	83.38	0.5521	14.6	89.7	104.3	0.0328	0.2247	8
9	26.034	0.0120	1.7727	83.27	0.5641	14.9	89.5	104.4	0.0335	0.2245	9
10	26.625	0.0120	1.7355	83.17	0.5762	15.2	89.4	104.6	0.0342	0.2244	10
11	27.227	0.0120	1.6989	83.06	0.5886	15.5	89.2	104.7	0.0348	0.2244	11
12	27.839	0.0121	1.6633	82.95	0.6012	15.9	89.0	104.9	0.0355	0.2243	12
13	28.462	0.0121	1.6287	82.84	0.6140	16.2	88.9	105.0	0.0362	0.2242	13
14	29.095	0.0121	1.5949	82.73	0.6270	16.5	88.7	105.2	0.0368	0.2241	14
15	29.739	0.0121	1.5620	82.63	0.6402	16.8	88.5	105.3	0.0375	0.2240	15
16	30.395	0.0121	1.5298	82.52	0.6537	17.1	88.3	105.5	0.0381	0.2239	16
17	31.061	0.0121	1.4984	82.41	0.6674	17.4	88.2	105.6	0.0388	0.2238	17
18	31.739	0.0122	1.4678	82.30	0.6813	17.7	88.0	105.7	0.0395	0.2237	18
19	32.428	0.0122	1.4380	82.19	0.6954	18.1	87.8	105.9	0.0401	0.2236	19
20	33.129	0.0122	1.4090	82.08	0.7097	18.4	87.7	106.0	0.0408	0.2235	20
21	33.841	0.0122	1.3806	81.97	0.7243	18.7	87.5	106.2	0.0414	0.2234	21
22	34.566	0.0122	1.3528	81.86	0.7392	19.0	87.3	106.3	0.0421	0.2233	22
23	35.302	0.0122	1.3259	81.75	0.7542	19.3	87.1	106.5	0.0427	0.2233	23
24	36.050	0.0122	1.2995	81.64	0.7695	19.6	87.0	106.6	0.0434	0.2232	24
25	36.810	0.0123	1.2737	81.52	0.7851	20.0	86.8	106.7	0.0440	0.2231	25
26	37.583	0.0123	1.2486	81.41	0.8009	20.3	86.6	106.9	0.0447	0.2230	26
27	38.368	0.0123	1.2240	81.30	0.8170	20.6	86.4	107.0	0.0453	0.2229	27
28	39.166	0.0123	1.2000	81.19	0.8333	20.9	86.2	107.2	0.0460	0.2229	28
29	39.977	0.0123	1.1766	81.08	0.8499	21.2	86.1	107.3	0.0467	0.2228	29

Table 1. Freon™ 134a Saturation Properties—Temperature Table (continued)

Temp [°F]	Pressure	Volume [ft³/lb]		Density [lb/ft³]		Enthalpy [Btu/lb]			Entropy [Btu/lb·°R]		Temp [°F]
	psia	Liquid v_f	Vapor v_g	Liquid d_f	Vapor d_g	Liquid h_f	Latent h_{fg}	Vapor h_g	Liquid s_f	Vapor s_g	
30	40.800	0.0124	1.1538	80.96	0.8667	21.6	85.9	107.4	0.0473	0.2227	30
31	41.636	0.0124	1.1315	80.85	0.8838	21.9	85.7	107.6	0.0480	0.2226	31
32	42.486	0.0124	1.1098	80.74	0.9011	22.2	85.5	107.7	0.0486	0.2226	32
33	43.349	0.0124	1.0884	80.62	0.9188	22.5	85.3	107.9	0.0492	0.2225	33
34	44.225	0.0124	1.0676	80.51	0.9367	22.8	85.2	108.0	0.0499	0.2224	34
35	45.115	0.0124	1.0472	80.40	0.9549	23.2	85.0	108.1	0.0505	0.2223	35
36	46.018	0.0125	1.0274	80.28	0.9733	23.5	84.8	108.3	0.0512	0.2223	36
37	46.935	0.0125	1.0080	80.17	0.9921	23.8	84.6	108.4	0.0518	0.2222	37
38	47.866	0.0125	0.9890	80.05	1.0111	24.1	84.4	108.6	0.0525	0.2221	38
39	48.812	0.0125	0.9705	79.94	1.0304	24.5	84.2	108.7	0.0531	0.2221	39
40	49.771	0.0125	0.9523	79.82	1.0501	24.8	84.1	108.8	0.0538	0.2220	40
41	50.745	0.0125	0.9346	79.70	1.0700	25.1	83.9	109.0	0.0544	0.2219	41
42	51.733	0.0126	0.9173	79.59	1.0902	25.4	83.7	109.1	0.0551	0.2219	42
43	52.736	0.0126	0.9003	79.47	1.1107	25.8	83.5	109.2	0.0557	0.2218	43
44	53.754	0.0126	0.8837	79.35	1.1316	26.1	83.3	109.4	0.0564	0.2217	44
45	54.787	0.0126	0.8675	79.24	1.1527	26.4	83.1	109.5	0.0570	0.2217	45
46	55.835	0.0126	0.8516	79.12	1.1742	26.7	82.9	109.7	0.0576	0.2216	46
47	56.898	0.0127	0.8361	79.00	1.1960	27.1	82.7	109.8	0.0583	0.2216	47
48	57.976	0.0127	0.8210	78.88	1.2181	27.4	82.5	109.9	0.0589	0.2215	48
49	59.070	0.0127	0.8061	78.76	1.2405	27.7	82.3	110.1	0.0596	0.2214	49
50	60.180	0.0127	0.7916	78.64	1.2633	28.0	82.1	110.2	0.0602	0.2214	50
51	61.305	0.0127	0.7774	78.53	1.2864	28.4	81.9	110.3	0.0608	0.2213	51
52	62.447	0.0128	0.7634	78.41	1.3099	28.7	81.8	110.5	0.0615	0.2213	52
53	63.604	0.0128	0.7498	78.29	1.3337	29.0	81.6	110.6	0.0621	0.2212	53
54	64.778	0.0128	0.7365	78.16	1.3578	29.4	81.4	110.7	0.0628	0.2211	54
55	65.963	0.0128	0.7234	78.04	1.3823	29.7	81.2	110.9	0.0634	0.2211	55
56	67.170	0.0128	0.7106	77.92	1.4072	30.0	81.0	111.0	0.0640	0.2210	56
57	68.394	0.0129	0.6981	77.80	1.4324	30.4	80.8	111.1	0.0647	0.2210	57
58	69.635	0.0129	0.6859	77.68	1.4579	30.7	80.6	111.3	0.0653	0.2209	58
59	70.892	0.0129	0.6739	77.56	1.4839	31.0	80.4	111.4	0.0659	0.2209	59
60	72.167	0.0129	0.6622	77.43	1.5102	31.4	80.2	111.5	0.0666	0.2208	60
61	73.459	0.0129	0.6507	77.31	1.5369	31.7	80.0	111.6	0.0672	0.2208	61
62	74.769	0.0130	0.6394	77.19	1.5640	32.0	79.7	111.8	0.0678	0.2207	62
63	76.096	0.0130	0.6283	77.06	1.5915	32.4	79.5	111.9	0.0685	0.2207	63
64	77.440	0.0130	0.6175	76.94	1.6194	32.7	79.3	112.0	0.0691	0.2206	64
65	78.803	0.0130	0.6069	76.81	1.6477	33.0	79.1	112.2	0.0698	0.2206	65
66	80.184	0.0130	0.5965	76.69	1.6764	33.4	78.9	112.3	0.0704	0.2205	66
67	81.582	0.0131	0.5863	76.56	1.7055	33.7	78.7	112.4	0.0710	0.2205	67
68	83.000	0.0131	0.5764	76.44	1.7350	34.0	78.5	112.5	0.0717	0.2204	68
69	84.435	0.0131	0.5666	76.31	1.7649	34.4	78.3	112.7	0.0723	0.2204	69
70	85.890	0.0131	0.5570	76.18	1.7952	34.7	78.1	112.8	0.0729	0.2203	70
71	87.363	0.0131	0.5476	76.05	1.8260	35.1	77.9	112.9	0.0735	0.2203	71
72	88.855	0.0132	0.5384	75.93	1.8573	35.4	77.6	113.0	0.0742	0.2202	72
73	90.366	0.0132	0.5294	75.80	1.8889	35.7	77.4	113.2	0.0748	0.2202	73
74	91.897	0.0132	0.5206	75.67	1.9210	36.1	77.2	113.3	0.0754	0.2201	74
75	93.447	0.0132	0.5119	75.54	1.9536	36.4	77.0	113.4	0.0761	0.2201	75
76	95.016	0.0133	0.5034	75.41	1.9866	36.8	76.8	113.5	0.0767	0.2200	76
77	96.606	0.0133	0.4950	75.28	2.0201	37.1	76.6	113.7	0.0773	0.2200	77
78	98.215	0.0133	0.4868	75.15	2.0541	37.4	76.3	113.8	0.0780	0.2200	78
79	99.844	0.0133	0.4788	75.02	2.0885	37.8	76.1	113.9	0.0786	0.2199	79
80	101.494	0.0134	0.4709	74.89	2.1234	38.1	75.9	114.0	0.0792	0.2199	80
81	103.164	0.0134	0.4632	74.75	2.1589	38.5	75.7	114.1	0.0799	0.2198	81
82	104.855	0.0134	0.4556	74.62	2.1948	38.8	75.4	114.3	0.0805	0.2198	82
83	106.566	0.0134	0.4482	74.49	2.2312	39.2	75.2	114.4	0.0811	0.2197	83
84	108.290	0.0134	0.4409	74.35	2.2681	39.5	75.0	114.5	0.0817	0.2197	84
85	110.050	0.0135	0.4337	74.22	2.3056	39.9	74.8	114.6	0.0824	0.2196	85
86	111.828	0.0135	0.4267	74.08	2.3436	40.2	74.5	114.7	0.0830	0.2196	86
87	113.626	0.0135	0.4198	73.95	2.3821	40.5	74.3	114.9	0.0836	0.2196	87
88	115.444	0.0135	0.4130	73.81	2.4211	40.9	74.1	115.0	0.0843	0.2195	88
89	117.281	0.0136	0.4064	73.67	2.4607	41.2	73.8	115.1	0.0849	0.2195	89

Table 1. Freon™ 134a Saturation Properties—Temperature Table (continued)

Temp [°F]	Pressure	Volume [ft³/lb]		Density [lb/ft³]		Enthalpy [Btu/lb]			Entropy [Btu/lb·°R]		Temp [°F]
	psia	Liquid v_f	Vapor v_g	Liquid d_f	Vapor d_g	Liquid h_f	Latent h_{fg}	Vapor h_g	Liquid s_f	Vapor s_g	
90	119.138	0.0136	0.3999	73.54	2.5009	41.6	73.6	115.2	0.0855	0.2194	90
91	121.024	0.0136	0.3935	73.40	2.5416	41.9	73.4	115.3	0.0861	0.2194	91
92	122.930	0.0137	0.3872	73.26	2.5829	42.3	73.1	115.4	0.0868	0.2193	92
93	124.858	0.0137	0.3810	73.12	2.6247	42.6	72.9	115.5	0.0874	0.2193	93
94	126.809	0.0137	0.3749	72.98	2.6672	43.0	72.7	115.7	0.0880	0.2193	94
95	128.782	0.0137	0.3690	72.84	2.7102	43.4	72.4	115.8	0.0886	0.2192	95
96	130.778	0.0138	0.3631	72.70	2.7539	43.7	72.2	115.9	0.0893	0.2192	96
97	132.798	0.0138	0.3574	72.56	2.7981	44.1	71.9	116.0	0.0899	0.2191	97
98	134.840	0.0138	0.3517	72.42	2.8430	44.4	71.7	116.1	0.0905	0.2191	98
99	136.906	0.0138	0.3462	72.27	2.8885	44.8	71.4	116.2	0.0912	0.2190	99
100	138.996	0.0139	0.3408	72.13	2.9347	45.1	71.2	116.3	0.0918	0.2190	100
101	141.109	0.0139	0.3354	71.99	2.9815	45.5	70.9	116.4	0.0924	0.2190	101
102	143.247	0.0139	0.3302	71.84	3.0289	45.8	70.7	116.5	0.0930	0.2189	102
103	145.408	0.0139	0.3250	71.70	3.0771	46.2	70.4	116.6	0.0937	0.2189	103
104	147.594	0.0140	0.3199	71.55	3.1259	46.6	70.2	116.7	0.0943	0.2188	104
105	149.804	0.0140	0.3149	71.40	3.1754	46.9	69.9	116.9	0.0949	0.2188	105
106	152.039	0.0140	0.3100	71.25	3.2256	47.3	69.7	117.0	0.0955	0.2187	106
107	154.298	0.0141	0.3052	71.11	3.2765	47.6	69.4	117.1	0.0962	0.2187	107
108	156.583	0.0141	0.3005	70.96	3.3282	48.0	69.2	117.2	0.0968	0.2186	108
109	158.893	0.0141	0.2958	70.81	3.3806	48.4	68.9	117.3	0.0974	0.2186	109
110	161.227	0.0142	0.2912	70.66	3.4337	48.7	68.6	117.4	0.0981	0.2185	110
111	163.588	0.0142	0.2867	70.51	3.4876	49.1	68.4	117.5	0.0987	0.2185	111
112	165.974	0.0142	0.2823	70.35	3.5423	49.5	68.1	117.6	0.0993	0.2185	112
113	168.393	0.0142	0.2780	70.20	3.5977	49.8	67.8	117.7	0.0999	0.2184	113
114	170.833	0.0143	0.2737	70.05	3.6539	50.2	67.6	117.8	0.1006	0.2184	114
115	173.298	0.0143	0.2695	69.89	3.7110	50.5	67.3	117.9	0.1012	0.2183	115
116	175.790	0.0143	0.2653	69.74	3.7689	50.9	67.0	117.9	0.1018	0.2183	116
117	178.297	0.0144	0.2613	69.58	3.8276	51.3	66.8	118.0	0.1024	0.2182	117
118	180.846	0.0144	0.2573	69.42	3.8872	51.7	66.5	118.1	0.1031	0.2182	118
119	183.421	0.0144	0.2533	69.26	3.9476	52.0	66.2	118.2	0.1037	0.2181	119
120	186.023	0.0145	0.2494	69.10	4.0089	52.4	65.9	118.3	0.1043	0.2181	120
121	188.652	0.0145	0.2456	68.94	4.0712	52.8	65.6	118.4	0.1050	0.2180	121
122	191.308	0.0145	0.2419	68.78	4.1343	53.1	65.4	118.5	0.1056	0.2180	122
123	193.992	0.0146	0.2382	68.62	4.1984	53.5	65.1	118.6	0.1062	0.2179	123
124	196.703	0.0146	0.2346	68.46	4.2634	53.9	64.8	118.7	0.1068	0.2178	124
125	199.443	0.0146	0.2310	68.29	4.3294	54.3	64.5	118.8	0.1075	0.2178	125
126	202.211	0.0147	0.2275	68.13	4.3964	54.6	64.2	118.8	0.1081	0.2177	126
127	205.008	0.0147	0.2240	67.96	4.4644	55.0	63.9	118.9	0.1087	0.2177	127
128	207.834	0.0147	0.2206	67.80	4.5334	55.4	63.6	119.0	0.1094	0.2176	128
129	210.688	0.0148	0.2172	67.63	4.6034	55.8	63.3	119.1	0.1100	0.2176	129
130	213.572	0.0148	0.2139	67.46	4.6745	56.2	63.0	119.2	0.1106	0.2175	130
131	216.485	0.0149	0.2107	67.29	4.7467	56.5	62.7	119.2	0.1113	0.2174	131
132	219.429	0.0149	0.2075	67.12	4.8200	56.9	62.4	119.3	0.1119	0.2174	132
133	222.402	0.0149	0.2043	66.95	4.8945	57.3	62.1	119.4	0.1125	0.2173	133
134	225.405	0.0150	0.2012	66.77	4.9700	57.7	61.8	119.5	0.1132	0.2173	134
135	228.438	0.0150	0.1981	66.60	5.0468	58.1	61.5	119.6	0.1138	0.2172	135
136	231.502	0.0151	0.1951	66.42	5.1248	58.5	61.2	119.6	0.1144	0.2171	136
137	234.597	0.0151	0.1922	66.24	5.2040	58.8	60.8	119.7	0.1151	0.2171	137
138	237.723	0.0151	0.1892	66.06	5.2844	59.2	60.5	119.8	0.1157	0.2170	138
139	240.880	0.0152	0.1864	65.88	5.3661	59.6	60.2	119.8	0.1163	0.2169	139
140	244.068	0.0152	0.1835	65.70	5.4491	60.0	59.9	119.9	0.1170	0.2168	140
141	247.288	0.0153	0.1807	65.52	5.5335	60.4	59.6	120.0	0.1176	0.2168	141
142	250.540	0.0153	0.1780	65.34	5.6192	60.8	59.2	120.0	0.1183	0.2167	142
143	253.824	0.0153	0.1752	65.15	5.7064	61.2	58.9	120.1	0.1189	0.2166	143
144	257.140	0.0154	0.1726	64.96	5.7949	61.6	58.6	120.1	0.1195	0.2165	144
145	260.489	0.0154	0.1699	64.78	5.8849	62.0	58.2	120.2	0.1202	0.2165	145
146	263.871	0.0155	0.1673	64.59	5.9765	62.4	57.9	120.3	0.1208	0.2164	146
147	267.270	0.0155	0.1648	64.39	6.0695	62.8	57.5	120.3	0.1215	0.2163	147
148	270.721	0.0156	0.1622	64.20	6.1642	63.2	57.2	120.4	0.1221	0.2162	148
149	274.204	0.0156	0.1597	64.01	6.2604	63.6	56.8	120.4	0.1228	0.2161	149

Table 1. Freon™ 134a Saturation Properties—Temperature Table (continued)

Temp [°F]	Pressure	Volume [ft³/lb]		Density [lb/ft³]		Enthalpy [Btu/lb]			Entropy [Btu/lb·°R]		Temp [°F]
	psia	Liquid v_f	Vapor v_g	Liquid d_f	Vapor d_g	Liquid h_f	Latent h_{fg}	Vapor h_g	Liquid s_f	Vapor s_g	
150	277.721	0.0157	0.1573	63.81	6.3584	64.0	56.5	120.5	0.1234	0.2160	150
151	281.272	0.0157	0.1548	63.61	6.4580	64.4	56.1	120.5	0.1240	0.2159	151
152	284.857	0.0158	0.1525	63.41	6.5593	64.8	55.7	120.6	0.1247	0.2158	152
153	288.477	0.0158	0.1501	63.21	6.6625	65.2	55.4	120.6	0.1253	0.2157	153
154	292.131	0.0159	0.1478	63.01	6.7675	65.6	55.0	120.6	0.1260	0.2156	154
155	295.820	0.0159	0.1455	62.80	6.8743	66.0	54.6	120.7	0.1266	0.2155	155
156	299.544	0.0160	0.1432	62.59	6.9831	66.4	54.3	120.7	0.1273	0.2154	156
157	303.304	0.0160	0.1410	62.38	7.0940	66.9	53.9	120.7	0.1279	0.2153	157
158	307.100	0.0161	0.1388	62.17	7.2068	67.3	53.5	120.8	0.1286	0.2152	158
159	310.931	0.0161	0.1366	61.96	7.3218	67.7	53.1	120.8	0.1293	0.2151	159
160	314.800	0.0162	0.1344	61.74	7.4390	68.1	52.7	120.8	0.1299	0.2150	160
161	318.704	0.0163	0.1323	61.52	7.5584	68.5	52.3	120.9	0.1306	0.2149	161
162	322.646	0.0163	0.1302	61.30	7.6801	69.0	51.9	120.9	0.1312	0.2148	162
163	326.625	0.0164	0.1281	61.08	7.8042	69.4	51.5	120.9	0.1319	0.2146	163
164	330.641	0.0164	0.1261	60.86	7.9308	69.8	51.1	120.9	0.1326	0.2145	164
165	334.696	0.0165	0.1241	60.63	8.0600	70.2	50.7	120.9	0.1332	0.2144	165
166	338.788	0.0166	0.1221	60.40	8.1917	70.7	50.3	120.9	0.1339	0.2142	166
167	342.919	0.0166	0.1201	60.16	8.3262	71.1	49.8	120.9	0.1346	0.2141	167
168	347.089	0.0167	0.1182	59.93	8.4635	71.5	49.4	120.9	0.1352	0.2140	168
169	351.298	0.0168	0.1162	59.69	8.6037	72.0	49.0	120.9	0.1359	0.2138	169
170	355.547	0.0168	0.1143	59.45	8.7470	72.4	48.5	120.9	0.1366	0.2137	170
171	359.835	0.0169	0.1124	59.20	8.8934	72.8	48.1	120.9	0.1373	0.2135	171
172	364.164	0.0170	0.1106	58.95	9.0431	73.3	47.6	120.9	0.1380	0.2133	172
173	368.533	0.0170	0.1087	58.70	9.1961	73.7	47.2	120.9	0.1386	0.2132	173
174	372.942	0.0171	0.1069	58.45	9.3527	74.2	46.7	120.9	0.1393	0.2130	174
175	377.393	0.0172	0.1051	58.19	9.5129	74.6	46.2	120.8	0.1400	0.2128	175
176	381.886	0.0173	0.1033	57.92	9.6770	75.1	45.7	120.8	0.1407	0.2126	176
177	386.421	0.0173	0.1016	57.66	9.8451	75.5	45.2	120.8	0.1414	0.2125	177
178	390.998	0.0174	0.0998	57.39	10.0173	76.0	44.7	120.7	0.1421	0.2123	178
179	395.617	0.0175	0.0981	57.11	10.1939	76.5	44.2	120.7	0.1428	0.2121	179
180	400.280	0.0176	0.0964	56.83	10.3750	76.9	43.7	120.7	0.1435	0.2119	180
181	404.987	0.0177	0.0947	56.55	10.5609	77.4	43.2	120.6	0.1442	0.2116	181
182	409.738	0.0178	0.0930	56.26	10.7518	77.9	42.7	120.5	0.1449	0.2114	182
183	414.533	0.0179	0.0913	55.96	10.9481	78.4	42.1	120.5	0.1456	0.2112	183
184	419.373	0.0180	0.0897	55.66	11.1498	78.8	41.6	120.4	0.1464	0.2109	184
185	424.258	0.0181	0.0880	55.35	11.3575	79.3	41.0	120.3	0.1471	0.2107	185
186	429.189	0.0182	0.0864	55.04	11.5713	79.8	40.4	120.2	0.1478	0.2104	186
187	434.167	0.0183	0.0848	54.72	11.7916	80.3	39.8	120.1	0.1486	0.2102	187
188	439.192	0.0184	0.0832	54.40	12.0189	80.8	39.2	120.0	0.1493	0.2099	188
189	444.264	0.0185	0.0816	54.07	12.2536	81.3	38.6	119.9	0.1501	0.2096	189
190	449.384	0.0186	0.0800	53.73	12.4962	81.8	38.0	119.8	0.1508	0.2093	190
191	454.552	0.0187	0.0784	53.38	12.7472	82.3	37.4	119.7	0.1516	0.2090	191
192	459.757	0.0189	0.0769	53.02	13.0072	82.8	36.7	119.5	0.1523	0.2087	192
193	465.026	0.0190	0.0753	52.65	13.2769	83.4	36.0	119.4	0.1531	0.2083	193
194	470.346	0.0191	0.0738	52.27	13.5570	83.9	35.3	119.2	0.1539	0.2080	194
195	475.717	0.0193	0.0722	51.88	13.8484	84.4	34.6	119.1	0.1547	0.2076	195
196	481.139	0.0194	0.0707	51.48	14.1522	85.0	33.9	118.9	0.1555	0.2072	196
197	486.614	0.0196	0.0691	51.07	14.4693	85.5	33.1	118.7	0.1563	0.2068	197
198	492.142	0.0197	0.0676	50.64	14.8012	86.1	32.3	118.4	0.1572	0.2063	198
199	497.724	0.0199	0.0660	50.20	15.1493	86.7	31.5	118.2	0.1580	0.2059	199
200	503.361	0.0201	0.0645	49.73	15.5155	87.3	30.7	118.0	0.1589	0.2054	200
201	509.054	0.0203	0.0629	49.25	15.9020	87.9	29.8	117.7	0.1597	0.2049	201
202	514.805	0.0205	0.0613	48.75	16.3113	88.5	28.9	117.4	0.1606	0.2043	202
203	520.613	0.0207	0.0597	48.22	16.7466	89.1	27.9	117.0	0.1616	0.2037	203
204	526.481	0.0210	0.0581	47.66	17.2121	89.8	26.9	116.7	0.1625	0.2031	204
205	532.410	0.0212	0.0565	47.06	17.7129	90.5	25.8	116.3	0.1635	0.2024	205
206	538.402	0.0215	0.0548	46.42	18.2558	91.2	24.7	115.8	0.1645	0.2016	206
207	544.458	0.0219	0.0531	45.73	18.8499	91.9	23.4	115.3	0.1656	0.2008	207
208	550.581	0.0222	0.0513	44.98	19.5084	92.7	22.1	114.8	0.1667	0.1998	208
209	556.773	0.0227	0.0494	44.14	20.2504	93.5	20.6	114.1	0.1680	0.1988	209

Table 1. Freon™ 134a Saturation Properties—Temperature Table (continued)

Temp [°F]	Pressure	Volume [ft³/lb]		Density [lb/ft³]		Enthalpy [Btu/lb]			Entropy [Btu/lb·°R]		Temp [°F]
	psia	Liquid v_f	Vapor v_g	Liquid d_f	Vapor d_g	Liquid h_f	Latent h_{fg}	Vapor h_g	Liquid s_f	Vapor s_g	
210	563.037	0.0232	0.0474	43.19	21.1071	94.4	18.9	113.4	0.1693	0.1976	210
211	569.378	0.0238	0.0452	42.07	22.1329	95.5	17.0	112.4	0.1708	0.1961	211
212	575.801	0.0246	0.0427	40.67	23.4420	96.7	14.5	111.2	0.1726	0.1942	212
213	582.316	0.0259	0.0394	38.65	25.3583	98.4	11.1	109.5	0.1750	0.1915	213

Table 2. Freon™ 134a Superheated—Vapor Constant Pressure Tables

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 1.00 psia							Pressure = 2.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
−97.6	0.01065	−16.6	−0.0426	0.2813	1.5295	3163.1	SAT LIQ	0.01085	−11.6	−0.0290	0.2857	1.5183	3004.1	−79.9
−97.6	37.87879	88.5	0.2478	0.1570	1.1488	447.2	SAT VAP	19.76285	91.2	0.2416	0.1629	1.1470	455.7	−79.9
−90	38.61004	89.7	0.2511	0.1588	1.1462	451.6		—	—	—	—	—	—	−90
−80	39.68254	91.3	0.2554	0.1612	1.1429	457.3		—	—	—	—	—	—	−80
−70	40.81633	92.9	0.2596	0.1637	1.1398	463.0		20.28398	92.8	0.2458	0.1651	1.1435	461.4	−70
−60	41.84100	94.6	0.2638	0.1662	1.1370	468.5		20.83333	94.4	0.2500	0.1674	1.1401	467.1	−60
−50	42.91845	96.3	0.2679	0.1686	1.1342	474.0		21.36752	96.1	0.2542	0.1698	1.1370	472.6	−50
−40	44.05286	98.0	0.2720	0.1711	1.1317	479.3		21.92982	97.8	0.2583	0.1721	1.1341	478.1	−40
−30	45.04505	99.7	0.2761	0.1736	1.1292	484.7		22.47191	99.6	0.2624	0.1745	1.1314	483.5	−30
−20	46.08295	101.4	0.2801	0.1760	1.1269	489.9		22.98851	101.3	0.2664	0.1768	1.1288	488.8	−20
−10	47.16981	103.2	0.2841	0.1785	1.1247	495.1		23.52941	103.1	0.2704	0.1792	1.1264	494.1	−10
0	48.30918	105.0	0.2880	0.1809	1.1226	500.2		24.03846	104.9	0.2744	0.1816	1.1242	499.3	0
10	49.26108	106.8	0.2919	0.1834	1.1206	505.3		24.57002	106.7	0.2783	0.1839	1.1220	504.4	10
20	50.25126	108.7	0.2958	0.1858	1.1187	510.3		25.12563	108.6	0.2822	0.1863	1.1200	509.5	20
30	51.28205	110.5	0.2997	0.1882	1.1169	515.2		25.64103	110.5	0.2861	0.1887	1.1180	514.5	30
40	52.35602	112.4	0.3035	0.1906	1.1151	520.1		26.17801	112.4	0.2899	0.1910	1.1161	519.4	40
50	53.47594	114.4	0.3073	0.1930	1.1134	525.0		26.73797	114.3	0.2937	0.1933	1.1144	524.3	50
60	54.64481	116.3	0.3111	0.1953	1.1118	529.8		27.24796	116.2	0.2975	0.1957	1.1127	529.2	60
70	55.55556	118.3	0.3148	0.1977	1.1103	534.5		27.77778	118.2	0.3013	0.1980	1.1110	533.9	70
80	56.81818	120.2	0.3186	0.2000	1.1088	539.3		28.32861	120.2	0.3050	0.2003	1.1095	538.7	80
90	57.80347	122.3	0.3223	0.2023	1.1073	543.9		28.81844	122.2	0.3087	0.2026	1.1080	543.4	90
100	58.82353	124.3	0.3259	0.2046	1.1059	548.5		29.32551	124.2	0.3124	0.2049	1.1065	548.0	100
110	59.88024	126.4	0.3296	0.2069	1.1046	553.1		29.85075	126.3	0.3160	0.2071	1.1051	552.7	110
120	60.97561	128.4	0.3332	0.2092	1.1033	557.7		30.39514	128.4	0.3196	0.2094	1.1038	557.2	120
130	62.11180	130.5	0.3368	0.2114	1.1020	562.2		30.95975	130.5	0.3232	0.2116	1.1025	561.7	130
140	62.89308	132.7	0.3404	0.2137	1.1008	566.6		31.44654	132.6	0.3268	0.2139	1.1013	566.2	140
150	64.10256	134.8	0.3439	0.2159	1.0997	571.1		32.05128	134.8	0.3304	0.2161	1.1001	570.7	150
160	64.93506	137.0	0.3474	0.2181	1.0985	575.5		32.57329	136.9	0.3339	0.2182	1.0989	575.1	160
170	66.22517	139.2	0.3509	0.2203	1.0974	579.8		33.11258	139.1	0.3374	0.2204	1.0978	579.5	170
180	67.11409	141.4	0.3544	0.2224	1.0964	584.2		33.55705	141.4	0.3409	0.2226	1.0967	583.8	180
190	68.49315	143.6	0.3579	0.2246	1.0953	588.5		34.12969	143.6	0.3444	0.2247	1.0956	588.1	190
200	69.44444	145.9	0.3613	0.2267	1.0943	592.7		34.60208	145.8	0.3478	0.2268	1.0946	592.4	200
210	70.42254	148.2	0.3648	0.2288	1.0934	597.0		35.21127	148.1	0.3512	0.2289	1.0936	596.7	210
220	—	—	—	—	—	—		35.71429	150.4	0.3547	0.2310	1.0927	600.9	220

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 3.00 psia							Pressure = 4.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
−68.5	0.01098	−8.4	−0.0206	0.2887	1.5126	2903.8	SAT LIQ	0.01108	−5.9	−0.0143	0.2910	1.5092	2829.0	−60
−68.5	13.51351	92.9	0.2382	0.1669	1.1466	460.7	SAT VAP	10.31992	94.2	0.2360	0.1700	1.1467	464.1	−60
−60	13.83126	94.3	0.2418	0.1687	1.1434	465.6		—	—	—	—	—	—	−60
−50	14.18440	96.0	0.2460	0.1709	1.1399	471.3		10.60445	95.9	0.2402	0.1720	1.1428	469.9	−50
−40	14.55604	97.7	0.2502	0.1731	1.1366	476.9		10.86957	97.6	0.2444	0.1741	1.1392	475.6	−40
−30	14.92537	99.5	0.2543	0.1754	1.1336	482.4		11.14827	99.4	0.2485	0.1763	1.1359	481.2	−30
−20	15.26718	101.2	0.2583	0.1776	1.1308	487.8		11.42857	101.1	0.2526	0.1784	1.1328	486.7	−20
−10	15.62500	103.0	0.2624	0.1799	1.1282	493.1		11.69591	102.9	0.2566	0.1806	1.1300	492.1	−10
0	16.00000	104.8	0.2663	0.1822	1.1257	498.4		11.96172	104.7	0.2606	0.1829	1.1273	497.4	0
10	16.33987	106.7	0.2703	0.1845	1.1234	503.6		12.23990	106.6	0.2646	0.1851	1.1248	502.7	10
20	16.72241	108.5	0.2742	0.1868	1.1212	508.7		12.50000	108.4	0.2685	0.1873	1.1225	507.9	20
30	17.06485	110.4	0.2781	0.1891	1.1191	513.7		12.77139	110.3	0.2724	0.1896	1.1203	513.0	30
40	17.42160	112.3	0.2819	0.1914	1.1172	518.7		13.03781	112.2	0.2762	0.1919	1.1182	518.0	40
50	17.79359	114.2	0.2857	0.1937	1.1153	523.6		13.31558	114.2	0.2800	0.1941	1.1162	523.0	50
60	18.14882	116.2	0.2895	0.1960	1.1135	528.5		13.58696	116.1	0.2838	0.1964	1.1144	527.9	60
70	18.48429	118.1	0.2933	0.1983	1.1118	533.4		13.85042	118.1	0.2876	0.1987	1.1126	532.8	70
80	18.83239	120.1	0.2970	0.2006	1.1102	538.1		14.10437	120.1	0.2913	0.2009	1.1109	537.6	80
90	19.19386	122.2	0.3007	0.2029	1.1086	542.9		14.38849	122.1	0.2951	0.2031	1.1093	542.3	90
100	19.56947	124.2	0.3044	0.2051	1.1071	547.5		14.64129	124.2	0.2987	0.2054	1.1077	547.0	100
110	19.92032	126.3	0.3081	0.2074	1.1057	552.2		14.90313	126.2	0.3024	0.2076	1.1063	551.7	110
120	20.24291	128.3	0.3117	0.2096	1.1043	556.8		15.17451	128.3	0.3060	0.2098	1.1048	556.3	120
130	20.61856	130.5	0.3153	0.2118	1.1030	561.3		15.45595	130.4	0.3096	0.2120	1.1035	560.9	130
140	20.96436	132.6	0.3189	0.2140	1.1017	565.8		15.72327	132.5	0.3132	0.2142	1.1022	565.4	140
150	21.32196	134.7	0.3224	0.2162	1.1005	570.3		15.97444	134.7	0.3168	0.2164	1.1009	569.9	150
160	21.69197	136.9	0.3260	0.2184	1.0993	574.7		16.23377	136.9	0.3203	0.2186	1.0997	574.4	160
170	22.02643	139.1	0.3295	0.2206	1.0981	579.1		16.50165	139.1	0.3238	0.2207	1.0985	578.8	170
180	22.37136	141.3	0.3330	0.2227	1.0970	583.5		16.77852	141.3	0.3273	0.2228	1.0974	583.2	180
190	22.72727	143.6	0.3364	0.2248	1.0960	587.8		17.03578	143.5	0.3308	0.2250	1.0963	587.5	190
200	23.09469	145.8	0.3399	0.2270	1.0949	592.1		17.30104	145.8	0.3343	0.2271	1.0952	591.8	200
210	23.41920	148.1	0.3433	0.2290	1.0939	596.4		17.57469	148.1	0.3377	0.2292	1.0942	596.1	210
220	23.80952	150.4	0.3467	0.2311	1.0929	600.6		17.82531	150.4	0.3411	0.2312	1.0932	600.3	220
230	24.15459	152.7	0.3501	0.2332	1.0920	604.8		18.08318	152.7	0.3445	0.2333	1.0923	604.5	230
240	24.50980	155.1	0.3535	0.2352	1.0911	609.0		18.34862	155.0	0.3479	0.2353	1.0913	608.7	240
250	—	—	—	—	—	—		18.62197	157.4	0.3512	0.2373	1.0904	612.8	250

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 5.00 psia							Pressure = 6.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
−53	0.01116	−3.8	−0.0093	0.2929	1.5071	2768.7	SAT LIQ	0.01123	−2.1	−0.0051	0.2946	1.5057	2717.9	−47.1
−53	8.37521	95.2	0.2343	0.1726	1.1471	466.8	SAT VAP	7.06215	96.1	0.2330	0.1749	1.1476	468.9	−47.1
−50	8.44595	95.7	0.2356	0.1732	1.1458	468.6		—	—	—	—	—	—	−50
−40	8.66551	97.5	0.2398	0.1752	1.1418	474.4		7.19424	97.4	0.2360	0.1762	1.1445	473.1	−40
−30	8.88889	99.2	0.2439	0.1772	1.1382	480.0		7.38007	99.1	0.2402	0.1781	1.1406	478.9	−30
−20	9.10747	101.0	0.2480	0.1793	1.1349	485.6		7.57002	100.9	0.2443	0.1801	1.1369	484.5	−20
−10	9.32836	102.8	0.2521	0.1814	1.1318	491.1		7.75194	102.7	0.2484	0.1821	1.1336	490.1	−10
0	9.55110	104.7	0.2561	0.1835	1.1289	496.5		7.93651	104.6	0.2524	0.1842	1.1306	495.6	0
10	9.76563	106.5	0.2601	0.1857	1.1263	501.8		8.11688	106.4	0.2564	0.1863	1.1277	500.9	10
20	9.98004	108.4	0.2640	0.1879	1.1238	507.0		8.29876	108.3	0.2603	0.1884	1.1251	506.2	20
30	10.20408	110.3	0.2679	0.1901	1.1215	512.2		8.48176	110.2	0.2643	0.1906	1.1226	511.4	30
40	10.41667	112.2	0.2718	0.1923	1.1193	517.3		8.66551	112.1	0.2681	0.1927	1.1203	516.6	40
50	10.62699	114.1	0.2756	0.1945	1.1172	522.3		8.84173	114.0	0.2720	0.1949	1.1182	521.6	50
60	10.84599	116.1	0.2794	0.1968	1.1152	527.3		9.02527	116.0	0.2758	0.1971	1.1161	526.6	60
70	11.06195	118.0	0.2832	0.1990	1.1134	532.2		9.20810	118.0	0.2796	0.1993	1.1142	531.6	70
80	11.27396	120.0	0.2869	0.2012	1.1116	537.0		9.38086	120.0	0.2833	0.2015	1.1124	536.4	80
90	11.49425	122.1	0.2906	0.2034	1.1100	541.8		9.56023	122.0	0.2870	0.2037	1.1106	541.3	90
100	11.70960	124.1	0.2943	0.2056	1.1084	546.5		9.73710	124.1	0.2907	0.2059	1.1090	546.0	100
110	11.91895	126.2	0.2980	0.2078	1.1068	551.2		9.92063	126.1	0.2944	0.2081	1.1074	550.7	110
120	12.13592	128.3	0.3016	0.2100	1.1054	555.9		10.10101	128.2	0.2980	0.2103	1.1059	555.4	120
130	12.34568	130.4	0.3052	0.2122	1.1040	560.5		10.27749	130.3	0.3016	0.2124	1.1044	560.0	130
140	12.56281	132.5	0.3088	0.2144	1.1026	565.0		10.44932	132.5	0.3052	0.2146	1.1031	564.6	140
150	12.77139	134.7	0.3124	0.2166	1.1013	569.5		10.62699	134.6	0.3088	0.2167	1.1017	569.1	150
160	12.98701	136.8	0.3159	0.2187	1.1001	574.0		10.81081	136.8	0.3123	0.2189	1.1005	573.6	160
170	13.19261	139.0	0.3194	0.2209	1.0989	578.4		10.98901	139.0	0.3159	0.2210	1.0992	578.1	170
180	13.40483	141.3	0.3229	0.2230	1.0977	582.8		11.16071	141.2	0.3194	0.2231	1.0981	582.5	180
190	13.62398	143.5	0.3264	0.2251	1.0966	587.2		11.33787	143.5	0.3228	0.2252	1.0969	586.9	190
200	13.83126	145.8	0.3299	0.2272	1.0955	591.5		11.52074	145.7	0.3263	0.2273	1.0958	591.2	200
210	14.04494	148.0	0.3333	0.2293	1.0945	595.8		11.69591	148.0	0.3297	0.2294	1.0948	595.5	210
220	14.24501	150.3	0.3367	0.2313	1.0935	600.0		11.87648	150.3	0.3331	0.2314	1.0937	599.8	220
230	14.47178	152.7	0.3401	0.2334	1.0925	604.3		12.04819	152.6	0.3365	0.2335	1.0928	604.0	230
240	14.68429	155.0	0.3435	0.2354	1.0916	608.4		12.22494	155.0	0.3399	0.2355	1.0918	608.2	240
250	14.90313	157.4	0.3468	0.2374	1.0907	612.6		12.40695	157.3	0.3433	0.2375	1.0909	612.4	250
260	—	—	—	—	—	—		12.57862	159.7	0.3466	0.2395	1.0900	616.5	260

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 7.00 psia							Pressure = 8.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
−42	0.01130	−0.6	−0.0014	0.2960	1.5048	2673.7	SAT LIQ	0.01136	0.8	0.0018	0.2973	1.5042	2634.5	−37.4
−42	6.11247	96.9	0.2320	0.1770	1.1482	470.6	SAT VAP	5.39374	97.6	0.2311	0.1788	1.1489	472.1	−37.4
−40	6.14251	97.2	0.2328	0.1773	1.1473	471.8		—	—	—	—	—	—	−40
−30	6.30517	99.0	0.2370	0.1791	1.1430	477.7		5.49753	98.9	0.2342	0.1800	1.1455	476.5	−30
−20	6.46831	100.8	0.2411	0.1809	1.1391	483.5		5.64016	100.7	0.2383	0.1818	1.1412	482.3	−20
−10	6.62691	102.6	0.2452	0.1829	1.1355	489.1		5.78035	102.5	0.2424	0.1836	1.1374	488.1	−10
0	6.78426	104.5	0.2493	0.1849	1.1322	494.6		5.92066	104.4	0.2465	0.1855	1.1339	493.7	0
10	6.94444	106.3	0.2533	0.1869	1.1292	500.1		6.06061	106.2	0.2505	0.1875	1.1307	499.2	10
20	7.09723	108.2	0.2572	0.1890	1.1264	505.4		6.19963	108.1	0.2545	0.1895	1.1278	504.6	20
30	7.25689	110.1	0.2611	0.1911	1.1238	510.7		6.33714	110.0	0.2584	0.1916	1.1251	509.9	30
40	7.41290	112.0	0.2650	0.1932	1.1214	515.9		6.47249	112.0	0.2623	0.1936	1.1225	515.1	40
50	7.57002	114.0	0.2689	0.1953	1.1191	521.0		6.60939	113.9	0.2662	0.1957	1.1201	520.3	50
60	7.72201	115.9	0.2727	0.1975	1.1170	526.0		6.74764	115.9	0.2700	0.1979	1.1179	525.4	60
70	7.88022	117.9	0.2765	0.1996	1.1150	531.0		6.88231	117.9	0.2738	0.2000	1.1158	530.4	70
80	8.03213	119.9	0.2802	0.2018	1.1131	535.9		7.01754	119.9	0.2776	0.2021	1.1138	535.3	80
90	8.18331	122.0	0.2840	0.2040	1.1113	540.7		7.15308	121.9	0.2813	0.2043	1.1120	540.2	90
100	8.34028	124.0	0.2876	0.2061	1.1096	545.5		7.28863	124.0	0.2850	0.2064	1.1102	545.0	100
110	8.49618	126.1	0.2913	0.2083	1.1080	550.3		7.42390	126.0	0.2887	0.2085	1.1085	549.8	110
120	8.65052	128.2	0.2950	0.2105	1.1064	555.0		7.55858	128.1	0.2923	0.2107	1.1069	554.5	120
130	8.80282	130.3	0.2986	0.2126	1.1049	559.6		7.69231	130.2	0.2959	0.2128	1.1054	559.2	130
140	8.95255	132.4	0.3022	0.2148	1.1035	564.2		7.82473	132.4	0.2995	0.2150	1.1040	563.8	140
150	9.10747	134.6	0.3057	0.2169	1.1022	568.7		7.96178	134.5	0.3031	0.2171	1.1026	568.4	150
160	9.25926	136.8	0.3093	0.2190	1.1009	573.3		8.09061	136.7	0.3066	0.2192	1.1012	572.9	160
170	9.40734	139.0	0.3128	0.2211	1.0996	577.7		8.23045	138.9	0.3102	0.2213	1.1000	577.4	170
180	9.56023	141.2	0.3163	0.2233	1.0984	582.1		8.36120	141.2	0.3137	0.2234	1.0987	581.8	180
190	9.71817	143.4	0.3198	0.2253	1.0972	586.5		8.49618	143.4	0.3172	0.2255	1.0976	586.2	190
200	9.86193	145.7	0.3232	0.2274	1.0961	590.9		8.62813	145.7	0.3206	0.2275	1.0964	590.6	200
210	10.02004	148.0	0.3267	0.2295	1.0951	595.2		8.76424	147.9	0.3241	0.2296	1.0953	594.9	210
220	10.17294	150.3	0.3301	0.2315	1.0940	599.5		8.89680	150.3	0.3275	0.2316	1.0943	599.2	220
230	10.31992	152.6	0.3335	0.2336	1.0930	603.7		9.02527	152.6	0.3309	0.2337	1.0933	603.5	230
240	10.47120	155.0	0.3369	0.2356	1.0920	607.9		9.15751	154.9	0.3343	0.2357	1.0923	607.7	240
250	10.62699	157.3	0.3402	0.2376	1.0911	612.1		9.29368	157.3	0.3376	0.2377	1.0913	611.9	250
260	10.77586	159.7	0.3436	0.2396	1.0902	616.3		9.42507	159.7	0.3409	0.2397	1.0904	616.0	260
270	—	—	—	—	—	—		9.56023	162.1	0.3443	0.2416	1.0895	620.2	270

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 9.00 psia							Pressure = 10.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
−33.2	0.01141	2.0	0.0047	0.2985	1.5039	2599.2	SAT LIQ	0.01146	3.1	0.0074	0.2996	1.5038	2567.0	−29.5
−33.2	4.82859	98.2	0.2303	0.1805	1.1496	473.3	SAT VAP	4.37445	98.8	0.2297	0.1821	1.1503	474.4	−29.5
−30	4.87092	98.8	0.2317	0.1810	1.1480	475.3		—	—	—	—	—	—	−30
−20	4.99750	100.6	0.2359	0.1827	1.1435	481.2		4.48430	100.5	0.2336	0.1836	1.1457	480.1	−20
−10	5.12295	102.4	0.2400	0.1844	1.1394	487.0		4.59770	102.3	0.2378	0.1852	1.1414	486.0	−10
0	5.24934	104.3	0.2441	0.1862	1.1357	492.7		4.71254	104.2	0.2419	0.1869	1.1374	491.8	0
10	5.37346	106.2	0.2481	0.1881	1.1323	498.3		4.82393	106.1	0.2459	0.1888	1.1338	497.4	10
20	5.49753	108.1	0.2521	0.1901	1.1292	503.8		4.93583	108.0	0.2499	0.1906	1.1306	502.9	20
30	5.62114	110.0	0.2560	0.1921	1.1263	509.1		5.04796	109.9	0.2539	0.1926	1.1275	508.3	30
40	5.74383	111.9	0.2599	0.1941	1.1236	514.4		5.15996	111.8	0.2578	0.1945	1.1247	513.7	40
50	5.86510	113.8	0.2638	0.1961	1.1211	519.6		5.26870	113.8	0.2616	0.1966	1.1222	518.9	50
60	5.98802	115.8	0.2676	0.1982	1.1188	524.7		5.37924	115.8	0.2655	0.1986	1.1197	524.1	60
70	6.10874	117.8	0.2714	0.2003	1.1166	529.8		5.48847	117.8	0.2693	0.2007	1.1175	529.2	70
80	6.23053	119.8	0.2752	0.2024	1.1146	534.7		5.59910	119.8	0.2731	0.2027	1.1154	534.2	80
90	6.34921	121.9	0.2789	0.2045	1.1127	539.7		5.70776	121.8	0.2768	0.2048	1.1134	539.1	90
100	6.47249	123.9	0.2826	0.2067	1.1108	544.5		5.81734	123.9	0.2805	0.2069	1.1115	544.0	100
110	6.59196	126.0	0.2863	0.2088	1.1091	549.3		5.92417	125.9	0.2842	0.2090	1.1097	548.8	110
120	6.71141	128.1	0.2900	0.2109	1.1075	554.0		6.03500	128.0	0.2879	0.2111	1.1080	553.6	120
130	6.83060	130.2	0.2936	0.2130	1.1059	558.7		6.14251	130.2	0.2915	0.2132	1.1064	558.3	130
140	6.94927	132.3	0.2972	0.2151	1.1044	563.4		6.25000	132.3	0.2951	0.2153	1.1049	563.0	140
150	7.06714	134.5	0.3008	0.2172	1.1030	568.0		6.35728	134.5	0.2987	0.2174	1.1034	567.6	150
160	7.18907	136.7	0.3043	0.2194	1.1016	572.5		6.46412	136.7	0.3022	0.2195	1.1020	572.1	160
170	7.30994	138.9	0.3078	0.2214	1.1003	577.0		6.57030	138.9	0.3057	0.2216	1.1007	576.7	170
180	7.42942	141.1	0.3113	0.2235	1.0991	581.5		6.68003	141.1	0.3093	0.2237	1.0994	581.1	180
190	7.54717	143.4	0.3148	0.2256	1.0979	585.9		6.78887	143.3	0.3127	0.2257	1.0982	585.6	190
200	7.66284	145.6	0.3183	0.2277	1.0967	590.3		6.89180	145.6	0.3162	0.2278	1.0970	590.0	200
210	7.78210	147.9	0.3217	0.2297	1.0956	594.6		6.99790	147.9	0.3196	0.2298	1.0959	594.3	210
220	7.89889	150.2	0.3252	0.2318	1.0945	598.9		7.10732	150.2	0.3231	0.2319	1.0948	598.6	220
230	8.01925	152.6	0.3285	0.2338	1.0935	603.2		7.21501	152.5	0.3265	0.2339	1.0938	602.9	230
240	8.13670	154.9	0.3319	0.2358	1.0925	607.4		7.32064	154.9	0.3298	0.2359	1.0928	607.2	240
250	8.25764	157.3	0.3353	0.2378	1.0916	611.6		7.42942	157.2	0.3332	0.2379	1.0918	611.4	250
260	8.37521	159.7	0.3386	0.2398	1.0906	615.8		7.53580	159.6	0.3366	0.2398	1.0908	615.6	260
270	8.48896	162.1	0.3420	0.2417	1.0897	619.9		7.63942	162.0	0.3399	0.2418	1.0899	619.7	270
280	—	—	—	—	—	—		7.74593	164.5	0.3432	0.2437	1.0890	623.8	280

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 11.00 psia							Pressure = 12.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
−26	0.01151	4.2	0.0098	0.3007	1.5038	2537.3	SAT LIQ	0.01155	5.2	0.0121	0.3017	1.5039	2509.8	−22.7
−26	4.00000	99.3	0.2291	0.1836	1.1511	475.3	SAT VAP	3.68460	99.8	0.2286	0.1850	1.1519	476.2	−22.7
−20	4.06174	100.4	0.2316	0.1845	1.1481	479.0		3.71195	100.3	0.2297	0.1854	1.1504	477.8	−20
−10	4.16840	102.2	0.2357	0.1860	1.1434	485.0		3.80952	102.1	0.2339	0.1868	1.1455	483.9	−10
0	4.27168	104.1	0.2399	0.1876	1.1392	490.8		3.90472	104.0	0.2380	0.1884	1.1410	489.8	0
10	4.37445	106.0	0.2439	0.1894	1.1354	496.5		4.00160	105.9	0.2421	0.1900	1.1370	495.6	10
20	4.47828	107.9	0.2479	0.1912	1.1320	502.1		4.09500	107.8	0.2461	0.1918	1.1334	501.2	20
30	4.58085	109.8	0.2519	0.1931	1.1288	507.6		4.18936	109.7	0.2501	0.1936	1.1301	506.8	30
40	4.68165	111.8	0.2558	0.1950	1.1259	512.9		4.28266	111.7	0.2540	0.1955	1.1270	512.2	40
50	4.78240	113.7	0.2597	0.1970	1.1232	518.2		4.37637	113.6	0.2579	0.1974	1.1242	517.5	50
60	4.88281	115.7	0.2635	0.1990	1.1207	523.4		4.46828	115.6	0.2618	0.1994	1.1216	522.8	60
70	4.98256	117.7	0.2674	0.2010	1.1183	528.5		4.55996	117.6	0.2656	0.2013	1.1192	527.9	70
80	5.08388	119.7	0.2711	0.2030	1.1161	533.6		4.65333	119.7	0.2694	0.2034	1.1169	533.0	80
90	5.18135	121.8	0.2749	0.2051	1.1141	538.6		4.74383	121.7	0.2731	0.2054	1.1148	538.0	90
100	5.28262	123.8	0.2786	0.2072	1.1121	543.5		4.83559	123.8	0.2768	0.2074	1.1128	543.0	100
110	5.37924	125.9	0.2823	0.2093	1.1103	548.3		4.92611	125.9	0.2805	0.2095	1.1109	547.9	110
120	5.47945	128.0	0.2859	0.2113	1.1086	553.1		5.01756	128.0	0.2842	0.2116	1.1091	552.7	120
130	5.57724	130.1	0.2896	0.2134	1.1069	557.9		5.10725	130.1	0.2878	0.2136	1.1074	557.4	130
140	5.67537	132.3	0.2932	0.2155	1.1054	562.5		5.19751	132.2	0.2914	0.2157	1.1058	562.1	140
150	5.77367	134.4	0.2968	0.2176	1.1039	567.2		5.28821	134.4	0.2950	0.2178	1.1043	566.8	150
160	5.87199	136.6	0.3003	0.2197	1.1024	571.8		5.37924	136.6	0.2986	0.2198	1.1028	571.4	160
170	5.97015	138.8	0.3039	0.2217	1.1011	576.3		5.46747	138.8	0.3021	0.2219	1.1015	575.9	170
180	6.06796	141.1	0.3074	0.2238	1.0998	580.8		5.55864	141.0	0.3056	0.2239	1.1001	580.5	180
190	6.16523	143.3	0.3108	0.2259	1.0985	585.2		5.64653	143.3	0.3091	0.2260	1.0989	584.9	190
200	6.26174	145.6	0.3143	0.2279	1.0973	589.7		5.73723	145.5	0.3126	0.2280	1.0977	589.3	200
210	6.36132	147.9	0.3178	0.2299	1.0962	594.0		5.82751	147.8	0.3160	0.2301	1.0965	593.7	210
220	6.45578	150.2	0.3212	0.2320	1.0951	598.4		5.91716	150.1	0.3195	0.2321	1.0954	598.1	220
230	6.55308	152.5	0.3246	0.2340	1.0940	602.7		6.00601	152.5	0.3229	0.2341	1.0943	602.4	230
240	6.64894	154.9	0.3280	0.2360	1.0930	606.9		6.09385	154.8	0.3262	0.2361	1.0932	606.7	240
250	6.74764	157.2	0.3313	0.2380	1.0920	611.1		6.18429	157.2	0.3296	0.2380	1.0922	610.9	250
260	6.84463	159.6	0.3347	0.2399	1.0911	615.3		6.27353	159.6	0.3330	0.2400	1.0913	615.1	260
270	6.94444	162.0	0.3380	0.2419	1.0901	619.5		6.36132	162.0	0.3363	0.2420	1.0903	619.3	270
280	7.03730	164.4	0.3413	0.2438	1.0892	623.6		6.44745	164.4	0.3396	0.2439	1.0894	623.4	280

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 13.00 psia							Pressure = 14.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
−19.7	0.01159	6.1	0.0142	0.3026	1.5041	2484.1	SAT LIQ	0.01163	7.0	0.0161	0.3035	1.5044	2459.9	−16.8
−19.7	3.41763	100.2	0.2281	0.1864	1.1527	476.9	SAT VAP	3.18776	100.7	0.2277	0.1876	1.1535	477.6	−16.8
−10	3.50508	102.0	0.2322	0.1876	1.1476	482.9		3.24570	101.9	0.2305	0.1885	1.1498	481.8	−10
0	3.59454	103.9	0.2363	0.1891	1.1429	488.8		3.32889	103.8	0.2347	0.1898	1.1448	487.9	0
10	3.68460	105.8	0.2404	0.1907	1.1387	494.7		3.41180	105.7	0.2388	0.1913	1.1404	493.8	10
20	3.77216	107.7	0.2444	0.1924	1.1349	500.4		3.49406	107.7	0.2429	0.1929	1.1363	499.5	20
30	3.85951	109.7	0.2484	0.1941	1.1314	506.0		3.57654	109.6	0.2468	0.1946	1.1327	505.2	30
40	3.94633	111.6	0.2523	0.1959	1.1282	511.5		3.65764	111.5	0.2508	0.1964	1.1294	510.7	40
50	4.03226	113.6	0.2562	0.1978	1.1253	516.8		3.73832	113.5	0.2547	0.1982	1.1263	516.1	50
60	4.11862	115.6	0.2601	0.1997	1.1225	522.1		3.81825	115.5	0.2586	0.2001	1.1235	521.5	60
70	4.20345	117.6	0.2639	0.2017	1.1200	527.3		3.89712	117.5	0.2624	0.2020	1.1209	526.7	70
80	4.28816	119.6	0.2677	0.2037	1.1177	532.4		3.97614	119.6	0.2662	0.2040	1.1185	531.9	80
90	4.37254	121.7	0.2715	0.2057	1.1155	537.5		4.05515	121.6	0.2700	0.2060	1.1162	536.9	90
100	4.45831	123.7	0.2752	0.2077	1.1134	542.5		4.13394	123.7	0.2737	0.2080	1.1141	541.9	100
110	4.54133	125.8	0.2789	0.2097	1.1115	547.4		4.21408	125.8	0.2774	0.2100	1.1121	546.9	110
120	4.62535	127.9	0.2826	0.2118	1.1097	552.2		4.29185	127.9	0.2811	0.2120	1.1102	551.7	120
130	4.71032	130.0	0.2862	0.2138	1.1079	557.0		4.36872	130.0	0.2847	0.2140	1.1084	556.6	130
140	4.79386	132.2	0.2898	0.2159	1.1063	561.7		4.44642	132.2	0.2883	0.2161	1.1068	561.3	140
150	4.87567	134.4	0.2934	0.2179	1.1047	566.4		4.52489	134.3	0.2919	0.2181	1.1052	566.0	150
160	4.96032	136.5	0.2970	0.2200	1.1033	571.0		4.60193	136.5	0.2955	0.2202	1.1037	570.6	160
170	5.04286	138.8	0.3005	0.2220	1.1018	575.6		4.67946	138.7	0.2990	0.2222	1.1022	575.2	170
180	5.12558	141.0	0.3040	0.2241	1.1005	580.1		4.75737	141.0	0.3026	0.2242	1.1008	579.8	180
190	5.20833	143.2	0.3075	0.2261	1.0992	584.6		4.83325	143.2	0.3060	0.2262	1.0995	584.3	190
200	5.29101	145.5	0.3110	0.2281	1.0980	589.0		4.91159	145.5	0.3095	0.2283	1.0983	588.7	200
210	5.37346	147.8	0.3144	0.2302	1.0968	593.4		4.98753	147.8	0.3130	0.2303	1.0971	593.1	210
220	5.45852	150.1	0.3179	0.2322	1.0956	597.8		5.06329	150.1	0.3164	0.2323	1.0959	597.5	220
230	5.54017	152.4	0.3213	0.2342	1.0945	602.1		5.14139	152.4	0.3198	0.2343	1.0948	601.9	230
240	5.62114	154.8	0.3247	0.2362	1.0935	606.4		5.21921	154.8	0.3232	0.2362	1.0937	606.1	240
250	5.70451	157.2	0.3280	0.2381	1.0925	610.7		5.29381	157.1	0.3266	0.2382	1.0927	610.4	250
260	5.78704	159.6	0.3314	0.2401	1.0915	614.9		5.37057	159.5	0.3299	0.2402	1.0917	614.6	260
270	5.86854	162.0	0.3347	0.2420	1.0905	619.0		5.44662	161.9	0.3332	0.2421	1.0908	618.8	270
280	5.95238	164.4	0.3380	0.2440	1.0896	623.2		5.52486	164.4	0.3365	0.2440	1.0898	623.0	280
290	6.03500	166.9	0.3413	0.2459	1.0887	627.3		5.59910	166.8	0.3398	0.2460	1.0889	627.1	290

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 14.696 psia							Pressure = 15.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
−14.9	0.01166	7.5	0.0174	0.3041	1.5046	2443.9	SAT LIQ	0.01167	7.8	0.0180	0.3043	1.5047	2437.1	−14.1
−14.9	3.04507	100.9	0.2274	0.1885	1.1540	478.0	SAT VAP	2.98686	101.1	0.2273	0.1888	1.1543	478.1	−14.1
−10	3.08547	101.9	0.2295	0.1891	1.1513	481.0		3.01932	101.8	0.2290	0.1893	1.1520	480.7	−10
0	3.16556	103.8	0.2336	0.1904	1.1461	487.2		3.09885	103.7	0.2332	0.1906	1.1467	486.9	0
10	3.24465	105.7	0.2378	0.1918	1.1415	493.1		3.17662	105.6	0.2373	0.1920	1.1420	492.8	10
20	3.32336	107.6	0.2418	0.1934	1.1374	498.9		3.25415	107.6	0.2414	0.1935	1.1378	498.7	20
30	3.40136	109.5	0.2458	0.1950	1.1336	504.6		3.33111	109.5	0.2454	0.1952	1.1340	504.4	30
40	3.47947	111.5	0.2498	0.1967	1.1302	510.2		3.40716	111.5	0.2494	0.1969	1.1306	510.0	40
50	3.55619	113.5	0.2537	0.1985	1.1271	515.7		3.48189	113.5	0.2533	0.1987	1.1274	515.5	50
60	3.63240	115.5	0.2576	0.2004	1.1242	521.0		3.55745	115.4	0.2571	0.2005	1.1245	520.8	60
70	3.70920	117.5	0.2614	0.2023	1.1215	526.3		3.63240	117.5	0.2610	0.2024	1.1218	526.1	70
80	3.78501	119.5	0.2652	0.2042	1.1190	531.5		3.70645	119.5	0.2648	0.2043	1.1193	531.3	80
90	3.85951	121.6	0.2690	0.2062	1.1167	536.6		3.78072	121.5	0.2686	0.2063	1.1169	536.4	90
100	3.93546	123.6	0.2727	0.2082	1.1145	541.6		3.85356	123.6	0.2723	0.2082	1.1147	541.4	100
110	4.01123	125.7	0.2764	0.2102	1.1125	546.5		3.92773	125.7	0.2760	0.2102	1.1127	546.4	110
120	4.08497	127.8	0.2801	0.2122	1.1106	551.4		4.00160	127.8	0.2797	0.2122	1.1108	551.3	120
130	4.15973	130.0	0.2837	0.2142	1.1088	556.2		4.07332	130.0	0.2833	0.2142	1.1090	556.1	130
140	4.23370	132.1	0.2874	0.2162	1.1071	561.0		4.14594	132.1	0.2869	0.2163	1.1072	560.9	140
150	4.30849	134.3	0.2910	0.2182	1.1055	565.7		4.21941	134.3	0.2905	0.2183	1.1056	565.6	150
160	4.38212	136.5	0.2945	0.2203	1.1039	570.4		4.29185	136.5	0.2941	0.2203	1.1041	570.3	160
170	4.45633	138.7	0.2981	0.2223	1.1025	575.0		4.36300	138.7	0.2977	0.2223	1.1026	574.9	170
180	4.52899	140.9	0.3016	0.2243	1.1011	579.5		4.43656	140.9	0.3012	0.2244	1.1012	579.4	180
190	4.60193	143.2	0.3051	0.2263	1.0998	584.1		4.50857	143.2	0.3047	0.2264	1.0999	584.0	190
200	4.67727	145.5	0.3086	0.2284	1.0985	588.5		4.58085	145.5	0.3081	0.2284	1.0986	588.4	200
210	4.74834	147.8	0.3120	0.2304	1.0973	592.9		4.65333	147.7	0.3116	0.2304	1.0974	592.8	210
220	4.82393	150.1	0.3154	0.2324	1.0961	597.3		4.72367	150.1	0.3150	0.2324	1.0962	597.2	220
230	4.89476	152.4	0.3188	0.2343	1.0950	601.7		4.79616	152.4	0.3184	0.2344	1.0951	601.6	230
240	4.97018	154.8	0.3222	0.2363	1.0939	606.0		4.86618	154.7	0.3218	0.2363	1.0940	605.9	240
250	5.04286	157.1	0.3256	0.2383	1.0929	610.2		4.93827	157.1	0.3252	0.2383	1.0929	610.2	250
260	5.11509	159.5	0.3289	0.2402	1.0919	614.5		5.01002	159.5	0.3285	0.2403	1.0919	614.4	260
270	5.18672	161.9	0.3323	0.2422	1.0909	618.7		5.08130	161.9	0.3319	0.2422	1.0910	618.6	270
280	5.26039	164.4	0.3356	0.2441	1.0900	622.8		5.15198	164.4	0.3352	0.2441	1.0900	622.8	280
290	5.33333	166.8	0.3389	0.2460	1.0891	627.0		5.22466	166.8	0.3385	0.2460	1.0891	626.9	290

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 16.00 psia							Pressure = 17.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
−11.5	0.01170	8.6	0.0197	0.3051	1.5051	2415.5	SAT LIQ	0.01174	9.3	0.0214	0.3059	1.5056	2395.0	−9.1
−11.5	2.81057	101.4	0.2269	0.1900	1.1551	478.7	SAT VAP	2.65463	101.8	0.2266	0.1911	1.1559	479.1	−9.1
−10	2.82247	101.7	0.2276	0.1902	1.1542	479.6		—	—	—	—	—	—	−10
0	2.89687	103.6	0.2318	0.1913	1.1487	485.9		2.71887	103.5	0.2305	0.1921	1.1507	484.9	0
10	2.97089	105.6	0.2359	0.1927	1.1438	491.9		2.78862	105.5	0.2346	0.1934	1.1455	491.0	10
20	3.04321	107.5	0.2400	0.1941	1.1394	497.8		2.85796	107.4	0.2387	0.1947	1.1409	497.0	20
30	3.11624	109.4	0.2440	0.1957	1.1354	503.6		2.92654	109.4	0.2427	0.1963	1.1368	502.8	30
40	3.18776	111.4	0.2480	0.1974	1.1318	509.2		2.99401	111.3	0.2467	0.1979	1.1330	508.5	40
50	3.25839	113.4	0.2519	0.1991	1.1285	514.7		3.06185	113.3	0.2506	0.1995	1.1296	514.0	50
60	3.33000	115.4	0.2558	0.2009	1.1254	520.2		3.12891	115.3	0.2545	0.2013	1.1264	519.5	60
70	3.40020	117.4	0.2597	0.2028	1.1226	525.5		3.19489	117.3	0.2584	0.2031	1.1235	524.9	70
80	3.46981	119.4	0.2635	0.2046	1.1201	530.7		3.26158	119.4	0.2622	0.2050	1.1209	530.1	80
90	3.53982	121.5	0.2672	0.2066	1.1177	535.8		3.32668	121.4	0.2660	0.2069	1.1184	535.3	90
100	3.60881	123.6	0.2710	0.2085	1.1154	540.9		3.39213	123.5	0.2697	0.2088	1.1161	540.4	100
110	3.67782	125.7	0.2747	0.2105	1.1133	545.9		3.45781	125.6	0.2734	0.2107	1.1139	545.4	110
120	3.74672	127.8	0.2784	0.2125	1.1113	550.8		3.52237	127.7	0.2771	0.2127	1.1119	550.4	120
130	3.81534	129.9	0.2820	0.2145	1.1095	555.7		3.58809	129.9	0.2808	0.2147	1.1100	555.2	130
140	3.88350	132.1	0.2856	0.2165	1.1077	560.5		3.65230	132.0	0.2844	0.2167	1.1082	560.1	140
150	3.95257	134.2	0.2892	0.2185	1.1061	565.2		3.71609	134.2	0.2880	0.2186	1.1065	564.8	150
160	4.01929	136.4	0.2928	0.2205	1.1045	569.9		3.78072	136.4	0.2916	0.2206	1.1049	569.5	160
170	4.08831	138.7	0.2964	0.2225	1.1030	574.5		3.84468	138.6	0.2951	0.2226	1.1034	574.2	170
180	4.15628	140.9	0.2999	0.2245	1.1016	579.1		3.90930	140.9	0.2987	0.2246	1.1019	578.8	180
190	4.22297	143.1	0.3034	0.2265	1.1002	583.6		3.97298	143.1	0.3022	0.2266	1.1005	583.3	190
200	4.29185	145.4	0.3069	0.2285	1.0989	588.1		4.03551	145.4	0.3056	0.2286	1.0992	587.8	200
210	4.35920	147.7	0.3103	0.2305	1.0977	592.6		4.10004	147.7	0.3091	0.2306	1.0979	592.3	210
220	4.42674	150.0	0.3137	0.2325	1.0965	597.0		4.16320	150.0	0.3125	0.2326	1.0967	596.7	220
230	4.49438	152.4	0.3171	0.2345	1.0953	601.3		4.22654	152.3	0.3159	0.2346	1.0956	601.0	230
240	4.55996	154.7	0.3205	0.2364	1.0942	605.6		4.29000	154.7	0.3193	0.2365	1.0945	605.4	240
250	4.62749	157.1	0.3239	0.2384	1.0932	609.9		4.35350	157.1	0.3227	0.2385	1.0934	609.7	250
260	4.69484	159.5	0.3273	0.2403	1.0921	614.2		4.41696	159.5	0.3260	0.2404	1.0924	613.9	260
270	4.76190	161.9	0.3306	0.2423	1.0912	618.4		4.48029	161.9	0.3294	0.2423	1.0914	618.1	270
280	4.82859	164.3	0.3339	0.2442	1.0902	622.5		4.54339	164.3	0.3327	0.2443	1.0904	622.3	280
290	4.89716	166.8	0.3372	0.2461	1.0893	626.7		4.60617	166.8	0.3360	0.2462	1.0895	626.5	290
300	—	—	—	—	—	—		4.66853	169.2	0.3393	0.2480	1.0886	630.6	300

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 18.00 psia							Pressure = 19.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
−6.8	0.01177	10.0	0.0230	0.3067	1.5060	2375.4	SAT LIQ	0.01181	10.7	0.0245	0.3074	1.5065	2356.7	−4.5
−6.8	2.51509	102.1	0.2263	0.1922	1.1568	479.5	SAT VAP	2.38949	102.5	0.2261	0.1933	1.1576	479.9	−4.5
0	2.56016	103.4	0.2292	0.1929	1.1527	483.8		2.41896	103.3	0.2280	0.1937	1.1548	482.8	0
10	2.62674	105.4	0.2333	0.1940	1.1473	490.1		2.48201	105.3	0.2321	0.1947	1.1491	489.1	10
20	2.69251	107.3	0.2374	0.1954	1.1425	496.1		2.54518	107.2	0.2363	0.1960	1.1441	495.2	20
30	2.75786	109.3	0.2415	0.1968	1.1382	502.0		2.60688	109.2	0.2403	0.1974	1.1396	501.2	30
40	2.82247	111.3	0.2455	0.1984	1.1342	507.7		2.66880	111.2	0.2443	0.1988	1.1355	507.0	40
50	2.88600	113.3	0.2494	0.2000	1.1307	513.3		2.72926	113.2	0.2483	0.2004	1.1318	512.6	50
60	2.94985	115.3	0.2533	0.2017	1.1274	518.8		2.78940	115.2	0.2522	0.2021	1.1284	518.2	60
70	3.01296	117.3	0.2572	0.2035	1.1244	524.2		2.84981	117.2	0.2561	0.2038	1.1253	523.6	70
80	3.07503	119.3	0.2610	0.2053	1.1217	529.5		2.90951	119.3	0.2599	0.2056	1.1225	529.0	80
90	3.13775	121.4	0.2648	0.2072	1.1191	534.7		2.96824	121.3	0.2637	0.2075	1.1199	534.2	90
100	3.20000	123.5	0.2686	0.2091	1.1168	539.9		3.02755	123.4	0.2674	0.2093	1.1174	539.4	100
110	3.26158	125.6	0.2723	0.2110	1.1145	544.9		3.08642	125.5	0.2712	0.2112	1.1152	544.4	110
120	3.32336	127.7	0.2760	0.2129	1.1125	549.9		3.14465	127.7	0.2749	0.2131	1.1130	549.4	120
130	3.38524	129.8	0.2796	0.2149	1.1105	554.8		3.20307	129.8	0.2785	0.2151	1.1110	554.4	130
140	3.44590	132.0	0.2833	0.2168	1.1087	559.6		3.26158	132.0	0.2821	0.2170	1.1092	559.2	140
150	3.50631	134.2	0.2869	0.2188	1.1069	564.4		3.31895	134.1	0.2858	0.2190	1.1074	564.0	150
160	3.56761	136.4	0.2904	0.2208	1.1053	569.1		3.37724	136.3	0.2893	0.2210	1.1057	568.8	160
170	3.62845	138.6	0.2940	0.2228	1.1038	573.8		3.43407	138.6	0.2929	0.2230	1.1041	573.4	170
180	3.68868	140.8	0.2975	0.2248	1.1023	578.4		3.49162	140.8	0.2964	0.2249	1.1026	578.1	180
190	3.74813	143.1	0.3010	0.2268	1.1009	583.0		3.54862	143.1	0.2999	0.2269	1.1012	582.7	190
200	3.80952	145.4	0.3045	0.2288	1.0995	587.5		3.60620	145.3	0.3034	0.2289	1.0998	587.2	200
210	3.86997	147.7	0.3079	0.2307	1.0982	592.0		3.66300	147.6	0.3069	0.2308	1.0985	591.7	210
220	3.92927	150.0	0.3114	0.2327	1.0970	596.4		3.72024	149.9	0.3103	0.2328	1.0973	596.1	220
230	3.99042	152.3	0.3148	0.2347	1.0958	600.8		3.77786	152.3	0.3137	0.2348	1.0961	600.5	230
240	4.04858	154.7	0.3182	0.2366	1.0947	605.1		3.83436	154.6	0.3171	0.2367	1.0950	604.9	240
250	4.10846	157.0	0.3216	0.2386	1.0936	609.4		3.89105	157.0	0.3205	0.2387	1.0939	609.2	250
260	4.17014	159.4	0.3249	0.2405	1.0926	613.7		3.94789	159.4	0.3238	0.2406	1.0928	613.5	260
270	4.22833	161.9	0.3282	0.2424	1.0916	617.9		4.00481	161.8	0.3272	0.2425	1.0918	617.7	270
280	4.28816	164.3	0.3316	0.2443	1.0906	622.1		4.06174	164.3	0.3305	0.2444	1.0908	621.9	280
290	4.34783	166.7	0.3348	0.2462	1.0897	626.3		4.11692	166.7	0.3338	0.2463	1.0899	626.1	290
300	4.40917	169.2	0.3381	0.2481	1.0888	630.4		4.17362	169.2	0.3370	0.2482	1.0890	630.2	300

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 20.00 psia							Pressure = 21.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
−2.4	0.01184	11.4	0.0259	0.3081	1.5071	2338.7	SAT LIQ	0.01187	12.0	0.0273	0.3088	1.5076	2321.4	−0.3
−2.4	2.27635	102.8	0.2258	0.1943	1.1585	480.2	SAT VAP	2.17391	103.1	0.2256	0.1953	1.1593	480.5	−0.3
0	2.29095	103.3	0.2268	0.1945	1.1569	481.8		2.17581	103.2	0.2257	0.1953	1.1591	480.8	0
10	2.35183	105.2	0.2310	0.1955	1.1510	488.2		2.23414	105.1	0.2299	0.1962	1.1529	487.2	10
20	2.41196	107.2	0.2351	0.1966	1.1457	494.3		2.29148	107.1	0.2341	0.1972	1.1474	493.5	20
30	2.47158	109.1	0.2392	0.1979	1.1410	500.3		2.34852	109.1	0.2381	0.1985	1.1425	499.5	30
40	2.52972	111.1	0.2432	0.1994	1.1368	506.2		2.40442	111.0	0.2422	0.1999	1.1381	505.4	40
50	2.58799	113.1	0.2472	0.2009	1.1329	511.9		2.46063	113.1	0.2461	0.2013	1.1341	511.2	50
60	2.64550	115.1	0.2511	0.2025	1.1295	517.5		2.51572	115.1	0.2501	0.2029	1.1305	516.8	60
70	2.70270	117.2	0.2550	0.2042	1.1263	523.0		2.57003	117.1	0.2539	0.2046	1.1272	522.4	70
80	2.76014	119.2	0.2588	0.2060	1.1233	528.4		2.62467	119.2	0.2578	0.2063	1.1242	527.8	80
90	2.81690	121.3	0.2626	0.2078	1.1206	533.6		2.67881	121.2	0.2616	0.2081	1.1214	533.1	90
100	2.87274	123.4	0.2664	0.2096	1.1181	538.8		2.73224	123.3	0.2654	0.2099	1.1188	538.3	100
110	2.92826	125.5	0.2701	0.2115	1.1158	543.9		2.78552	125.4	0.2691	0.2117	1.1164	543.4	110
120	2.98418	127.6	0.2738	0.2134	1.1136	549.0		2.83930	127.6	0.2728	0.2136	1.1142	548.5	120
130	3.03951	129.7	0.2775	0.2153	1.1116	553.9		2.89184	129.7	0.2765	0.2155	1.1121	553.5	130
140	3.09502	131.9	0.2811	0.2172	1.1097	558.8		2.94464	131.9	0.2801	0.2174	1.1101	558.4	140
150	3.14961	134.1	0.2847	0.2192	1.1078	563.6		2.99760	134.1	0.2837	0.2194	1.1083	563.2	150
160	3.20513	136.3	0.2883	0.2211	1.1061	568.4		3.04971	136.3	0.2873	0.2213	1.1066	568.0	160
170	3.26052	138.5	0.2918	0.2231	1.1045	573.1		3.10270	138.5	0.2909	0.2233	1.1049	572.7	170
180	3.31455	140.8	0.2954	0.2251	1.1030	577.7		3.15457	140.7	0.2944	0.2252	1.1034	577.4	180
190	3.36927	143.0	0.2989	0.2270	1.1015	582.3		3.20616	143.0	0.2979	0.2272	1.1019	582.0	190
200	3.42349	145.3	0.3024	0.2290	1.1002	586.9		3.25839	145.3	0.3014	0.2291	1.1005	586.6	200
210	3.47826	147.6	0.3058	0.2310	1.0988	591.4		3.31016	147.6	0.3048	0.2311	1.0991	591.1	210
220	3.53232	149.9	0.3093	0.2329	1.0976	595.8		3.36247	149.9	0.3083	0.2330	1.0979	595.5	220
230	3.58680	152.3	0.3127	0.2349	1.0964	600.2		3.41413	152.2	0.3117	0.2350	1.0966	600.0	230
240	3.64033	154.6	0.3161	0.2368	1.0952	604.6		3.46500	154.6	0.3151	0.2369	1.0955	604.3	240
250	3.69413	157.0	0.3195	0.2387	1.0941	608.9		3.51741	157.0	0.3185	0.2388	1.0943	608.7	250
260	3.74813	159.4	0.3228	0.2407	1.0930	613.2		3.56888	159.4	0.3218	0.2408	1.0932	613.0	260
270	3.80228	161.8	0.3261	0.2426	1.0920	617.5		3.61925	161.8	0.3252	0.2427	1.0922	617.2	270
280	3.85654	164.2	0.3295	0.2445	1.0910	621.7		3.67107	164.2	0.3285	0.2446	1.0912	621.5	280
290	3.91083	166.7	0.3328	0.2464	1.0901	625.9		3.72162	166.7	0.3318	0.2464	1.0902	625.7	290
300	3.96354	169.2	0.3360	0.2482	1.0891	630.0		3.77358	169.1	0.3351	0.2483	1.0893	629.8	300

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 22.00 psia							Pressure = 23.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
1.7	0.01190	12.6	0.0286	0.3094	1.5082	2304.8	SAT LIQ	0.01193	13.2	0.0299	0.3101	1.5088	2288.8	3.6
1.7	2.07987	103.4	0.2253	0.1962	1.1602	480.8	SAT VAP	1.99402	103.7	0.2251	0.1972	1.1610	481.1	3.6
10	2.12675	105.0	0.2289	0.1969	1.1548	486.2		2.02881	104.9	0.2278	0.1976	1.1567	485.3	10
20	2.18198	107.0	0.2330	0.1979	1.1490	492.6		2.08247	106.9	0.2320	0.1985	1.1507	491.7	20
30	2.23664	109.0	0.2371	0.1991	1.1439	498.7		2.13493	108.9	0.2361	0.1996	1.1454	497.9	30
40	2.29095	111.0	0.2411	0.2004	1.1394	504.7		2.18675	110.9	0.2402	0.2009	1.1407	503.9	40
50	2.34412	113.0	0.2451	0.2018	1.1352	510.5		2.23814	112.9	0.2442	0.2023	1.1364	509.8	50
60	2.39693	115.0	0.2491	0.2033	1.1315	516.2		2.28885	114.9	0.2481	0.2037	1.1326	515.5	60
70	2.44978	117.1	0.2530	0.2049	1.1281	521.7		2.33918	117.0	0.2520	0.2053	1.1291	521.1	70
80	2.50188	119.1	0.2568	0.2066	1.1250	527.2		2.38949	119.1	0.2559	0.2070	1.1259	526.6	80
90	2.55363	121.2	0.2606	0.2084	1.1222	532.5		2.43902	121.1	0.2597	0.2087	1.1229	532.0	90
100	2.60485	123.3	0.2644	0.2102	1.1195	537.8		2.48818	123.2	0.2635	0.2104	1.1202	537.3	100
110	2.65604	125.4	0.2681	0.2120	1.1171	542.9		2.53743	125.3	0.2672	0.2122	1.1177	542.4	110
120	2.70709	127.5	0.2718	0.2138	1.1148	548.0		2.58665	127.5	0.2709	0.2141	1.1154	547.6	120
130	2.75786	129.7	0.2755	0.2157	1.1126	553.0		2.63505	129.6	0.2746	0.2159	1.1132	552.6	130
140	2.80820	131.8	0.2791	0.2176	1.1106	558.0		2.68384	131.8	0.2782	0.2178	1.1111	557.5	140
150	2.85878	134.0	0.2828	0.2195	1.1088	562.8		2.73149	134.0	0.2819	0.2197	1.1092	562.4	150
160	2.90867	136.2	0.2864	0.2215	1.1070	567.6		2.78009	136.2	0.2854	0.2216	1.1074	567.2	160
170	2.95946	138.4	0.2899	0.2234	1.1053	572.4		2.82805	138.4	0.2890	0.2236	1.1057	572.0	170
180	3.00842	140.7	0.2934	0.2254	1.1037	577.0		2.87604	140.7	0.2925	0.2255	1.1041	576.7	180
190	3.05904	143.0	0.2970	0.2273	1.1022	581.7		2.92312	142.9	0.2961	0.2274	1.1026	581.3	190
200	3.10849	145.2	0.3004	0.2293	1.1008	586.2		2.97177	145.2	0.2995	0.2294	1.1011	585.9	200
210	3.15756	147.5	0.3039	0.2312	1.0994	590.8		3.01932	147.5	0.3030	0.2313	1.0997	590.5	210
220	3.20821	149.9	0.3074	0.2331	1.0981	595.3		3.06654	149.8	0.3065	0.2332	1.0984	595.0	220
230	3.25627	152.2	0.3108	0.2351	1.0969	599.7		3.11333	152.2	0.3099	0.2352	1.0972	599.4	230
240	3.30579	154.6	0.3142	0.2370	1.0957	604.1		3.16056	154.5	0.3133	0.2371	1.0960	603.8	240
250	3.35570	156.9	0.3175	0.2389	1.0946	608.4		3.20821	156.9	0.3167	0.2390	1.0948	608.2	250
260	3.40483	159.3	0.3209	0.2408	1.0935	612.7		3.25521	159.3	0.3200	0.2409	1.0937	612.5	260
270	3.45304	161.8	0.3242	0.2427	1.0924	617.0		3.30251	161.7	0.3233	0.2428	1.0926	616.8	270
280	3.50263	164.2	0.3276	0.2446	1.0914	621.3		3.34896	164.2	0.3267	0.2447	1.0916	621.0	280
290	3.55240	166.7	0.3309	0.2465	1.0904	625.5		3.39674	166.6	0.3300	0.2466	1.0906	625.2	290
300	3.60101	169.1	0.3341	0.2484	1.0895	629.6		3.44234	169.1	0.3332	0.2484	1.0897	629.4	300
310	3.64964	171.6	0.3374	0.2502	1.0886	633.8		3.48918	171.6	0.3365	0.2503	1.0888	633.6	310

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 24.00 psia							Pressure = 25.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
5.4	0.01195	13.8	0.0311	0.3107	1.5094	2273.3	SAT LIQ	0.01198	14.4	0.0323	0.3113	1.5100	2258.3	7.2
5.4	1.91534	103.9	0.2249	0.1981	1.1619	481.3	SAT VAP	1.84264	104.2	0.2247	0.1990	1.1627	481.5	7.2
10	1.93911	104.8	0.2269	0.1984	1.1587	484.3		1.85667	104.7	0.2259	0.1992	1.1607	483.3	10
20	1.99045	106.8	0.2311	0.1992	1.1525	490.8		1.90621	106.7	0.2301	0.1999	1.1542	489.9	20
30	2.04123	108.8	0.2352	0.2002	1.1469	497.0		1.95542	108.7	0.2343	0.2008	1.1485	496.2	30
40	2.09118	110.8	0.2392	0.2014	1.1420	503.1		2.00361	110.8	0.2383	0.2019	1.1434	502.3	40
50	2.14087	112.9	0.2432	0.2027	1.1376	509.0		2.05128	112.8	0.2423	0.2032	1.1388	508.3	50
60	2.18962	114.9	0.2472	0.2042	1.1336	514.8		2.09864	114.8	0.2463	0.2046	1.1347	514.1	60
70	2.23814	116.9	0.2511	0.2057	1.1300	520.5		2.14546	116.9	0.2502	0.2061	1.1310	519.8	70
80	2.28624	119.0	0.2550	0.2073	1.1267	526.0		2.19202	118.9	0.2541	0.2077	1.1276	525.4	80
90	2.33427	121.1	0.2588	0.2090	1.1237	531.4		2.23764	121.0	0.2579	0.2093	1.1245	530.8	90
100	2.38152	123.2	0.2626	0.2107	1.1209	536.7		2.28363	123.1	0.2617	0.2110	1.1216	536.2	100
110	2.42895	125.3	0.2663	0.2125	1.1183	541.9		2.32937	125.2	0.2655	0.2128	1.1190	541.4	110
120	2.47586	127.4	0.2700	0.2143	1.1160	547.1		2.37417	127.4	0.2692	0.2145	1.1166	546.6	120
130	2.52270	129.6	0.2737	0.2162	1.1137	552.1		2.41955	129.5	0.2729	0.2164	1.1143	551.7	130
140	2.56937	131.8	0.2774	0.2180	1.1116	557.1		2.46427	131.7	0.2765	0.2182	1.1121	556.7	140
150	2.61575	133.9	0.2810	0.2199	1.1097	562.0		2.50878	133.9	0.2801	0.2201	1.1101	561.6	150
160	2.66170	136.1	0.2846	0.2218	1.1078	566.9		2.55363	136.1	0.2837	0.2220	1.1083	566.5	160
170	2.70856	138.4	0.2881	0.2237	1.1061	571.6		2.59740	138.3	0.2873	0.2239	1.1065	571.3	170
180	2.75406	140.6	0.2917	0.2256	1.1045	576.4		2.64201	140.6	0.2908	0.2258	1.1048	576.0	180
190	2.80034	142.9	0.2952	0.2276	1.1029	581.0		2.68601	142.9	0.2944	0.2277	1.1033	580.7	190
200	2.84495	145.2	0.2987	0.2295	1.1014	585.6		2.73000	145.1	0.2979	0.2296	1.1018	585.3	200
210	2.89101	147.5	0.3021	0.2314	1.1000	590.2		2.77316	147.5	0.3013	0.2315	1.1003	589.9	210
220	2.93686	149.8	0.3056	0.2334	1.0987	594.7		2.81690	149.8	0.3048	0.2335	1.0990	594.4	220
230	2.98240	152.1	0.3090	0.2353	1.0974	599.2		2.86123	152.1	0.3082	0.2354	1.0977	598.9	230
240	3.02755	154.5	0.3124	0.2372	1.0962	603.6		2.90529	154.5	0.3116	0.2373	1.0965	603.3	240
250	3.07220	156.9	0.3158	0.2391	1.0950	607.9		2.94811	156.9	0.3150	0.2392	1.0953	607.7	250
260	3.11818	159.3	0.3192	0.2410	1.0939	612.3		2.99222	159.3	0.3183	0.2411	1.0941	612.0	260
270	3.16356	161.7	0.3225	0.2429	1.0928	616.6		3.03490	161.7	0.3217	0.2430	1.0931	616.3	270
280	3.20821	164.1	0.3258	0.2448	1.0918	620.8		3.07882	164.1	0.3250	0.2449	1.0920	620.6	280
290	3.25309	166.6	0.3291	0.2467	1.0908	625.0		3.12207	166.6	0.3283	0.2467	1.0910	624.8	290
300	3.29815	169.1	0.3324	0.2485	1.0899	629.2		3.16456	169.1	0.3316	0.2486	1.0900	629.0	300
310	3.34336	171.6	0.3357	0.2504	1.0889	633.4		3.20821	171.6	0.3348	0.2504	1.0891	633.2	310

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 26.00 psia							Pressure = 27.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
8.9	0.01201	14.9	0.0335	0.3119	1.5106	2243.7	SAT LIQ	0.01203	15.4	0.0346	0.3125	1.5112	2229.6	10.6
8.9	1.77494	104.4	0.2246	0.1999	1.1636	481.6	SAT VAP	1.71233	104.7	0.2244	0.2007	1.1644	481.8	10.6
10	1.78031	104.7	0.2250	0.1999	1.1628	482.3		—	—	—	—	—	—	10
20	1.82849	106.7	0.2292	0.2005	1.1560	489.0		1.75623	106.6	0.2284	0.2012	1.1578	488.0	20
30	1.87582	108.7	0.2334	0.2014	1.1500	495.4		1.80213	108.6	0.2325	0.2020	1.1516	494.5	30
40	1.92271	110.7	0.2375	0.2025	1.1448	501.6		1.84740	110.6	0.2366	0.2030	1.1462	500.8	40
50	1.96850	112.7	0.2415	0.2037	1.1400	507.6		1.89215	112.6	0.2406	0.2042	1.1413	506.9	50
60	2.01450	114.8	0.2454	0.2050	1.1358	513.5		1.93648	114.7	0.2446	0.2054	1.1369	512.8	60
70	2.05973	116.8	0.2494	0.2065	1.1320	519.2		1.98020	116.8	0.2485	0.2068	1.1330	518.6	70
80	2.10438	118.9	0.2532	0.2080	1.1285	524.8		2.02347	118.8	0.2524	0.2083	1.1294	524.2	80
90	2.14869	121.0	0.2571	0.2096	1.1253	530.3		2.06654	120.9	0.2563	0.2099	1.1261	529.7	90
100	2.19298	123.1	0.2609	0.2113	1.1224	535.7		2.10926	123.0	0.2601	0.2116	1.1231	535.1	100
110	2.23714	125.2	0.2646	0.2130	1.1197	540.9		2.15146	125.2	0.2638	0.2133	1.1203	540.4	110
120	2.28050	127.3	0.2684	0.2148	1.1171	546.1		2.19346	127.3	0.2676	0.2150	1.1178	545.7	120
130	2.32396	129.5	0.2720	0.2166	1.1148	551.2		2.23514	129.5	0.2713	0.2168	1.1154	550.8	130
140	2.36686	131.7	0.2757	0.2184	1.1126	556.3		2.27739	131.6	0.2749	0.2186	1.1132	555.8	140
150	2.41022	133.9	0.2793	0.2203	1.1106	561.2		2.31857	133.8	0.2785	0.2205	1.1111	560.8	150
160	2.45278	136.1	0.2829	0.2222	1.1087	566.1		2.36016	136.0	0.2821	0.2223	1.1091	565.7	160
170	2.49563	138.3	0.2865	0.2240	1.1069	570.9		2.40154	138.3	0.2857	0.2242	1.1073	570.6	170
180	2.53807	140.6	0.2900	0.2259	1.1052	575.7		2.44260	140.5	0.2893	0.2261	1.1056	575.3	180
190	2.58065	142.8	0.2936	0.2278	1.1036	580.4		2.48324	142.8	0.2928	0.2280	1.1040	580.0	190
200	2.62329	145.1	0.2971	0.2298	1.1021	585.0		2.52398	145.1	0.2963	0.2299	1.1024	584.7	200
210	2.66525	147.4	0.3005	0.2317	1.1006	589.6		2.56476	147.4	0.2998	0.2318	1.1009	589.3	210
220	2.70783	149.7	0.3040	0.2336	1.0993	594.1		2.60552	149.7	0.3032	0.2337	1.0996	593.8	220
230	2.74952	152.1	0.3074	0.2355	1.0980	598.6		2.64620	152.1	0.3066	0.2356	1.0982	598.3	230
240	2.79174	154.5	0.3108	0.2374	1.0967	603.1		2.68673	154.4	0.3100	0.2375	1.0970	602.8	240
250	2.83366	156.8	0.3142	0.2393	1.0955	607.4		2.72702	156.8	0.3134	0.2394	1.0957	607.2	250
260	2.87522	159.2	0.3175	0.2412	1.0944	611.8		2.76702	159.2	0.3168	0.2413	1.0946	611.6	260
270	2.91715	161.7	0.3209	0.2431	1.0933	616.1		2.80741	161.6	0.3201	0.2431	1.0935	615.9	270
280	2.95858	164.1	0.3242	0.2449	1.0922	620.4		2.84819	164.1	0.3235	0.2450	1.0924	620.2	280
290	3.00030	166.6	0.3275	0.2468	1.0912	624.6		2.88850	166.5	0.3268	0.2469	1.0914	624.4	290
300	3.04136	169.0	0.3308	0.2487	1.0902	628.8		2.92826	169.0	0.3300	0.2487	1.0904	628.6	300
310	3.08356	171.5	0.3341	0.2505	1.0893	633.0		2.96824	171.5	0.3333	0.2506	1.0895	632.8	310
320	—	—	—	—	—	—		3.00842	174.0	0.3365	0.2524	1.0885	636.9	320

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 28.00 psia							Pressure = 29.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
12.3	0.01206	15.9	0.0357	0.3131	1.5119	2216.0	SAT LIQ	0.01208	16.4	0.0367	0.3137	1.5125	2202.6	13.9
12.3	1.65426	104.9	0.2242	0.2016	1.1653	481.9	SAT VAP	1.59974	105.1	0.2241	0.2024	1.1661	482.0	13.9
20	1.68919	106.5	0.2275	0.2019	1.1597	487.1		1.62681	106.4	0.2267	0.2026	1.1616	486.2	20
30	1.73400	108.5	0.2317	0.2026	1.1533	493.7		1.67029	108.4	0.2309	0.2032	1.1549	492.8	30
40	1.77778	110.5	0.2358	0.2035	1.1476	500.0		1.71292	110.5	0.2350	0.2041	1.1490	499.2	40
50	1.82116	112.6	0.2398	0.2046	1.1425	506.1		1.75500	112.5	0.2390	0.2051	1.1438	505.4	50
60	1.86393	114.6	0.2438	0.2059	1.1380	512.1		1.79662	114.6	0.2430	0.2063	1.1392	511.4	60
70	1.90621	116.7	0.2478	0.2072	1.1340	517.9		1.83756	116.6	0.2470	0.2076	1.1350	517.3	70
80	1.94818	118.8	0.2516	0.2087	1.1303	523.6		1.87829	118.7	0.2509	0.2091	1.1312	523.0	80
90	1.98965	120.9	0.2555	0.2102	1.1269	529.2		1.91865	120.8	0.2547	0.2106	1.1277	528.6	90
100	2.03128	123.0	0.2593	0.2119	1.1238	534.6		1.95848	122.9	0.2585	0.2122	1.1246	534.1	100
110	2.07254	125.1	0.2631	0.2135	1.1210	539.9		1.99800	125.1	0.2623	0.2138	1.1217	539.4	110
120	2.11282	127.2	0.2668	0.2153	1.1184	545.2		2.03791	127.2	0.2661	0.2155	1.1190	544.7	120
130	2.15378	129.4	0.2705	0.2170	1.1159	550.3		2.07684	129.4	0.2698	0.2173	1.1165	549.9	130
140	2.19394	131.6	0.2742	0.2188	1.1137	555.4		2.11595	131.5	0.2734	0.2190	1.1142	555.0	140
150	2.23364	133.8	0.2778	0.2207	1.1116	560.4		2.15471	133.7	0.2771	0.2208	1.1120	560.0	150
160	2.27428	136.0	0.2814	0.2225	1.1096	565.3		2.19346	136.0	0.2807	0.2227	1.1100	565.0	160
170	2.31374	138.2	0.2850	0.2244	1.1077	570.2		2.23214	138.2	0.2842	0.2245	1.1081	569.8	170
180	2.35349	140.5	0.2885	0.2262	1.1060	575.0		2.27066	140.5	0.2878	0.2264	1.1063	574.6	180
190	2.39292	142.8	0.2920	0.2281	1.1043	579.7		2.30894	142.7	0.2913	0.2283	1.1047	579.4	190
200	2.43250	145.1	0.2955	0.2300	1.1027	584.4		2.34687	145.0	0.2948	0.2301	1.1031	584.1	200
210	2.47158	147.4	0.2990	0.2319	1.1013	589.0		2.38493	147.3	0.2983	0.2320	1.1016	588.7	210
220	2.51130	149.7	0.3025	0.2338	1.0998	593.6		2.42307	149.7	0.3018	0.2339	1.1001	593.3	220
230	2.55037	152.0	0.3059	0.2357	1.0985	598.1		2.46063	152.0	0.3052	0.2358	1.0988	597.8	230
240	2.58933	154.4	0.3093	0.2376	1.0972	602.5		2.49875	154.4	0.3086	0.2377	1.0975	602.3	240
250	2.62881	156.8	0.3127	0.2395	1.0960	607.0		2.53614	156.8	0.3120	0.2396	1.0962	606.7	250
260	2.66738	159.2	0.3161	0.2413	1.0948	611.3		2.57400	159.2	0.3153	0.2414	1.0950	611.1	260
270	2.70636	161.6	0.3194	0.2432	1.0937	615.7		2.61165	161.6	0.3187	0.2433	1.0939	615.4	270
280	2.74499	164.1	0.3227	0.2451	1.0926	620.0		2.64901	164.0	0.3220	0.2452	1.0928	619.7	280
290	2.78396	166.5	0.3260	0.2469	1.0916	624.2		2.68673	166.5	0.3253	0.2470	1.0918	624.0	290
300	2.82247	169.0	0.3293	0.2488	1.0906	628.4		2.72405	169.0	0.3286	0.2489	1.0908	628.2	300
310	2.86123	171.5	0.3326	0.2506	1.0896	632.6		2.76167	171.5	0.3319	0.2507	1.0898	632.4	310
320	2.90023	174.0	0.3358	0.2524	1.0887	636.8		2.79877	174.0	0.3351	0.2525	1.0889	636.6	320

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 30.00 psia							Pressure = 31.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
15.4	0.01211	16.9	0.0377	0.3142	1.5132	2189.7	SAT LIQ	0.01213	17.4	0.0387	0.3148	1.5138	2177.1	16.9
15.4	1.54895	105.4	0.2239	0.2032	1.1670	482.1	SAT VAP	1.50128	105.6	0.2238	0.2040	1.1679	482.2	16.9
20	1.56863	106.3	0.2259	0.2033	1.1635	485.3		1.51400	106.2	0.2251	0.2041	1.1654	484.3	20
30	1.61082	108.3	0.2301	0.2039	1.1566	491.9		1.55521	108.3	0.2293	0.2045	1.1582	491.1	30
40	1.65235	110.4	0.2342	0.2046	1.1505	498.4		1.59566	110.3	0.2335	0.2052	1.1520	497.6	40
50	1.69319	112.4	0.2383	0.2056	1.1451	504.6		1.63532	112.4	0.2375	0.2061	1.1464	503.9	50
60	1.73340	114.5	0.2423	0.2068	1.1403	510.7		1.67448	114.4	0.2416	0.2072	1.1414	510.0	60
70	1.77336	116.6	0.2462	0.2080	1.1360	516.6		1.71350	116.5	0.2455	0.2084	1.1370	516.0	70
80	1.81291	118.7	0.2501	0.2094	1.1321	522.4		1.75162	118.6	0.2494	0.2098	1.1330	521.8	80
90	1.85185	120.8	0.2540	0.2109	1.1285	528.0		1.78987	120.7	0.2533	0.2112	1.1294	527.4	90
100	1.89107	122.9	0.2578	0.2124	1.1253	533.5		1.82749	122.8	0.2571	0.2127	1.1261	533.0	100
110	1.92938	125.0	0.2616	0.2141	1.1223	538.9		1.86498	125.0	0.2609	0.2143	1.1230	538.4	110
120	1.96773	127.2	0.2653	0.2157	1.1196	544.2		1.90223	127.1	0.2646	0.2160	1.1202	543.8	120
130	2.00562	129.3	0.2690	0.2175	1.1171	549.4		1.93911	129.3	0.2684	0.2177	1.1176	549.0	130
140	2.04332	131.5	0.2727	0.2192	1.1147	554.6		1.97550	131.5	0.2720	0.2194	1.1152	554.1	140
150	2.08117	133.7	0.2764	0.2210	1.1125	559.6		2.01248	133.7	0.2757	0.2212	1.1130	559.2	150
160	2.11864	135.9	0.2800	0.2228	1.1105	564.6		2.04834	135.9	0.2793	0.2230	1.1109	564.2	160
170	2.15610	138.2	0.2835	0.2247	1.1085	569.5		2.08464	138.1	0.2829	0.2248	1.1089	569.1	170
180	2.19346	140.4	0.2871	0.2265	1.1067	574.3		2.12089	140.4	0.2864	0.2267	1.1071	573.9	180
190	2.23015	142.7	0.2906	0.2284	1.1050	579.0		2.15703	142.7	0.2900	0.2285	1.1054	578.7	190
200	2.26706	145.0	0.2941	0.2303	1.1034	583.7		2.19250	145.0	0.2935	0.2304	1.1037	583.4	200
210	2.30415	147.3	0.2976	0.2321	1.1019	588.4		2.22816	147.3	0.2969	0.2323	1.1022	588.1	210
220	2.34082	149.6	0.3011	0.2340	1.1004	593.0		2.26398	149.6	0.3004	0.2341	1.1007	592.7	220
230	2.37756	152.0	0.3045	0.2359	1.0990	597.5		2.29938	152.0	0.3038	0.2360	1.0993	597.2	230
240	2.41429	154.4	0.3079	0.2378	1.0977	602.0		2.33481	154.3	0.3072	0.2379	1.0980	601.8	240
250	2.45038	156.7	0.3113	0.2396	1.0965	606.5		2.37023	156.7	0.3106	0.2397	1.0967	606.2	250
260	2.48694	159.1	0.3147	0.2415	1.0953	610.9		2.40558	159.1	0.3140	0.2416	1.0955	610.6	260
270	2.52334	161.6	0.3180	0.2434	1.0941	615.2		2.44081	161.5	0.3173	0.2435	1.0943	615.0	270
280	2.55951	164.0	0.3213	0.2452	1.0930	619.5		2.47647	164.0	0.3207	0.2453	1.0932	619.3	280
290	2.59605	166.5	0.3246	0.2471	1.0920	623.8		2.51130	166.4	0.3240	0.2472	1.0922	623.6	290
300	2.63227	169.0	0.3279	0.2489	1.0910	628.0		2.54647	168.9	0.3273	0.2490	1.0911	627.8	300
310	2.66809	171.5	0.3312	0.2507	1.0900	632.2		2.58131	171.4	0.3305	0.2508	1.0901	632.0	310
320	2.70416	174.0	0.3344	0.2526	1.0890	636.4		2.61643	173.9	0.3338	0.2526	1.0892	636.2	320

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 32.00 psia							Pressure = 33.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
18.4	0.01216	17.9	0.0397	0.3153	1.5145	2164.7	SAT LIQ	0.01218	18.3	0.0406	0.3158	1.5152	2152.7	19.8
18.4	1.45645	105.8	0.2237	0.2048	1.1687	482.2	SAT VAP	1.41423	106.0	0.2235	0.2055	1.1696	482.3	19.8
20	1.46306	106.1	0.2244	0.2048	1.1674	483.4		1.41483	106.0	0.2236	0.2055	1.1694	482.4	20
30	1.50308	108.2	0.2286	0.2052	1.1600	490.2		1.45412	108.1	0.2279	0.2058	1.1617	489.3	30
40	1.54250	110.2	0.2327	0.2058	1.1535	496.8		1.49254	110.2	0.2320	0.2064	1.1550	496.0	40
50	1.58128	112.3	0.2368	0.2066	1.1477	503.1		1.53022	112.2	0.2361	0.2071	1.1491	502.4	50
60	1.61943	114.4	0.2408	0.2077	1.1426	509.3		1.56740	114.3	0.2402	0.2081	1.1438	508.6	60
70	1.65700	116.5	0.2448	0.2088	1.1380	515.3		1.60411	116.4	0.2441	0.2092	1.1391	514.7	70
80	1.69434	118.5	0.2487	0.2101	1.1339	521.2		1.64069	118.5	0.2481	0.2105	1.1349	520.6	80
90	1.73130	120.7	0.2526	0.2115	1.1302	526.9		1.67645	120.6	0.2519	0.2119	1.1310	526.3	90
100	1.76772	122.8	0.2564	0.2130	1.1268	532.5		1.71233	122.7	0.2558	0.2133	1.1276	531.9	100
110	1.80440	124.9	0.2602	0.2146	1.1237	537.9		1.74764	124.9	0.2596	0.2149	1.1244	537.4	110
120	1.84060	127.1	0.2640	0.2162	1.1208	543.3		1.78285	127.0	0.2633	0.2165	1.1215	542.8	120
130	1.87617	129.2	0.2677	0.2179	1.1182	548.5		1.81752	129.2	0.2670	0.2181	1.1188	548.1	130
140	1.91205	131.4	0.2714	0.2196	1.1157	553.7		1.85219	131.4	0.2707	0.2199	1.1163	553.3	140
150	1.94780	133.6	0.2750	0.2214	1.1135	558.8		1.88679	133.6	0.2744	0.2216	1.1140	558.4	150
160	1.98295	135.9	0.2786	0.2232	1.1113	563.8		1.92086	135.8	0.2780	0.2234	1.1118	563.4	160
170	2.01776	138.1	0.2822	0.2250	1.1094	568.7		1.95503	138.1	0.2816	0.2252	1.1098	568.4	170
180	2.05297	140.4	0.2858	0.2268	1.1075	573.6		1.98926	140.3	0.2851	0.2270	1.1079	573.2	180
190	2.08768	142.6	0.2893	0.2287	1.1057	578.4		2.02306	142.6	0.2887	0.2288	1.1061	578.1	190
200	2.12269	144.9	0.2928	0.2305	1.1041	583.1		2.05677	144.9	0.2922	0.2306	1.1044	582.8	200
210	2.15750	147.2	0.2963	0.2324	1.1025	587.8		2.09030	147.2	0.2957	0.2325	1.1028	587.5	210
220	2.19154	149.6	0.2997	0.2342	1.1010	592.4		2.12404	149.5	0.2991	0.2343	1.1013	592.1	220
230	2.22618	151.9	0.3032	0.2361	1.0996	597.0		2.15796	151.9	0.3026	0.2362	1.0999	596.7	230
240	2.26040	154.3	0.3066	0.2380	1.0982	601.5		2.19106	154.3	0.3060	0.2381	1.0985	601.2	240
250	2.29516	156.7	0.3100	0.2398	1.0969	606.0		2.22469	156.7	0.3094	0.2399	1.0972	605.7	250
260	2.32937	159.1	0.3134	0.2417	1.0957	610.4		2.25734	159.1	0.3127	0.2418	1.0960	610.1	260
270	2.36351	161.5	0.3167	0.2435	1.0946	614.8		2.29095	161.5	0.3161	0.2436	1.0948	614.5	270
280	2.39751	164.0	0.3200	0.2454	1.0934	619.1		2.32396	163.9	0.3194	0.2455	1.0936	618.9	280
290	2.43191	166.4	0.3233	0.2472	1.0924	623.4		2.35682	166.4	0.3227	0.2473	1.0925	623.2	290
300	2.46609	168.9	0.3266	0.2491	1.0913	627.6		2.39006	168.9	0.3260	0.2491	1.0915	627.4	300
310	2.49938	171.4	0.3299	0.2509	1.0903	631.9		2.42307	171.4	0.3293	0.2509	1.0905	631.7	310
320	2.53357	173.9	0.3331	0.2527	1.0894	636.0		2.45640	173.9	0.3325	0.2527	1.0895	635.9	320

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 34.00 psia							Pressure = 35.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
21.2	0.01220	18.8	0.0416	0.3164	1.5159	2141.0	SAT LIQ	0.01223	19.2	0.0425	0.3169	1.5165	2129.5	22.6
21.2	1.37438	106.2	0.2234	0.2063	1.1704	482.3	SAT VAP	1.33672	106.4	0.2233	0.2070	1.1713	482.4	22.6
30	1.40786	108.0	0.2271	0.2065	1.1635	488.4		1.36444	107.9	0.2265	0.2071	1.1653	487.6	30
40	1.44550	110.1	0.2313	0.2069	1.1565	495.2		1.40095	110.0	0.2306	0.2075	1.1581	494.3	40
50	1.48236	112.2	0.2354	0.2076	1.1504	501.6		1.43699	112.1	0.2348	0.2082	1.1518	500.9	50
60	1.51860	114.2	0.2395	0.2086	1.1450	507.9		1.47254	114.2	0.2388	0.2090	1.1462	507.2	60
70	1.55448	116.3	0.2435	0.2096	1.1402	514.0		1.50761	116.3	0.2428	0.2101	1.1412	513.3	70
80	1.58983	118.4	0.2474	0.2109	1.1358	519.9		1.54202	118.4	0.2467	0.2112	1.1368	519.3	80
90	1.62496	120.5	0.2513	0.2122	1.1319	525.7		1.57629	120.5	0.2506	0.2125	1.1328	525.1	90
100	1.65975	122.7	0.2551	0.2136	1.1283	531.4		1.61005	122.6	0.2545	0.2139	1.1291	530.8	100
110	1.69405	124.8	0.2589	0.2152	1.1251	536.9		1.64366	124.8	0.2583	0.2154	1.1258	536.4	110
120	1.72831	127.0	0.2627	0.2167	1.1221	542.3		1.67701	126.9	0.2620	0.2170	1.1227	541.8	120
130	1.76211	129.2	0.2664	0.2184	1.1194	547.6		1.71028	129.1	0.2658	0.2186	1.1199	547.2	130
140	1.79598	131.3	0.2701	0.2201	1.1168	552.9		1.74307	131.3	0.2695	0.2203	1.1173	552.4	140
150	1.82949	133.6	0.2737	0.2218	1.1144	558.0		1.77557	133.5	0.2731	0.2220	1.1149	557.6	150
160	1.86289	135.8	0.2774	0.2235	1.1122	563.0		1.80832	135.7	0.2767	0.2237	1.1127	562.6	160
170	1.89645	138.0	0.2809	0.2253	1.1102	568.0		1.84026	138.0	0.2803	0.2255	1.1106	567.6	170
180	1.92938	140.3	0.2845	0.2271	1.1083	572.9		1.87266	140.3	0.2839	0.2273	1.1086	572.5	180
190	1.96194	142.6	0.2880	0.2289	1.1064	577.7		1.90476	142.5	0.2874	0.2291	1.1068	577.4	190
200	1.99521	144.9	0.2916	0.2308	1.1047	582.5		1.93686	144.8	0.2910	0.2309	1.1051	582.2	200
210	2.02758	147.2	0.2950	0.2326	1.1031	587.2		1.96850	147.2	0.2944	0.2327	1.1034	586.9	210
220	2.06016	149.5	0.2985	0.2345	1.1016	591.8		2.00040	149.5	0.2979	0.2346	1.1019	591.6	220
230	2.09293	151.9	0.3019	0.2363	1.1001	596.4		2.03211	151.8	0.3013	0.2364	1.1004	596.2	230
240	2.12540	154.2	0.3054	0.2382	1.0987	601.0		2.06356	154.2	0.3048	0.2383	1.0990	600.7	240
250	2.15796	156.6	0.3087	0.2400	1.0974	605.5		2.09512	156.6	0.3082	0.2401	1.0977	605.2	250
260	2.19010	159.0	0.3121	0.2419	1.0962	609.9		2.12630	159.0	0.3115	0.2419	1.0964	609.7	260
270	2.22272	161.5	0.3155	0.2437	1.0950	614.3		2.15796	161.4	0.3149	0.2438	1.0952	614.1	270
280	2.25428	163.9	0.3188	0.2455	1.0938	618.7		2.18962	163.9	0.3182	0.2456	1.0940	618.4	280
290	2.28676	166.4	0.3221	0.2474	1.0927	623.0		2.22074	166.4	0.3215	0.2474	1.0929	622.8	290
300	2.31857	168.9	0.3254	0.2492	1.0917	627.2		2.25175	168.8	0.3248	0.2493	1.0919	627.0	300
310	2.35073	171.4	0.3287	0.2510	1.0907	631.5		2.28311	171.3	0.3281	0.2511	1.0908	631.3	310
320	2.38265	173.9	0.3319	0.2528	1.0897	635.7		2.31428	173.9	0.3313	0.2529	1.0899	635.5	320
330	2.41488	176.4	0.3352	0.2546	1.0888	639.8		2.34522	176.4	0.3346	0.2547	1.0889	639.7	330

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 36.00 psia							Pressure = 37.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
23.9	0.01225	19.6	0.0433	0.3174	1.5172	2118.3	SAT LIQ	0.01227	20.0	0.0442	0.3179	1.5179	2107.3	25.2
23.9	1.30124	106.6	0.2232	0.2078	1.1722	482.4	SAT VAP	1.26743	106.8	0.2231	0.2085	1.1730	482.4	25.2
30	1.32328	107.9	0.2258	0.2078	1.1671	486.7		1.28436	107.8	0.2251	0.2085	1.1690	485.8	30
40	1.35906	109.9	0.2300	0.2081	1.1597	493.5		1.31944	109.9	0.2293	0.2087	1.1613	492.7	40
50	1.39431	112.0	0.2341	0.2087	1.1532	500.1		1.35391	111.9	0.2335	0.2092	1.1546	499.3	50
60	1.42898	114.1	0.2382	0.2095	1.1474	506.5		1.38793	114.0	0.2375	0.2100	1.1487	505.8	60
70	1.46327	116.2	0.2422	0.2105	1.1423	512.7		1.42126	116.1	0.2415	0.2109	1.1434	512.0	70
80	1.49701	118.3	0.2461	0.2116	1.1377	518.7		1.45412	118.3	0.2455	0.2120	1.1387	518.1	80
90	1.53022	120.4	0.2500	0.2129	1.1336	524.6		1.48677	120.4	0.2494	0.2132	1.1345	524.0	90
100	1.56323	122.6	0.2539	0.2142	1.1299	530.3		1.51906	122.5	0.2533	0.2146	1.1307	529.7	100
110	1.59617	124.7	0.2577	0.2157	1.1265	535.9		1.55087	124.7	0.2571	0.2160	1.1272	535.4	110
120	1.62866	126.9	0.2614	0.2172	1.1234	541.4		1.58278	126.8	0.2608	0.2175	1.1240	540.9	120
130	1.66085	129.1	0.2652	0.2188	1.1205	546.7		1.61394	129.0	0.2646	0.2191	1.1211	546.3	130
140	1.69291	131.3	0.2689	0.2205	1.1179	552.0		1.64555	131.2	0.2683	0.2207	1.1184	551.6	140
150	1.72473	133.5	0.2725	0.2222	1.1154	557.2		1.67645	133.4	0.2719	0.2224	1.1159	556.8	150
160	1.75623	135.7	0.2762	0.2239	1.1132	562.3		1.70736	135.7	0.2756	0.2241	1.1136	561.9	160
170	1.78763	138.0	0.2797	0.2256	1.1110	567.3		1.73792	137.9	0.2792	0.2258	1.1114	566.9	170
180	1.81917	140.2	0.2833	0.2274	1.1090	572.2		1.76866	140.2	0.2827	0.2276	1.1094	571.8	180
190	1.85048	142.5	0.2869	0.2292	1.1072	577.1		1.79921	142.5	0.2863	0.2294	1.1075	576.7	190
200	1.88147	144.8	0.2904	0.2310	1.1054	581.9		1.82949	144.8	0.2898	0.2312	1.1057	581.5	200
210	1.91241	147.1	0.2939	0.2329	1.1037	586.6		1.85977	147.1	0.2933	0.2330	1.1041	586.3	210
220	1.94363	149.5	0.2973	0.2347	1.1022	591.3		1.89000	149.4	0.2968	0.2348	1.1025	591.0	220
230	1.97433	151.8	0.3008	0.2365	1.1007	595.9		1.91975	151.8	0.3002	0.2366	1.1010	595.6	230
240	2.00521	154.2	0.3042	0.2384	1.0993	600.5		1.95008	154.2	0.3036	0.2385	1.0995	600.2	240
250	2.03583	156.6	0.3076	0.2402	1.0979	605.0		1.97981	156.6	0.3070	0.2403	1.0982	604.7	250
260	2.06654	159.0	0.3110	0.2420	1.0966	609.4		2.00965	159.0	0.3104	0.2421	1.0969	609.2	260
270	2.09688	161.4	0.3143	0.2439	1.0954	613.9		2.03915	161.4	0.3138	0.2439	1.0956	613.6	270
280	2.12766	163.9	0.3176	0.2457	1.0942	618.2		2.06911	163.8	0.3171	0.2458	1.0945	618.0	280
290	2.15796	166.3	0.3210	0.2475	1.0931	622.6		2.09864	166.3	0.3204	0.2476	1.0933	622.3	290
300	2.18818	168.8	0.3242	0.2493	1.0921	626.8		2.12811	168.8	0.3237	0.2494	1.0922	626.6	300
310	2.21828	171.3	0.3275	0.2511	1.0910	631.1		2.15796	171.3	0.3270	0.2512	1.0912	630.9	310
320	2.24871	173.8	0.3308	0.2529	1.0900	635.3		2.18723	173.8	0.3302	0.2530	1.0902	635.1	320
330	2.27894	176.4	0.3340	0.2547	1.0891	639.5		2.21680	176.4	0.3335	0.2548	1.0892	639.3	330

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 38.00 psia							Pressure = 39.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
26.5	0.01229	20.4	0.0450	0.3184	1.5186	2096.5	SAT LIQ	0.01231	20.9	0.0459	0.3189	1.5193	2086.0	27.8
26.5	1.23533	107.0	0.2230	0.2092	1.1739	482.4	SAT VAP	1.20496	107.1	0.2229	0.2099	1.1748	482.4	27.8
30	1.24750	107.7	0.2245	0.2092	1.1709	484.9		1.21256	107.6	0.2238	0.2099	1.1728	484.0	30
40	1.28189	109.8	0.2287	0.2093	1.1629	491.8		1.24626	109.7	0.2281	0.2099	1.1646	491.0	40
50	1.31562	111.9	0.2328	0.2098	1.1560	498.6		1.27926	111.8	0.2322	0.2103	1.1574	497.8	50
60	1.34880	114.0	0.2369	0.2104	1.1499	505.1		1.31182	113.9	0.2363	0.2109	1.1512	504.3	60
70	1.38141	116.1	0.2409	0.2113	1.1445	511.4		1.34372	116.0	0.2403	0.2117	1.1456	510.7	70
80	1.41383	118.2	0.2449	0.2124	1.1397	517.5		1.37533	118.1	0.2443	0.2127	1.1407	516.8	80
90	1.44550	120.3	0.2488	0.2136	1.1354	523.4		1.40647	120.3	0.2482	0.2139	1.1363	522.8	90
100	1.47710	122.5	0.2527	0.2149	1.1315	529.2		1.43740	122.4	0.2521	0.2152	1.1323	528.6	100
110	1.50830	124.6	0.2565	0.2163	1.1279	534.8		1.46778	124.6	0.2559	0.2165	1.1287	534.3	110
120	1.53941	126.8	0.2603	0.2177	1.1247	540.4		1.49813	126.7	0.2597	0.2180	1.1253	539.9	120
130	1.56986	129.0	0.2640	0.2193	1.1217	545.8		1.52812	128.9	0.2634	0.2195	1.1223	545.3	130
140	1.60051	131.2	0.2677	0.2209	1.1190	551.1		1.55788	131.1	0.2672	0.2211	1.1195	550.7	140
150	1.63079	133.4	0.2714	0.2226	1.1164	556.3		1.58755	133.4	0.2708	0.2227	1.1169	555.9	150
160	1.66085	135.6	0.2750	0.2242	1.1141	561.5		1.61708	135.6	0.2745	0.2244	1.1145	561.1	160
170	1.69090	137.9	0.2786	0.2260	1.1119	566.5		1.64636	137.8	0.2781	0.2261	1.1123	566.2	170
180	1.72058	140.2	0.2822	0.2277	1.1098	571.5		1.67560	140.1	0.2816	0.2279	1.1102	571.1	180
190	1.75039	142.4	0.2857	0.2295	1.1079	576.4		1.70445	142.4	0.2852	0.2296	1.1083	576.1	190
200	1.77999	144.7	0.2893	0.2313	1.1061	581.2		1.73310	144.7	0.2887	0.2314	1.1064	580.9	200
210	1.80963	147.1	0.2927	0.2331	1.1044	586.0		1.76211	147.0	0.2922	0.2332	1.1047	585.7	210
220	1.83891	149.4	0.2962	0.2349	1.1028	590.7		1.79083	149.4	0.2957	0.2350	1.1031	590.4	220
230	1.86846	151.8	0.2997	0.2367	1.1012	595.3		1.81951	151.7	0.2991	0.2368	1.1015	595.1	230
240	1.89753	154.1	0.3031	0.2386	1.0998	599.9		1.84775	154.1	0.3025	0.2387	1.1001	599.7	240
250	1.92678	156.5	0.3065	0.2404	1.0984	604.5		1.87652	156.5	0.3059	0.2405	1.0987	604.2	250
260	1.95580	158.9	0.3099	0.2422	1.0971	609.0		1.90476	158.9	0.3093	0.2423	1.0973	608.7	260
270	1.98491	161.4	0.3132	0.2440	1.0959	613.4		1.93311	161.4	0.3127	0.2441	1.0961	613.2	270
280	2.01369	163.8	0.3165	0.2458	1.0947	617.8		1.96117	163.8	0.3160	0.2459	1.0949	617.6	280
290	2.04290	166.3	0.3199	0.2477	1.0935	622.1		1.98926	166.3	0.3193	0.2477	1.0937	621.9	290
300	2.07168	168.8	0.3232	0.2495	1.0924	626.5		2.01776	168.8	0.3226	0.2495	1.0926	626.3	300
310	2.10040	171.3	0.3264	0.2513	1.0914	630.7		2.04583	171.3	0.3259	0.2513	1.0916	630.5	310
320	2.12902	173.8	0.3297	0.2531	1.0904	634.9		2.07383	173.8	0.3292	0.2531	1.0905	634.8	320
330	2.15796	176.3	0.3329	0.2548	1.0894	639.1		2.10172	176.3	0.3324	0.2549	1.0896	639.0	330

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 40.00 psia							Pressure = 41.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
29	0.01233	21.2	0.0467	0.3194	1.5200	2075.7	SAT LIQ	0.01236	21.6	0.0475	0.3198	1.5207	2065.5	30.2
29	1.17606	107.3	0.2228	0.2106	1.1756	482.3	SAT VAP	1.14837	107.5	0.2227	0.2113	1.1765	482.3	30.2
30	1.17925	107.5	0.2232	0.2106	1.1748	483.0		—	—	—	—	—	—	30
40	1.21242	109.6	0.2275	0.2105	1.1663	490.2		1.18008	109.5	0.2269	0.2112	1.1680	489.3	40
50	1.24471	111.7	0.2316	0.2108	1.1589	497.0		1.21197	111.7	0.2310	0.2114	1.1604	496.2	50
60	1.27665	113.8	0.2357	0.2114	1.1525	503.6		1.24316	113.8	0.2352	0.2119	1.1538	502.9	60
70	1.30787	116.0	0.2398	0.2122	1.1468	510.0		1.27389	115.9	0.2392	0.2126	1.1479	509.3	70
80	1.33887	118.1	0.2437	0.2131	1.1417	516.2		1.30412	118.0	0.2432	0.2135	1.1427	515.6	80
90	1.36930	120.2	0.2477	0.2142	1.1372	522.2		1.33404	120.2	0.2471	0.2146	1.1381	521.6	90
100	1.39958	122.4	0.2515	0.2155	1.1331	528.1		1.36351	122.3	0.2510	0.2158	1.1339	527.5	100
110	1.42939	124.5	0.2554	0.2168	1.1294	533.8		1.39276	124.5	0.2548	0.2171	1.1301	533.3	110
120	1.45900	126.7	0.2592	0.2183	1.1260	539.4		1.42167	126.7	0.2586	0.2185	1.1267	538.9	120
130	1.48832	128.9	0.2629	0.2198	1.1229	544.9		1.45033	128.8	0.2624	0.2200	1.1235	544.4	130
140	1.51745	131.1	0.2666	0.2213	1.1201	550.3		1.47885	131.1	0.2661	0.2215	1.1206	549.8	140
150	1.54655	133.3	0.2703	0.2229	1.1174	555.5		1.50739	133.3	0.2698	0.2231	1.1179	555.1	150
160	1.57505	135.6	0.2739	0.2246	1.1150	560.7		1.53539	135.5	0.2734	0.2248	1.1155	560.3	160
170	1.60359	137.8	0.2775	0.2263	1.1127	565.8		1.56348	137.8	0.2770	0.2265	1.1132	565.4	170
180	1.63212	140.1	0.2811	0.2280	1.1106	570.8		1.59109	140.0	0.2806	0.2282	1.1110	570.4	180
190	1.66058	142.4	0.2847	0.2298	1.1086	575.7		1.61891	142.3	0.2841	0.2299	1.1090	575.4	190
200	1.68890	144.7	0.2882	0.2316	1.1068	580.6		1.64636	144.6	0.2877	0.2317	1.1071	580.3	200
210	1.71674	147.0	0.2917	0.2333	1.1050	585.4		1.67392	147.0	0.2912	0.2335	1.1053	585.1	210
220	1.74520	149.3	0.2952	0.2351	1.1034	590.1		1.70126	149.3	0.2946	0.2353	1.1037	589.8	220
230	1.77305	151.7	0.2986	0.2369	1.1018	594.8		1.72861	151.7	0.2981	0.2370	1.1021	594.5	230
240	1.80050	154.1	0.3020	0.2388	1.1003	599.4		1.75593	154.1	0.3015	0.2389	1.1006	599.1	240
250	1.82849	156.5	0.3054	0.2406	1.0989	604.0		1.78317	156.5	0.3049	0.2407	1.0992	603.7	250
260	1.85598	158.9	0.3088	0.2424	1.0976	608.5		1.80995	158.9	0.3083	0.2425	1.0978	608.2	260
270	1.88359	161.3	0.3122	0.2442	1.0963	612.9		1.83688	161.3	0.3117	0.2443	1.0965	612.7	270
280	1.91131	163.8	0.3155	0.2460	1.0951	617.4		1.86393	163.8	0.3150	0.2461	1.0953	617.1	280
290	1.93911	166.2	0.3188	0.2478	1.0939	621.7		1.89072	166.2	0.3183	0.2479	1.0941	621.5	290
300	1.96657	168.7	0.3221	0.2496	1.0928	626.1		1.91755	168.7	0.3216	0.2497	1.0930	625.9	300
310	1.99362	171.2	0.3254	0.2514	1.0917	630.3		1.94439	171.2	0.3249	0.2515	1.0919	630.1	310
320	2.02102	173.8	0.3286	0.2532	1.0907	634.6		1.97122	173.7	0.3281	0.2532	1.0909	634.4	320
330	2.04834	176.3	0.3319	0.2550	1.0897	638.8		1.99760	176.3	0.3314	0.2550	1.0899	638.6	330
340	—	—	—	—	—	—		2.02429	178.8	0.3346	0.2568	1.0889	642.8	340

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 42.00 psia							Pressure = 43.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
31.4	0.01238	22.0	0.0482	0.3203	1.5214	2055.6	SAT LIQ	0.01240	22.4	0.0490	0.3208	1.5221	2045.8	32.6
31.4	1.12208	107.6	0.2226	0.2120	1.1774	482.3	SAT VAP	1.09685	107.8	0.2225	0.2127	1.1783	482.2	32.6
40	1.14943	109.5	0.2263	0.2118	1.1697	488.5		1.12007	109.4	0.2257	0.2125	1.1715	487.6	40
50	1.18064	111.6	0.2305	0.2119	1.1619	495.5		1.15075	111.5	0.2299	0.2125	1.1634	494.7	50
60	1.21124	113.7	0.2346	0.2124	1.1551	502.2		1.18078	113.6	0.2340	0.2129	1.1564	501.4	60
70	1.24131	115.8	0.2386	0.2130	1.1491	508.7		1.21036	115.8	0.2381	0.2135	1.1503	508.0	70
80	1.27113	118.0	0.2426	0.2139	1.1438	514.9		1.23946	117.9	0.2421	0.2143	1.1448	514.3	80
90	1.30039	120.1	0.2466	0.2149	1.1390	521.0		1.26823	120.1	0.2460	0.2153	1.1399	520.5	90
100	1.32926	122.3	0.2505	0.2161	1.1347	527.0		1.29668	122.2	0.2499	0.2164	1.1356	526.4	100
110	1.35777	124.4	0.2543	0.2174	1.1309	532.8		1.32468	124.4	0.2538	0.2177	1.1316	532.3	110
120	1.38639	126.6	0.2581	0.2188	1.1273	538.4		1.35245	126.6	0.2576	0.2190	1.1280	537.9	120
130	1.41443	128.8	0.2618	0.2202	1.1241	544.0		1.37988	128.8	0.2613	0.2205	1.1247	543.5	130
140	1.44238	131.0	0.2656	0.2218	1.1212	549.4		1.40726	131.0	0.2650	0.2220	1.1217	548.9	140
150	1.46994	133.2	0.2692	0.2233	1.1185	554.7		1.43431	133.2	0.2687	0.2235	1.1190	554.3	150
160	1.49745	135.5	0.2729	0.2250	1.1159	559.9		1.46156	135.4	0.2724	0.2252	1.1164	559.5	160
170	1.52509	137.7	0.2765	0.2266	1.1136	565.0		1.48810	137.7	0.2760	0.2268	1.1140	564.7	170
180	1.55207	140.0	0.2801	0.2283	1.1114	570.1		1.51469	140.0	0.2796	0.2285	1.1118	569.7	180
190	1.57928	142.3	0.2836	0.2301	1.1094	575.1		1.54131	142.3	0.2831	0.2302	1.1097	574.7	190
200	1.60617	144.6	0.2872	0.2318	1.1075	580.0		1.56789	144.6	0.2867	0.2320	1.1078	579.6	200
210	1.63292	146.9	0.2907	0.2336	1.1057	584.8		1.59388	146.9	0.2902	0.2337	1.1060	584.5	210
220	1.65975	149.3	0.2941	0.2354	1.1040	589.5		1.62022	149.3	0.2937	0.2355	1.1043	589.3	220
230	1.68663	151.7	0.2976	0.2372	1.1024	594.2		1.64636	151.6	0.2971	0.2373	1.1026	594.0	230
240	1.71292	154.0	0.3010	0.2390	1.1008	598.9		1.67224	154.0	0.3005	0.2391	1.1011	598.6	240
250	1.73943	156.4	0.3044	0.2408	1.0994	603.5		1.69808	156.4	0.3039	0.2408	1.0997	603.2	250
260	1.76616	158.8	0.3078	0.2426	1.0980	608.0		1.72414	158.8	0.3073	0.2426	1.0983	607.8	260
270	1.79244	161.3	0.3112	0.2444	1.0967	612.5		1.75009	161.3	0.3107	0.2444	1.0970	612.3	270
280	1.81851	163.7	0.3145	0.2462	1.0955	616.9		1.77557	163.7	0.3140	0.2462	1.0957	616.7	280
290	1.84502	166.2	0.3178	0.2480	1.0943	621.3		1.80148	166.2	0.3173	0.2480	1.0945	621.1	290
300	1.87126	168.7	0.3211	0.2497	1.0932	625.7		1.82715	168.7	0.3206	0.2498	1.0934	625.5	300
310	1.89717	171.2	0.3244	0.2515	1.0921	630.0		1.85254	171.2	0.3239	0.2516	1.0923	629.8	310
320	1.92345	173.7	0.3277	0.2533	1.0910	634.2		1.87829	173.7	0.3272	0.2534	1.0912	634.0	320
330	1.94970	176.3	0.3309	0.2551	1.0900	638.4		1.90331	176.2	0.3304	0.2551	1.0902	638.3	330
340	1.97550	178.8	0.3341	0.2568	1.0891	642.6		1.92901	178.8	0.3336	0.2569	1.0892	642.5	340

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 44.00 psia							Pressure = 45 .00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
33.7	0.01242	22.8	0.0497	0.3212	1.5228	2036.2	SAT LIQ	0.01244	23.1	0.0505	0.3217	1.5235	2026.8	34.9
33.7	1.07285	108.0	0.2224	0.2133	1.1791	482.2	SAT VAP	1.04987	108.1	0.2223	0.2140	1.1800	482.1	34.9
40	1.09206	109.3	0.2251	0.2131	1.1733	486.8		1.06530	109.2	0.2246	0.2138	1.1751	485.9	40
50	1.12221	111.4	0.2293	0.2131	1.1650	493.9		1.09493	111.4	0.2288	0.2137	1.1666	493.1	50
60	1.15181	113.6	0.2335	0.2134	1.1578	500.7		1.12397	113.5	0.2329	0.2139	1.1591	500.0	60
70	1.18078	115.7	0.2376	0.2139	1.1515	507.3		1.15260	115.6	0.2370	0.2144	1.1527	506.6	70
80	1.20934	117.8	0.2416	0.2147	1.1459	513.7		1.18064	117.8	0.2410	0.2151	1.1469	513.0	80
90	1.23762	120.0	0.2455	0.2157	1.1409	519.9		1.20831	119.9	0.2450	0.2160	1.1418	519.3	90
100	1.26534	122.2	0.2494	0.2168	1.1364	525.9		1.23564	122.1	0.2489	0.2171	1.1372	525.3	100
110	1.29299	124.3	0.2533	0.2180	1.1324	531.7		1.26263	124.3	0.2528	0.2183	1.1331	531.2	110
120	1.32013	126.5	0.2571	0.2193	1.1287	537.4		1.28916	126.5	0.2566	0.2196	1.1294	537.0	120
130	1.34698	128.7	0.2608	0.2207	1.1254	543.0		1.31562	128.7	0.2603	0.2209	1.1260	542.6	130
140	1.37382	130.9	0.2645	0.2222	1.1223	548.5		1.34192	130.9	0.2641	0.2224	1.1229	548.1	140
150	1.40036	133.2	0.2682	0.2237	1.1195	553.9		1.36799	133.1	0.2677	0.2239	1.1200	553.5	150
160	1.42694	135.4	0.2719	0.2253	1.1169	559.1		1.39392	135.4	0.2714	0.2255	1.1174	558.7	160
170	1.45307	137.7	0.2755	0.2270	1.1145	564.3		1.41965	137.6	0.2750	0.2271	1.1149	563.9	170
180	1.47929	139.9	0.2791	0.2287	1.1122	569.4		1.44509	139.9	0.2786	0.2288	1.1126	569.0	180
190	1.50534	142.2	0.2827	0.2304	1.1101	574.4		1.47059	142.2	0.2822	0.2305	1.1105	574.1	190
200	1.53092	144.6	0.2862	0.2321	1.1082	579.3		1.49589	144.5	0.2857	0.2322	1.1085	579.0	200
210	1.55666	146.9	0.2897	0.2338	1.1063	584.2		1.52138	146.9	0.2892	0.2340	1.1066	583.9	210
220	1.58253	149.2	0.2932	0.2356	1.1046	589.0		1.54607	149.2	0.2927	0.2357	1.1049	588.7	220
230	1.60798	151.6	0.2966	0.2374	1.1029	593.7		1.57134	151.6	0.2962	0.2375	1.1032	593.4	230
240	1.63319	154.0	0.3001	0.2392	1.1014	598.4		1.59617	153.9	0.2996	0.2393	1.1016	598.1	240
250	1.65865	156.4	0.3035	0.2409	1.0999	603.0		1.62101	156.4	0.3030	0.2410	1.1002	602.7	250
260	1.68407	158.8	0.3068	0.2427	1.0985	607.5		1.64582	158.8	0.3064	0.2428	1.0987	607.3	260
270	1.70940	161.2	0.3102	0.2445	1.0972	612.0		1.67056	161.2	0.3097	0.2446	1.0974	611.8	270
280	1.73430	163.7	0.3135	0.2463	1.0959	616.5		1.69549	163.7	0.3131	0.2464	1.0961	616.3	280
290	1.75963	166.2	0.3169	0.2481	1.0947	620.9		1.71999	166.1	0.3164	0.2482	1.0949	620.7	290
300	1.78444	168.6	0.3202	0.2499	1.0935	625.3		1.74429	168.6	0.3197	0.2499	1.0937	625.1	300
310	1.80995	171.2	0.3234	0.2517	1.0924	629.6		1.76897	171.1	0.3230	0.2517	1.0926	629.4	310
320	1.83453	173.7	0.3267	0.2534	1.0914	633.9		1.79308	173.7	0.3262	0.2535	1.0916	633.7	320
330	1.85977	176.2	0.3299	0.2552	1.0904	638.1		1.81785	176.2	0.3295	0.2552	1.0905	637.9	330
340	1.88466	178.8	0.3332	0.2569	1.0894	642.3		1.84196	178.8	0.3327	0.2570	1.0895	642.1	340

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 46.00 psia							Pressure = 47.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
36	0.01246	23.5	0.0512	0.3222	1.5242	2017.5	SAT LIQ	0.01248	23.8	0.0519	0.3226	1.5249	2008.4	37.1
36	1.02775	108.3	0.2223	0.2146	1.1809	482.0	SAT VAP	1.00664	108.4	0.2222	0.2153	1.1818	481.9	37.1
40	1.03972	109.1	0.2240	0.2144	1.1770	485.0		1.01513	109.1	0.2235	0.2151	1.1788	484.2	40
50	1.06895	111.3	0.2282	0.2142	1.1682	492.3		1.04395	111.2	0.2277	0.2148	1.1698	491.5	50
60	1.09745	113.4	0.2324	0.2144	1.1605	499.2		1.07204	113.4	0.2319	0.2149	1.1619	498.5	60
70	1.12549	115.6	0.2365	0.2148	1.1539	505.9		1.09963	115.5	0.2360	0.2153	1.1551	505.2	70
80	1.15314	117.7	0.2405	0.2155	1.1480	512.4		1.12676	117.7	0.2400	0.2159	1.1491	511.8	80
90	1.18022	119.9	0.2445	0.2164	1.1428	518.7		1.15340	119.8	0.2440	0.2167	1.1437	518.1	90
100	1.20715	122.1	0.2484	0.2174	1.1381	524.8		1.17980	122.0	0.2479	0.2177	1.1390	524.2	100
110	1.23350	124.2	0.2523	0.2186	1.1339	530.7		1.20584	124.2	0.2518	0.2189	1.1347	530.2	110
120	1.25976	126.4	0.2561	0.2198	1.1301	536.5		1.23153	126.4	0.2556	0.2201	1.1308	536.0	120
130	1.28568	128.6	0.2598	0.2212	1.1266	542.1		1.25723	128.6	0.2594	0.2214	1.1272	541.6	130
140	1.31148	130.8	0.2636	0.2226	1.1234	547.6		1.28222	130.8	0.2631	0.2229	1.1240	547.2	140
150	1.33726	133.1	0.2673	0.2241	1.1205	553.0		1.30736	133.0	0.2668	0.2243	1.1211	552.6	150
160	1.36240	135.3	0.2709	0.2257	1.1178	558.3		1.33227	135.3	0.2705	0.2259	1.1183	557.9	160
170	1.38773	137.6	0.2746	0.2273	1.1153	563.6		1.35704	137.6	0.2741	0.2275	1.1158	563.2	170
180	1.41283	139.9	0.2782	0.2290	1.1130	568.7		1.38160	139.8	0.2777	0.2291	1.1134	568.3	180
190	1.43761	142.2	0.2817	0.2306	1.1109	573.7		1.40607	142.1	0.2813	0.2308	1.1112	573.4	190
200	1.46263	144.5	0.2853	0.2324	1.1088	578.7		1.43041	144.5	0.2848	0.2325	1.1092	578.4	200
210	1.48699	146.8	0.2888	0.2341	1.1070	583.6		1.45455	146.8	0.2883	0.2342	1.1073	583.3	210
220	1.51172	149.2	0.2922	0.2358	1.1052	588.4		1.47863	149.1	0.2918	0.2359	1.1055	588.1	220
230	1.53633	151.5	0.2957	0.2376	1.1035	593.1		1.50263	151.5	0.2953	0.2377	1.1038	592.9	230
240	1.56055	153.9	0.2991	0.2394	1.1019	597.8		1.52648	153.9	0.2987	0.2395	1.1022	597.6	240
250	1.58504	156.3	0.3025	0.2411	1.1004	602.5		1.55063	156.3	0.3021	0.2412	1.1007	602.2	250
260	1.60927	158.7	0.3059	0.2429	1.0990	607.0		1.57431	158.7	0.3055	0.2430	1.0992	606.8	260
270	1.63345	161.2	0.3093	0.2447	1.0976	611.6		1.59795	161.2	0.3089	0.2448	1.0978	611.3	270
280	1.65755	163.6	0.3126	0.2465	1.0963	616.0		1.62153	163.6	0.3122	0.2465	1.0965	615.8	280
290	1.68180	166.1	0.3160	0.2482	1.0951	620.5		1.64528	166.1	0.3155	0.2483	1.0953	620.3	290
300	1.70561	168.6	0.3193	0.2500	1.0939	624.9		1.66889	168.6	0.3188	0.2501	1.0941	624.7	300
310	1.72980	171.1	0.3225	0.2518	1.0928	629.2		1.69233	171.1	0.3221	0.2519	1.0930	629.0	310
320	1.75377	173.6	0.3258	0.2536	1.0917	633.5		1.71556	173.6	0.3254	0.2536	1.0919	633.3	320
330	1.77778	176.2	0.3290	0.2553	1.0907	637.7		1.73913	176.2	0.3286	0.2554	1.0909	637.6	330
340	1.80148	178.7	0.3323	0.2571	1.0897	642.0		1.76243	178.7	0.3318	0.2571	1.0899	641.8	340

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 48.00 psia							Pressure = 49 .00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
38.1	0.01249	24.2	0.0526	0.3231	1.5257	1999.4	SAT LIQ	0.01251	24.5	0.0533	0.3235	1.5264	1990.5	39.2
38.1	0.98629	108.6	0.2221	0.2159	1.1827	481.9	SAT VAP	0.96684	108.7	0.2220	0.2166	1.1835	481.8	39.2
40	0.99167	109.0	0.2229	0.2158	1.1808	483.3		0.96909	108.9	0.2224	0.2165	1.1827	482.4	40
50	1.01999	111.1	0.2272	0.2154	1.1714	490.7		0.99701	111.1	0.2267	0.2160	1.1731	489.8	50
60	1.04767	113.3	0.2314	0.2154	1.1634	497.7		1.02428	113.2	0.2309	0.2160	1.1648	497.0	60
70	1.07481	115.4	0.2355	0.2158	1.1563	504.5		1.05097	115.4	0.2350	0.2162	1.1576	503.8	70
80	1.10144	117.6	0.2395	0.2163	1.1502	511.1		1.07724	117.5	0.2390	0.2167	1.1513	510.5	80
90	1.12765	119.8	0.2435	0.2171	1.1447	517.5		1.10302	119.7	0.2430	0.2175	1.1457	516.9	90
100	1.15354	121.9	0.2474	0.2181	1.1398	523.6		1.12854	121.9	0.2470	0.2184	1.1407	523.1	100
110	1.17911	124.1	0.2513	0.2191	1.1354	529.6		1.15367	124.1	0.2508	0.2194	1.1362	529.1	110
120	1.20453	126.3	0.2551	0.2204	1.1315	535.5		1.17841	126.3	0.2547	0.2206	1.1322	535.0	120
130	1.22941	128.5	0.2589	0.2217	1.1279	541.2		1.20294	128.5	0.2584	0.2219	1.1285	540.7	130
140	1.25439	130.8	0.2626	0.2231	1.1246	546.7		1.22745	130.7	0.2622	0.2233	1.1252	546.3	140
150	1.27877	133.0	0.2663	0.2245	1.1216	552.2		1.25141	133.0	0.2659	0.2248	1.1221	551.8	150
160	1.30327	135.3	0.2700	0.2261	1.1188	557.6		1.27567	135.2	0.2696	0.2263	1.1193	557.2	160
170	1.32749	137.5	0.2736	0.2277	1.1162	562.8		1.29938	137.5	0.2732	0.2278	1.1167	562.4	170
180	1.35172	139.8	0.2772	0.2293	1.1138	568.0		1.32310	139.8	0.2768	0.2294	1.1143	567.6	180
190	1.37571	142.1	0.2808	0.2309	1.1116	573.0		1.34662	142.1	0.2804	0.2311	1.1120	572.7	190
200	1.39958	144.4	0.2844	0.2326	1.1096	578.0		1.37005	144.4	0.2839	0.2328	1.1099	577.7	200
210	1.42328	146.8	0.2879	0.2343	1.1076	583.0		1.39334	146.7	0.2874	0.2345	1.1079	582.6	210
220	1.44697	149.1	0.2914	0.2361	1.1058	587.8		1.41643	149.1	0.2909	0.2362	1.1061	587.5	220
230	1.47037	151.5	0.2948	0.2378	1.1041	592.6		1.43968	151.5	0.2944	0.2379	1.1044	592.3	230
240	1.49410	153.9	0.2983	0.2396	1.1024	597.3		1.46263	153.8	0.2978	0.2397	1.1027	597.0	240
250	1.51722	156.3	0.3017	0.2413	1.1009	602.0		1.48566	156.2	0.3012	0.2414	1.1012	601.7	250
260	1.54059	158.7	0.3051	0.2431	1.0995	606.6		1.50852	158.7	0.3046	0.2432	1.0997	606.3	260
270	1.56372	161.1	0.3084	0.2449	1.0981	611.1		1.53139	161.1	0.3080	0.2449	1.0983	610.9	270
280	1.58705	163.6	0.3118	0.2466	1.0968	615.6		1.55400	163.6	0.3113	0.2467	1.0970	615.4	280
290	1.61005	166.1	0.3151	0.2484	1.0955	620.1		1.57679	166.0	0.3147	0.2485	1.0957	619.8	290
300	1.63319	168.6	0.3184	0.2502	1.0943	624.5		1.59949	168.5	0.3180	0.2502	1.0945	624.3	300
310	1.65645	171.1	0.3217	0.2519	1.0932	628.8		1.62206	171.0	0.3213	0.2520	1.0933	628.6	310
320	1.67926	173.6	0.3249	0.2537	1.0921	633.1		1.64447	173.6	0.3245	0.2537	1.0922	632.9	320
330	1.70242	176.1	0.3282	0.2554	1.0910	637.4		1.66722	176.1	0.3278	0.2555	1.0912	637.2	330
340	1.72533	178.7	0.3314	0.2572	1.0900	641.6		1.68947	178.7	0.3310	0.2572	1.0902	641.5	340

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 50.00 psia							Pressure = 55.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
40.2	0.01253	24.9	0.0539	0.3239	1.5271	1981.8	SAT LIQ	0.01262	26.5	0.0571	0.3261	1.5307	1940.2	45.2
40.2	0.94805	108.9	0.2220	0.2172	1.1844	481.7	SAT VAP	0.86423	109.5	0.2217	0.2202	1.1889	481.1	45.2
50	0.97494	111.0	0.2262	0.2166	1.1748	489.0		0.87650	110.6	0.2237	0.2198	1.1836	484.9	50
60	1.00180	113.1	0.2304	0.2165	1.1663	496.2		0.90163	112.8	0.2280	0.2193	1.1739	492.4	60
70	1.02807	115.3	0.2345	0.2167	1.1589	503.1		0.92610	115.0	0.2322	0.2191	1.1655	499.6	70
80	1.05396	117.5	0.2386	0.2172	1.1524	509.8		0.95012	117.2	0.2363	0.2193	1.1582	506.5	80
90	1.07933	119.7	0.2426	0.2178	1.1467	516.3		0.97371	119.4	0.2403	0.2198	1.1518	513.2	90
100	1.10436	121.8	0.2465	0.2187	1.1416	522.5		0.99691	121.6	0.2443	0.2204	1.1461	519.6	100
110	1.12905	124.0	0.2504	0.2197	1.1370	528.6		1.01978	123.8	0.2482	0.2213	1.1411	525.9	110
120	1.15354	126.2	0.2542	0.2209	1.1329	534.5		1.04232	126.0	0.2520	0.2223	1.1365	532.0	120
130	1.17772	128.5	0.2580	0.2222	1.1292	540.2		1.06474	128.2	0.2559	0.2234	1.1325	537.9	130
140	1.20178	130.7	0.2617	0.2235	1.1258	545.9		1.08660	130.5	0.2596	0.2247	1.1288	543.6	140
150	1.22534	132.9	0.2655	0.2250	1.1226	551.4		1.10852	132.7	0.2634	0.2260	1.1254	549.3	150
160	1.24891	135.2	0.2691	0.2265	1.1198	556.8		1.13033	135.0	0.2670	0.2274	1.1223	554.8	160
170	1.27226	137.5	0.2728	0.2280	1.1171	562.1		1.15181	137.3	0.2707	0.2289	1.1194	560.2	170
180	1.29550	139.7	0.2764	0.2296	1.1147	567.3		1.17330	139.6	0.2743	0.2304	1.1168	565.5	180
190	1.31874	142.0	0.2799	0.2312	1.1124	572.4		1.19432	141.9	0.2779	0.2320	1.1143	570.7	190
200	1.34174	144.4	0.2835	0.2329	1.1103	577.4		1.21551	144.2	0.2815	0.2336	1.1121	575.8	200
210	1.36444	146.7	0.2870	0.2346	1.1083	582.3		1.23655	146.5	0.2850	0.2352	1.1100	580.8	210
220	1.38735	149.1	0.2905	0.2363	1.1064	587.2		1.25723	148.9	0.2885	0.2369	1.1080	585.8	220
230	1.41004	151.4	0.2940	0.2380	1.1046	592.0		1.27812	151.3	0.2920	0.2386	1.1061	590.6	230
240	1.43266	153.8	0.2974	0.2398	1.1030	596.8		1.29887	153.7	0.2954	0.2403	1.1044	595.5	240
250	1.45518	156.2	0.3008	0.2415	1.1014	601.5		1.31944	156.1	0.2988	0.2420	1.1027	600.2	250
260	1.47754	158.6	0.3042	0.2433	1.0999	606.1		1.33976	158.5	0.3022	0.2437	1.1011	604.9	260
270	1.50015	161.1	0.3076	0.2450	1.0985	610.7		1.36054	161.0	0.3056	0.2454	1.0997	609.5	270
280	1.52230	163.5	0.3109	0.2468	1.0972	615.2		1.38083	163.4	0.3089	0.2472	1.0983	614.1	280
290	1.54440	166.0	0.3142	0.2485	1.0959	619.6		1.40115	165.9	0.3123	0.2489	1.0969	618.6	290
300	1.56691	168.5	0.3176	0.2503	1.0947	624.1		1.42126	168.4	0.3156	0.2507	1.0956	623.1	300
310	1.58907	171.0	0.3208	0.2521	1.0935	628.4		1.44175	170.9	0.3189	0.2524	1.0944	627.5	310
320	1.61108	173.6	0.3241	0.2538	1.0924	632.8		1.46177	173.5	0.3221	0.2541	1.0933	631.8	320
330	1.63292	176.1	0.3273	0.2555	1.0913	637.0		1.48192	176.0	0.3254	0.2558	1.0922	636.2	330
340	1.65508	178.7	0.3306	0.2573	1.0903	641.3		1.50218	178.6	0.3286	0.2576	1.0911	640.5	340
350	1.67701	181.2	0.3338	0.2590	1.0893	645.5		1.52230	181.2	0.3318	0.2593	1.0901	644.7	350

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 60.00 psia							Pressure = 65.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
49.8	0.01271	28.0	0.0601	0.3282	1.5343	1901.3	SAT LIQ	0.01280	29.4	0.0629	0.3302	1.5380	1864.8	54.2
49.8	0.79390	110.2	0.2214	0.2232	1.1934	480.5	SAT VAP	0.73400	110.7	0.2211	0.2261	1.1979	479.7	54.2
50	0.79428	110.2	0.2215	0.2232	1.1932	480.6		—	—	—	—	—	—	50
60	0.81793	112.4	0.2258	0.2222	1.1820	488.5		0.74699	112.1	0.2237	0.2253	1.1908	484.5	60
70	0.84104	114.6	0.2300	0.2217	1.1725	496.0		0.76888	114.3	0.2280	0.2243	1.1800	492.3	70
80	0.86356	116.9	0.2342	0.2215	1.1643	503.2		0.79020	116.5	0.2321	0.2239	1.1708	499.8	80
90	0.88566	119.1	0.2382	0.2217	1.1572	510.1		0.81103	118.8	0.2363	0.2238	1.1628	506.9	90
100	0.90728	121.3	0.2422	0.2222	1.1509	516.7		0.83139	121.0	0.2403	0.2240	1.1558	513.8	100
110	0.92868	123.5	0.2462	0.2229	1.1453	523.2		0.85143	123.3	0.2443	0.2245	1.1497	520.4	110
120	0.94967	125.8	0.2500	0.2237	1.1403	529.4		0.87116	125.5	0.2482	0.2252	1.1443	526.8	120
130	0.97040	128.0	0.2539	0.2247	1.1359	535.5		0.89071	127.8	0.2520	0.2260	1.1394	533.1	130
140	0.99098	130.3	0.2577	0.2258	1.1318	541.4		0.90975	130.0	0.2558	0.2270	1.1350	539.1	140
150	1.01133	132.5	0.2614	0.2271	1.1282	547.1		0.92894	132.3	0.2596	0.2282	1.1311	545.0	150
160	1.03135	134.8	0.2651	0.2284	1.1248	552.8		0.94751	134.6	0.2633	0.2294	1.1275	550.7	160
170	1.05130	137.1	0.2688	0.2298	1.1218	558.3		0.96628	136.9	0.2670	0.2307	1.1242	556.4	170
180	1.07101	139.4	0.2724	0.2312	1.1189	563.7		0.98464	139.2	0.2707	0.2321	1.1212	561.9	180
190	1.09075	141.7	0.2760	0.2327	1.1163	569.0		1.00291	141.5	0.2743	0.2335	1.1184	567.3	190
200	1.11012	144.0	0.2796	0.2343	1.1139	574.2		1.02114	143.9	0.2778	0.2350	1.1158	572.5	200
210	1.12943	146.4	0.2831	0.2359	1.1117	579.3		1.03918	146.2	0.2814	0.2365	1.1134	577.7	210
220	1.14903	148.8	0.2866	0.2375	1.1096	584.3		1.05719	148.6	0.2849	0.2381	1.1112	582.8	220
230	1.16795	151.1	0.2901	0.2391	1.1076	589.2		1.07492	151.0	0.2884	0.2397	1.1091	587.8	230
240	1.18723	153.5	0.2936	0.2408	1.1057	594.1		1.09266	153.4	0.2919	0.2413	1.1072	592.8	240
250	1.20627	156.0	0.2970	0.2425	1.1040	598.9		1.11037	155.8	0.2953	0.2430	1.1053	597.7	250
260	1.22519	158.4	0.3004	0.2442	1.1024	603.7		1.12816	158.3	0.2987	0.2446	1.1036	602.5	260
270	1.24409	160.8	0.3038	0.2459	1.1008	608.4		1.14561	160.7	0.3021	0.2463	1.1020	607.2	270
280	1.26295	163.3	0.3071	0.2476	1.0993	613.0		1.16306	163.2	0.3055	0.2480	1.1004	611.9	280
290	1.28172	165.8	0.3105	0.2493	1.0979	617.5		1.18036	165.7	0.3088	0.2497	1.0990	616.5	290
300	1.30039	168.3	0.3138	0.2510	1.0966	622.0		1.19804	168.2	0.3121	0.2514	1.0976	621.0	300
310	1.31891	170.8	0.3171	0.2527	1.0953	626.5		1.21521	170.7	0.3154	0.2531	1.0963	625.5	310
320	1.33761	173.4	0.3204	0.2544	1.0941	630.9		1.23259	173.2	0.3187	0.2548	1.0950	630.0	320
330	1.35630	175.9	0.3236	0.2561	1.0930	635.3		1.24969	175.8	0.3220	0.2564	1.0938	634.4	330
340	1.37457	178.5	0.3268	0.2578	1.0919	639.6		1.26678	178.4	0.3252	0.2581	1.0927	638.8	340
350	1.39334	181.1	0.3301	0.2595	1.0908	643.9		1.28403	181.0	0.3284	0.2598	1.0916	643.1	350
360	—	—	—	—	—	—		1.30124	183.6	0.3316	0.2615	1.0905	647.4	360

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 70.00 psia							Pressure = 75.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
58.3	0.01288	30.8	0.0655	0.3321	1.5417	1830.2	SAT LIQ	0.01296	32.1	0.0680	0.3341	1.5454	1797.5	62.2
58.3	0.68236	111.3	0.2209	0.2288	1.2026	478.9	SAT VAP	0.63739	111.8	0.2207	0.2316	1.2072	478.0	62.2
60	0.68601	111.7	0.2217	0.2285	1.2002	480.3		—	—	—	—	—	—	60
70	0.70691	114.0	0.2260	0.2272	1.1880	488.5		0.65304	113.6	0.2241	0.2302	1.1966	484.6	70
80	0.72717	116.2	0.2302	0.2264	1.1777	496.3		0.67245	115.9	0.2284	0.2289	1.1850	492.7	80
90	0.74694	118.5	0.2344	0.2260	1.1688	503.7		0.69132	118.2	0.2326	0.2282	1.1751	500.4	90
100	0.76628	120.7	0.2385	0.2259	1.1611	510.8		0.70972	120.5	0.2367	0.2279	1.1666	507.7	100
110	0.78524	123.0	0.2425	0.2262	1.1543	517.6		0.72775	122.7	0.2408	0.2280	1.1592	514.8	110
120	0.80386	125.3	0.2464	0.2267	1.1484	524.2		0.74543	125.0	0.2448	0.2283	1.1526	521.6	120
130	0.82217	127.5	0.2503	0.2274	1.1431	530.6		0.76283	127.3	0.2487	0.2288	1.1469	528.1	130
140	0.84034	129.8	0.2541	0.2283	1.1383	536.8		0.77997	129.6	0.2525	0.2295	1.1417	534.5	140
150	0.85807	132.1	0.2579	0.2293	1.1341	542.8		0.79675	131.9	0.2563	0.2304	1.1371	540.6	150
160	0.87573	134.4	0.2617	0.2304	1.1302	548.7		0.81347	134.2	0.2601	0.2314	1.1330	546.6	160
170	0.89326	136.7	0.2654	0.2316	1.1266	554.4		0.83008	136.5	0.2638	0.2326	1.1292	552.5	170
180	0.91058	139.0	0.2690	0.2329	1.1234	560.0		0.84631	138.9	0.2675	0.2338	1.1257	558.2	180
190	0.92773	141.4	0.2726	0.2343	1.1205	565.5		0.86259	141.2	0.2711	0.2351	1.1226	563.8	190
200	0.94473	143.7	0.2762	0.2357	1.1177	570.9		0.87850	143.6	0.2747	0.2364	1.1197	569.2	200
210	0.96172	146.1	0.2798	0.2372	1.1152	576.2		0.89453	145.9	0.2783	0.2379	1.1170	574.6	210
220	0.97847	148.5	0.2833	0.2387	1.1128	581.4		0.91033	148.3	0.2818	0.2393	1.1145	579.9	220
230	0.99512	150.9	0.2868	0.2403	1.1106	586.4		0.92618	150.7	0.2853	0.2408	1.1122	585.0	230
240	1.01184	153.3	0.2903	0.2419	1.1086	591.5		0.94171	153.1	0.2888	0.2424	1.1100	590.1	240
250	1.02828	155.7	0.2937	0.2435	1.1067	596.4		0.95730	155.6	0.2922	0.2440	1.1080	595.1	250
260	1.04482	158.1	0.2971	0.2451	1.1049	601.2		0.97267	158.0	0.2957	0.2456	1.1061	600.0	260
270	1.06135	160.6	0.3005	0.2467	1.1032	606.0		0.98814	160.5	0.2991	0.2472	1.1043	604.9	270
280	1.07747	163.1	0.3039	0.2484	1.1015	610.8		1.00341	163.0	0.3024	0.2488	1.1027	609.6	280
290	1.09385	165.6	0.3072	0.2501	1.1000	615.4		1.01864	165.5	0.3058	0.2504	1.1011	614.4	290
300	1.11012	168.1	0.3106	0.2517	1.0986	620.0		1.03402	168.0	0.3091	0.2521	1.0996	619.0	300
310	1.12625	170.6	0.3139	0.2534	1.0972	624.6		1.04910	170.5	0.3124	0.2537	1.0982	623.6	310
320	1.14233	173.1	0.3172	0.2551	1.0959	629.1		1.06417	173.0	0.3157	0.2554	1.0968	628.2	320
330	1.15835	175.7	0.3204	0.2567	1.0947	633.5		1.07921	175.6	0.3190	0.2571	1.0955	632.6	330
340	1.17426	178.3	0.3237	0.2584	1.0935	637.9		1.09433	178.2	0.3222	0.2587	1.0943	637.1	340
350	1.19033	180.9	0.3269	0.2601	1.0923	642.3		1.10926	180.8	0.3254	0.2604	1.0931	641.5	350
360	1.20642	183.5	0.3301	0.2618	1.0913	646.6		1.12410	183.4	0.3287	0.2620	1.0920	645.8	360
370	—	—	—	—	—	—		1.13908	186.0	0.3318	0.2637	1.0909	650.1	370

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 80.00 psia							Pressure = 85.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
65.9	0.01304	33.3	0.0703	0.3359	1.5492	1766.4	SAT LIQ	0.01311	34.5	0.0725	0.3378	1.5530	1736.6	69.4
65.9	0.59787	112.3	0.2205	0.2342	1.2120	477.0	SAT VAP	0.56284	112.7	0.2204	0.2369	1.2168	476.0	69.4
70	0.60580	113.2	0.2224	0.2333	1.2058	480.7		0.56395	112.9	0.2206	0.2367	1.2158	476.6	70
80	0.62445	115.6	0.2267	0.2317	1.1928	489.1		0.58200	115.2	0.2250	0.2345	1.2011	485.4	80
90	0.64255	117.9	0.2309	0.2306	1.1818	497.1		0.59945	117.6	0.2293	0.2331	1.1888	493.6	90
100	0.66020	120.2	0.2351	0.2300	1.1723	504.7		0.61641	119.9	0.2335	0.2322	1.1784	501.5	100
110	0.67741	122.5	0.2392	0.2298	1.1642	511.9		0.63295	122.2	0.2376	0.2317	1.1695	509.0	110
120	0.69430	124.8	0.2432	0.2299	1.1571	518.9		0.64910	124.5	0.2417	0.2316	1.1617	516.2	120
130	0.71083	127.1	0.2471	0.2303	1.1508	525.6		0.66494	126.8	0.2456	0.2318	1.1549	523.1	130
140	0.72711	129.4	0.2510	0.2308	1.1453	532.1		0.68055	129.1	0.2495	0.2322	1.1489	529.8	140
150	0.74322	131.7	0.2548	0.2316	1.1403	538.4		0.69585	131.5	0.2534	0.2328	1.1436	536.2	150
160	0.75896	134.0	0.2586	0.2325	1.1358	544.6		0.71093	133.8	0.2572	0.2336	1.1388	542.5	160
170	0.77465	136.3	0.2623	0.2335	1.1318	550.5		0.72574	136.1	0.2609	0.2345	1.1345	548.6	170
180	0.79020	138.7	0.2660	0.2347	1.1281	556.4		0.74052	138.5	0.2646	0.2356	1.1306	554.5	180
190	0.80548	141.0	0.2696	0.2359	1.1248	562.0		0.75506	140.9	0.2683	0.2367	1.1270	560.3	190
200	0.82068	143.4	0.2733	0.2372	1.1217	567.6		0.76953	143.2	0.2719	0.2380	1.1237	565.9	200
210	0.83577	145.8	0.2768	0.2386	1.1188	573.0		0.78388	145.6	0.2755	0.2393	1.1207	571.5	210
220	0.85063	148.2	0.2804	0.2400	1.1162	578.4		0.79802	148.0	0.2790	0.2406	1.1180	576.9	220
230	0.86558	150.6	0.2839	0.2414	1.1138	583.6		0.81208	150.4	0.2826	0.2420	1.1154	582.2	230
240	0.88020	153.0	0.2874	0.2429	1.1115	588.8		0.82617	152.9	0.2861	0.2435	1.1130	587.4	240
250	0.89501	155.4	0.2908	0.2445	1.1094	593.8		0.84005	155.3	0.2895	0.2450	1.1108	592.5	250
260	0.90950	157.9	0.2943	0.2460	1.1074	598.8		0.85383	157.8	0.2930	0.2465	1.1087	597.6	260
270	0.92404	160.4	0.2977	0.2476	1.1056	603.7		0.86760	160.2	0.2964	0.2481	1.1068	602.5	270
280	0.93853	162.8	0.3011	0.2492	1.1038	608.5		0.88137	162.7	0.2998	0.2496	1.1050	607.4	280
290	0.95302	165.3	0.3044	0.2508	1.1021	613.3		0.89493	165.2	0.3031	0.2512	1.1032	612.2	290
300	0.96721	167.9	0.3078	0.2525	1.1006	618.0		0.90851	167.7	0.3065	0.2528	1.1016	617.0	300
310	0.98155	170.4	0.3111	0.2541	1.0991	622.6		0.92200	170.3	0.3098	0.2544	1.1001	621.7	310
320	0.99582	172.9	0.3144	0.2557	1.0977	627.2		0.93545	172.8	0.3131	0.2561	1.0986	626.3	320
330	1.01010	175.5	0.3176	0.2574	1.0964	631.8		0.94886	175.4	0.3164	0.2577	1.0972	630.9	330
340	1.02417	178.1	0.3209	0.2590	1.0951	636.2		0.96219	178.0	0.3196	0.2593	1.0959	635.4	340
350	1.03821	180.7	0.3241	0.2606	1.0939	640.7		0.97570	180.6	0.3228	0.2609	1.0947	639.9	350
360	1.05230	183.3	0.3273	0.2623	1.0927	645.0		0.98892	183.2	0.3260	0.2625	1.0935	644.3	360
370	1.06644	185.9	0.3305	0.2639	1.0916	649.4		1.00220	185.8	0.3292	0.2642	1.0923	648.6	370

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 90.00 psia							Pressure = 95.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
72.8	0.01319	35.7	0.0747	0.3396	1.5568	1708.1	SAT LIQ	0.01326	36.8	0.0767	0.3415	1.5607	1680.6	76
72.8	0.53155	113.1	0.2202	0.2395	1.2217	475.0	SAT VAP	0.50345	113.5	0.2200	0.2420	1.2266	473.9	76
80	0.54416	114.9	0.2234	0.2376	1.2100	481.6		0.51020	114.5	0.2218	0.2408	1.2196	477.6	80
90	0.56107	117.2	0.2278	0.2357	1.1964	490.2		0.52662	116.9	0.2262	0.2384	1.2044	486.6	90
100	0.57743	119.6	0.2320	0.2344	1.1849	498.3		0.54248	119.3	0.2305	0.2368	1.1917	495.0	100
110	0.59333	121.9	0.2361	0.2337	1.1751	506.0		0.55785	121.6	0.2347	0.2357	1.1809	503.0	110
120	0.60887	124.3	0.2402	0.2333	1.1666	513.4		0.57284	124.0	0.2388	0.2351	1.1717	510.6	120
130	0.62406	126.6	0.2442	0.2333	1.1592	520.5		0.58751	126.3	0.2428	0.2349	1.1637	517.9	130
140	0.63906	128.9	0.2481	0.2336	1.1527	527.4		0.60183	128.7	0.2468	0.2350	1.1567	524.9	140
150	0.65368	131.3	0.2520	0.2341	1.1470	534.0		0.61588	131.0	0.2507	0.2353	1.1505	531.7	150
160	0.66814	133.6	0.2558	0.2347	1.1418	540.4		0.62980	133.4	0.2545	0.2359	1.1450	538.2	160
170	0.68236	136.0	0.2596	0.2355	1.1372	546.6		0.64346	135.8	0.2583	0.2366	1.1401	544.6	170
180	0.69643	138.3	0.2633	0.2365	1.1331	552.6		0.65690	138.1	0.2620	0.2374	1.1356	550.7	180
190	0.71023	140.7	0.2670	0.2376	1.1293	558.5		0.67024	140.5	0.2657	0.2384	1.1316	556.7	190
200	0.72401	143.1	0.2706	0.2387	1.1258	564.2		0.68339	142.9	0.2694	0.2395	1.1280	562.6	200
210	0.73768	145.5	0.2742	0.2400	1.1227	569.9		0.69643	145.3	0.2730	0.2407	1.1246	568.3	210
220	0.75126	147.9	0.2778	0.2413	1.1197	575.4		0.70932	147.7	0.2765	0.2419	1.1215	573.9	220
230	0.76470	150.3	0.2813	0.2426	1.1170	580.8		0.72218	150.1	0.2801	0.2433	1.1187	579.3	230
240	0.77791	152.7	0.2848	0.2441	1.1145	586.0		0.73486	152.6	0.2836	0.2446	1.1161	584.7	240
250	0.79108	155.2	0.2883	0.2455	1.1122	591.2		0.74744	155.0	0.2871	0.2460	1.1137	589.9	250
260	0.80431	157.6	0.2917	0.2470	1.1101	596.3		0.76005	157.5	0.2905	0.2475	1.1114	595.1	260
270	0.81746	160.1	0.2951	0.2485	1.1080	601.4		0.77250	160.0	0.2940	0.2490	1.1093	600.2	270
280	0.83036	162.6	0.2985	0.2501	1.1061	606.3		0.78493	162.5	0.2974	0.2505	1.1073	605.2	280
290	0.84331	165.1	0.3019	0.2516	1.1043	611.2		0.79726	165.0	0.3007	0.2520	1.1054	610.1	290
300	0.85616	167.6	0.3052	0.2532	1.1026	616.0		0.80952	167.5	0.3041	0.2536	1.1037	614.9	300
310	0.86904	170.2	0.3086	0.2548	1.1010	620.7		0.82169	170.1	0.3074	0.2551	1.1020	619.7	310
320	0.88191	172.7	0.3119	0.2564	1.0995	625.4		0.83389	172.6	0.3107	0.2567	1.1005	624.4	320
330	0.89461	175.3	0.3151	0.2580	1.0981	630.0		0.84595	175.2	0.3140	0.2583	1.0990	629.1	330
340	0.90728	177.9	0.3184	0.2596	1.0967	634.5		0.85815	177.8	0.3173	0.2599	1.0976	633.7	340
350	0.91988	180.5	0.3216	0.2612	1.0955	639.0		0.87017	180.4	0.3205	0.2615	1.0962	638.2	350
360	0.93257	183.1	0.3249	0.2628	1.0942	643.5		0.88215	183.0	0.3237	0.2631	1.0950	642.7	360
370	0.94518	185.7	0.3280	0.2644	1.0930	647.9		0.89405	185.7	0.3269	0.2647	1.0938	647.2	370
380	0.95767	188.4	0.3312	0.2660	1.0919	652.3		0.90613	188.3	0.3301	0.2663	1.0926	651.5	380

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 100.00 psia							Pressure = 110.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
79.1	0.01333	37.8	0.0787	0.3433	1.5646	1654.2	SAT LIQ	0.01347	39.8	0.0824	0.3469	1.5726	1604.1	85
79.1	0.47803	113.9	0.2199	0.2446	1.2317	472.8	SAT VAP	0.43391	114.6	0.2196	0.2496	1.2420	470.4	85
80	0.47952	114.1	0.2203	0.2442	1.2300	473.6		—	—	—	—	—	—	80
90	0.49552	116.6	0.2248	0.2413	1.2129	482.9		0.44156	115.9	0.2219	0.2477	1.2319	475.4	90
100	0.51093	119.0	0.2291	0.2393	1.1989	491.7		0.45627	118.3	0.2264	0.2446	1.2146	484.8	100
110	0.52587	121.4	0.2333	0.2379	1.1871	499.9		0.47043	120.8	0.2307	0.2425	1.2004	493.6	110
120	0.54037	123.7	0.2375	0.2370	1.1770	507.8		0.48414	123.2	0.2349	0.2410	1.1884	502.0	120
130	0.55451	126.1	0.2415	0.2366	1.1683	515.3		0.49746	125.6	0.2390	0.2401	1.1782	509.9	130
140	0.56838	128.5	0.2455	0.2365	1.1608	522.5		0.51044	128.0	0.2430	0.2395	1.1694	517.5	140
150	0.58194	130.8	0.2494	0.2366	1.1541	529.4		0.52309	130.4	0.2470	0.2394	1.1618	524.7	150
160	0.59527	133.2	0.2533	0.2370	1.1482	536.1		0.53562	132.8	0.2509	0.2395	1.1550	531.7	160
170	0.60835	135.6	0.2570	0.2376	1.1430	542.5		0.54786	135.2	0.2547	0.2399	1.1491	538.5	170
180	0.62135	137.9	0.2608	0.2384	1.1383	548.8		0.55979	137.6	0.2585	0.2404	1.1438	545.0	180
190	0.63416	140.3	0.2645	0.2393	1.1340	554.9		0.57166	140.0	0.2622	0.2411	1.1390	551.3	190
200	0.64675	142.7	0.2682	0.2403	1.1301	560.9		0.58340	142.4	0.2659	0.2420	1.1347	557.4	200
210	0.65924	145.1	0.2718	0.2414	1.1266	566.7		0.59503	144.8	0.2696	0.2429	1.1308	563.4	210
220	0.67155	147.6	0.2754	0.2426	1.1234	572.3		0.60643	147.3	0.2732	0.2440	1.1272	569.3	220
230	0.68385	150.0	0.2789	0.2439	1.1204	577.9		0.61774	149.7	0.2768	0.2452	1.1239	575.0	230
240	0.69604	152.4	0.2825	0.2452	1.1177	583.3		0.62893	152.2	0.2803	0.2464	1.1209	580.5	240
250	0.70806	154.9	0.2859	0.2466	1.1151	588.6		0.64012	154.6	0.2838	0.2477	1.1181	586.0	250
260	0.72015	157.4	0.2894	0.2480	1.1128	593.9		0.65121	157.1	0.2873	0.2490	1.1156	591.4	260
270	0.73196	159.9	0.2928	0.2495	1.1106	599.0		0.66212	159.6	0.2907	0.2504	1.1132	596.6	270
280	0.74388	162.4	0.2962	0.2509	1.1085	604.1		0.67308	162.1	0.2941	0.2518	1.1109	601.8	280
290	0.75569	164.9	0.2996	0.2524	1.1066	609.0		0.68385	164.6	0.2975	0.2533	1.1088	606.9	290
300	0.76740	167.4	0.3030	0.2540	1.1047	613.9		0.69464	167.2	0.3009	0.2547	1.1069	611.9	300
310	0.77906	170.0	0.3063	0.2555	1.1030	618.7		0.70542	169.7	0.3042	0.2562	1.1050	616.8	310
320	0.79064	172.5	0.3096	0.2571	1.1014	623.5		0.71613	172.3	0.3076	0.2577	1.1033	621.6	320
330	0.80225	175.1	0.3129	0.2586	1.0999	628.2		0.72680	174.9	0.3109	0.2593	1.1017	626.4	330
340	0.81387	177.7	0.3162	0.2602	1.0984	632.8		0.73725	177.5	0.3141	0.2608	1.1001	631.1	340
350	0.82535	180.3	0.3194	0.2618	1.0970	637.4		0.74783	180.1	0.3174	0.2624	1.0987	635.8	350
360	0.83675	182.9	0.3226	0.2634	1.0957	641.9		0.75832	182.7	0.3206	0.2639	1.0973	640.4	360
370	0.84818	185.6	0.3258	0.2649	1.0945	646.4		0.76870	185.4	0.3238	0.2655	1.0959	644.9	370
380	0.85955	188.2	0.3290	0.2665	1.0933	650.8		0.77924	188.0	0.3270	0.2670	1.0947	649.4	380
390	—	—	—	—	—	—		0.78958	190.7	0.3302	0.2686	1.0935	653.8	390

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 120.00 psia							Pressure = 130.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
90.5	0.01361	41.8	0.0858	0.3504	1.5808	1557.1	SAT LIQ	0.01374	43.6	0.0890	0.3540	1.5893	1512.8	95.6
90.5	0.39689	115.3	0.2194	0.2546	1.2528	467.9	SAT VAP	0.36538	115.8	0.2192	0.2596	1.2640	465.4	95.6
100	0.41044	117.7	0.2238	0.2506	1.2326	477.6		0.37136	117.0	0.2212	0.2573	1.2531	470.1	100
110	0.42402	120.2	0.2282	0.2475	1.2153	487.1		0.38453	119.5	0.2257	0.2531	1.2321	480.3	110
120	0.43710	122.6	0.2324	0.2453	1.2010	496.0		0.39712	122.0	0.2301	0.2501	1.2150	489.8	120
130	0.44976	125.1	0.2366	0.2438	1.1890	504.4		0.40925	124.5	0.2344	0.2479	1.2009	498.7	130
140	0.46206	127.5	0.2407	0.2428	1.1788	512.4		0.42100	127.0	0.2385	0.2464	1.1890	507.1	140
150	0.47405	129.9	0.2447	0.2423	1.1700	520.0		0.43241	129.5	0.2426	0.2454	1.1788	515.1	150
160	0.48577	132.3	0.2487	0.2421	1.1623	527.3		0.44350	131.9	0.2466	0.2448	1.1701	522.7	160
170	0.49724	134.8	0.2525	0.2422	1.1555	534.3		0.45442	134.4	0.2505	0.2446	1.1624	530.0	170
180	0.50860	137.2	0.2564	0.2425	1.1495	541.1		0.46507	136.8	0.2544	0.2447	1.1557	537.1	180
190	0.51967	139.6	0.2601	0.2430	1.1442	547.6		0.47556	139.2	0.2582	0.2450	1.1497	543.9	190
200	0.53064	142.0	0.2639	0.2437	1.1394	554.0		0.48584	141.7	0.2619	0.2455	1.1444	550.5	200
210	0.54139	144.5	0.2675	0.2445	1.1351	560.1		0.49601	144.2	0.2656	0.2461	1.1396	556.8	210
220	0.55206	146.9	0.2712	0.2454	1.1311	566.2		0.50602	146.6	0.2692	0.2469	1.1352	563.0	220
230	0.56268	149.4	0.2747	0.2465	1.1275	572.0		0.51597	149.1	0.2729	0.2478	1.1313	569.1	230
240	0.57307	151.9	0.2783	0.2476	1.1243	577.8		0.52576	151.6	0.2764	0.2489	1.1277	575.0	240
250	0.58350	154.4	0.2818	0.2488	1.1212	583.4		0.53550	154.1	0.2800	0.2500	1.1244	580.7	250
260	0.59379	156.8	0.2853	0.2501	1.1184	588.9		0.54511	156.6	0.2835	0.2511	1.1214	586.3	260
270	0.60394	159.4	0.2888	0.2514	1.1158	594.2		0.55460	159.1	0.2870	0.2524	1.1186	591.8	270
280	0.61406	161.9	0.2922	0.2527	1.1134	599.5		0.56408	161.6	0.2904	0.2536	1.1160	597.2	280
290	0.62414	164.4	0.2956	0.2541	1.1112	604.7		0.57353	164.2	0.2938	0.2550	1.1136	602.5	290
300	0.63408	167.0	0.2990	0.2555	1.1091	609.8		0.58282	166.7	0.2972	0.2563	1.1113	607.7	300
310	0.64404	169.5	0.3023	0.2570	1.1071	614.8		0.59207	169.3	0.3006	0.2577	1.1092	612.8	310
320	0.65389	172.1	0.3057	0.2584	1.1052	619.8		0.60129	171.9	0.3039	0.2592	1.1072	617.9	320
330	0.66375	174.7	0.3090	0.2599	1.1035	624.6		0.61039	174.5	0.3072	0.2606	1.1054	622.8	330
340	0.67354	177.3	0.3122	0.2614	1.1019	629.4		0.61962	177.1	0.3105	0.2621	1.1036	627.7	340
350	0.68329	179.9	0.3155	0.2629	1.1003	634.1		0.62865	179.7	0.3138	0.2635	1.1020	632.5	350
360	0.69300	182.6	0.3187	0.2645	1.0988	638.8		0.63771	182.4	0.3170	0.2650	1.1004	637.2	360
370	0.70264	185.2	0.3220	0.2660	1.0974	643.4		0.64666	185.0	0.3202	0.2665	1.0989	641.9	370
380	0.71225	187.9	0.3252	0.2675	1.0961	648.0		0.65569	187.7	0.3234	0.2680	1.0975	646.5	380
390	0.72192	190.6	0.3283	0.2690	1.0948	652.5		0.66458	190.4	0.3266	0.2695	1.0962	651.1	390
400	0.73142	193.3	0.3315	0.2706	1.0936	656.9		0.67345	193.1	0.3298	0.2710	1.0949	655.6	400

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 140.00 psia							Pressure = 150.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
100.5	0.01388	45.3	0.0921	0.3576	1.5980	1470.8	SAT LIQ	0.01401	46.9	0.0950	0.3612	1.6070	1430.7	105.1
100.5	0.33818	116.4	0.2190	0.2646	1.2757	462.7	SAT VAP	0.31448	116.9	0.2188	0.2697	1.2878	460.0	105.1
110	0.35042	118.9	0.2234	0.2593	1.2512	473.2		0.32062	118.2	0.2211	0.2664	1.2732	465.7	110
120	0.36266	121.4	0.2279	0.2553	1.2307	483.3		0.33259	120.8	0.2257	0.2610	1.2484	476.6	120
130	0.37438	124.0	0.2322	0.2523	1.2140	492.8		0.34400	123.4	0.2301	0.2571	1.2285	486.7	130
140	0.38568	126.5	0.2364	0.2502	1.2001	501.7		0.35495	126.0	0.2344	0.2543	1.2123	496.1	140
150	0.39662	129.0	0.2406	0.2487	1.1884	510.1		0.36550	128.5	0.2386	0.2523	1.1988	505.0	150
160	0.40727	131.5	0.2446	0.2477	1.1784	518.1		0.37573	131.0	0.2427	0.2508	1.1874	513.3	160
170	0.41764	133.9	0.2486	0.2472	1.1697	525.7		0.38565	133.5	0.2467	0.2499	1.1776	521.3	170
180	0.42779	136.4	0.2524	0.2470	1.1622	533.0		0.39538	136.0	0.2506	0.2494	1.1691	528.9	180
190	0.43777	138.9	0.2563	0.2470	1.1555	540.1		0.40491	138.5	0.2545	0.2492	1.1616	536.2	190
200	0.44755	141.3	0.2601	0.2473	1.1496	546.9		0.41418	141.0	0.2583	0.2493	1.1550	543.3	200
210	0.45714	143.8	0.2638	0.2478	1.1443	553.5		0.42337	143.5	0.2621	0.2496	1.1492	550.1	210
220	0.46659	146.3	0.2675	0.2485	1.1395	559.9		0.43232	146.0	0.2658	0.2501	1.1440	556.7	220
230	0.47596	148.8	0.2711	0.2492	1.1352	566.1		0.44125	148.5	0.2694	0.2507	1.1393	563.1	230
240	0.48520	151.3	0.2747	0.2501	1.1313	572.1		0.44996	151.0	0.2730	0.2515	1.1350	569.3	240
250	0.49432	153.8	0.2782	0.2511	1.1277	578.0		0.45861	153.5	0.2766	0.2524	1.1311	575.3	250
260	0.50342	156.3	0.2818	0.2522	1.1244	583.8		0.46718	156.0	0.2801	0.2533	1.1276	581.2	260
270	0.51235	158.8	0.2853	0.2534	1.1214	589.4		0.47574	158.6	0.2836	0.2544	1.1243	587.0	270
280	0.52121	161.4	0.2887	0.2546	1.1186	594.9		0.48412	161.1	0.2871	0.2555	1.1213	592.6	280
290	0.53011	163.9	0.2921	0.2558	1.1160	600.3		0.49242	163.7	0.2906	0.2567	1.1185	598.1	290
300	0.53888	166.5	0.2955	0.2572	1.1136	605.6		0.50073	166.3	0.2940	0.2580	1.1159	603.6	300
310	0.54750	169.1	0.2989	0.2585	1.1113	610.9		0.50893	168.9	0.2973	0.2593	1.1135	608.9	310
320	0.55611	171.7	0.3022	0.2599	1.1092	616.0		0.51706	171.5	0.3007	0.2606	1.1113	614.1	320
330	0.56478	174.3	0.3056	0.2613	1.1073	621.0		0.52521	174.1	0.3040	0.2620	1.1092	619.2	330
340	0.57330	176.9	0.3089	0.2627	1.1054	626.0		0.53319	176.7	0.3073	0.2633	1.1072	624.2	340
350	0.58184	179.5	0.3121	0.2641	1.1036	630.9		0.54121	179.3	0.3106	0.2647	1.1054	629.2	350
360	0.59028	182.2	0.3154	0.2656	1.1020	635.7		0.54918	182.0	0.3139	0.2662	1.1036	634.1	360
370	0.59866	184.8	0.3186	0.2670	1.1004	640.4		0.55710	184.7	0.3171	0.2676	1.1020	638.9	370
380	0.60716	187.5	0.3218	0.2685	1.0989	645.1		0.56500	187.3	0.3203	0.2690	1.1004	643.7	380
390	0.61542	190.2	0.3250	0.2700	1.0975	649.7		0.57290	190.0	0.3235	0.2705	1.0989	648.4	390
400	0.62375	192.9	0.3282	0.2715	1.0962	654.3		0.58069	192.7	0.3267	0.2719	1.0975	653.0	400
410	0.63203	195.6	0.3313	0.2730	1.0949	658.8		0.58851	195.5	0.3298	0.2734	1.0962	657.6	410

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 160.00 psia							Pressure = 170.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
109.5	0.01414	48.5	0.0977	0.3648	1.6163	1392.4	SAT LIQ	0.01427	50.1	0.1004	0.3685	1.6259	1355.6	113.7
109.5	0.29362	117.3	0.2186	0.2748	1.3006	457.2	SAT VAP	0.27512	117.7	0.2184	0.2800	1.3139	454.4	113.7
110	0.29426	117.5	0.2188	0.2744	1.2988	457.9		—	—	—	—	—	—	110
120	0.30608	120.2	0.2235	0.2675	1.2685	469.6		0.28247	119.5	0.2214	0.2748	1.2915	462.3	120
130	0.31726	122.8	0.2281	0.2624	1.2448	480.4		0.29350	122.2	0.2261	0.2683	1.2631	473.8	130
140	0.32792	125.4	0.2324	0.2588	1.2258	490.4		0.30395	124.9	0.2305	0.2636	1.2406	484.4	140
150	0.33817	128.0	0.2367	0.2561	1.2101	499.7		0.31395	127.5	0.2349	0.2602	1.2225	494.3	150
160	0.34806	130.5	0.2409	0.2541	1.1970	508.5		0.32356	130.1	0.2391	0.2577	1.2075	503.5	160
170	0.35767	133.1	0.2449	0.2528	1.1859	516.8		0.33282	132.6	0.2432	0.2559	1.1949	512.2	170
180	0.36700	135.6	0.2489	0.2519	1.1764	524.7		0.34189	135.2	0.2472	0.2546	1.1842	520.5	180
190	0.37611	138.1	0.2528	0.2515	1.1681	532.3		0.35066	137.7	0.2512	0.2538	1.1749	528.4	190
200	0.38504	140.6	0.2566	0.2513	1.1608	539.6		0.35923	140.3	0.2550	0.2534	1.1669	535.9	200
210	0.39378	143.1	0.2604	0.2514	1.1544	546.7		0.36762	142.8	0.2588	0.2533	1.1598	543.2	210
220	0.40238	145.7	0.2641	0.2517	1.1486	553.4		0.37591	145.3	0.2626	0.2534	1.1535	550.2	220
230	0.41085	148.2	0.2678	0.2522	1.1435	560.0		0.38400	147.9	0.2663	0.2538	1.1479	556.9	230
240	0.41916	150.7	0.2715	0.2528	1.1388	566.4		0.39200	150.4	0.2700	0.2543	1.1428	563.5	240
250	0.42746	153.2	0.2751	0.2536	1.1346	572.6		0.39987	152.9	0.2736	0.2549	1.1383	569.9	250
260	0.43554	155.8	0.2786	0.2545	1.1308	578.6		0.40758	155.5	0.2771	0.2557	1.1341	576.0	260
270	0.44364	158.3	0.2821	0.2555	1.1273	584.5		0.41533	158.1	0.2807	0.2566	1.1304	582.1	270
280	0.45165	160.9	0.2856	0.2565	1.1241	590.3		0.42287	160.6	0.2842	0.2575	1.1269	588.0	280
290	0.45954	163.5	0.2891	0.2577	1.1211	595.9		0.43042	163.2	0.2876	0.2586	1.1237	593.7	290
300	0.46729	166.0	0.2925	0.2588	1.1183	601.4		0.43787	165.8	0.2911	0.2597	1.1208	599.3	300
310	0.47508	168.6	0.2959	0.2601	1.1158	606.9		0.44528	168.4	0.2945	0.2609	1.1181	604.8	310
320	0.48281	171.2	0.2992	0.2613	1.1134	612.2		0.45265	171.0	0.2979	0.2621	1.1155	610.3	320
330	0.49053	173.9	0.3026	0.2627	1.1112	617.4		0.45996	173.6	0.3012	0.2634	1.1132	615.6	330
340	0.49816	176.5	0.3059	0.2640	1.1091	622.5		0.46718	176.3	0.3045	0.2647	1.1110	620.8	340
350	0.50566	179.1	0.3092	0.2654	1.1071	627.6		0.47432	178.9	0.3078	0.2660	1.1089	625.9	350
360	0.51324	181.8	0.3124	0.2667	1.1053	632.5		0.48144	181.6	0.3111	0.2673	1.1069	630.9	360
370	0.52067	184.5	0.3157	0.2681	1.1035	637.4		0.48854	184.3	0.3143	0.2687	1.1051	635.9	370
380	0.52818	187.2	0.3189	0.2696	1.1019	642.2		0.49564	187.0	0.3176	0.2701	1.1034	640.8	380
390	0.53565	189.9	0.3221	0.2710	1.1003	647.0		0.50269	189.7	0.3208	0.2715	1.1018	645.6	390
400	0.54301	192.6	0.3253	0.2724	1.0988	651.7		0.50968	192.4	0.3240	0.2729	1.1002	650.4	400
410	0.55030	195.3	0.3284	0.2738	1.0974	656.3		0.51674	195.1	0.3271	0.2743	1.0987	655.0	410
420	—	—	—	—	—	—		0.52362	197.9	0.3303	0.2757	1.0973	659.7	420

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 180.00 psia							Pressure = 190.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
117.7	0.01439	51.5	0.1029	0.3723	1.6360	1320.2	SAT LIQ	0.01452	53.0	0.1053	0.3761	1.6465	1286.0	121.5
117.7	0.25856	118.1	0.2182	0.2854	1.3280	451.5	SAT VAP	0.24371	118.5	0.2180	0.2909	1.3427	448.5	121.5
120	0.26125	118.8	0.2193	0.2831	1.3184	454.6		—	—	—	—	—	—	120
130	0.27221	121.6	0.2241	0.2749	1.2838	467.0		0.25296	120.9	0.2221	0.2823	1.3076	459.8	130
140	0.28251	124.3	0.2287	0.2690	1.2572	478.3		0.26319	123.7	0.2268	0.2749	1.2759	471.9	140
150	0.29231	126.9	0.2331	0.2647	1.2361	488.7		0.27284	126.4	0.2313	0.2695	1.2511	483.0	150
160	0.30170	129.6	0.2374	0.2615	1.2189	498.4		0.28205	129.1	0.2357	0.2656	1.2313	493.2	160
170	0.31073	132.2	0.2415	0.2591	1.2046	507.5		0.29085	131.7	0.2399	0.2626	1.2150	502.7	170
180	0.31948	134.8	0.2456	0.2575	1.1925	516.1		0.29943	134.3	0.2440	0.2605	1.2014	511.7	180
190	0.32803	137.3	0.2496	0.2563	1.1822	524.3		0.30763	136.9	0.2480	0.2590	1.1899	520.2	190
200	0.33629	139.9	0.2535	0.2556	1.1732	532.2		0.31569	139.5	0.2520	0.2580	1.1800	528.3	200
210	0.34438	142.4	0.2573	0.2553	1.1654	539.7		0.32356	142.1	0.2559	0.2573	1.1714	536.1	210
220	0.35227	145.0	0.2611	0.2552	1.1586	546.9		0.33122	144.7	0.2597	0.2570	1.1639	543.5	220
230	0.36006	147.5	0.2648	0.2554	1.1524	553.8		0.33872	147.2	0.2634	0.2570	1.1572	550.7	230
240	0.36776	150.1	0.2685	0.2557	1.1470	560.6		0.34609	149.8	0.2671	0.2572	1.1513	557.6	240
250	0.37536	152.7	0.2722	0.2562	1.1420	567.1		0.35337	152.4	0.2708	0.2576	1.1459	564.3	250
260	0.38278	155.2	0.2757	0.2569	1.1376	573.4		0.36052	154.9	0.2744	0.2582	1.1411	570.8	260
270	0.39014	157.8	0.2793	0.2577	1.1335	579.6		0.36755	157.5	0.2780	0.2588	1.1368	577.1	270
280	0.39739	160.4	0.2828	0.2586	1.1298	585.6		0.37453	160.1	0.2815	0.2596	1.1328	583.2	280
290	0.40461	163.0	0.2863	0.2596	1.1264	591.5		0.38143	162.7	0.2850	0.2605	1.1292	589.2	290
300	0.41168	165.6	0.2897	0.2606	1.1233	597.2		0.38829	165.3	0.2884	0.2615	1.1259	595.1	300
310	0.41873	168.2	0.2931	0.2617	1.1204	602.8		0.39502	168.0	0.2919	0.2626	1.1228	600.8	310
320	0.42577	170.8	0.2965	0.2629	1.1177	608.3		0.40175	170.6	0.2953	0.2637	1.1199	606.4	320
330	0.43269	173.4	0.2999	0.2641	1.1152	613.7		0.40840	173.2	0.2986	0.2648	1.1173	611.9	330
340	0.43964	176.1	0.3032	0.2653	1.1129	619.0		0.41501	175.9	0.3020	0.2660	1.1148	617.3	340
350	0.44645	178.7	0.3065	0.2666	1.1107	624.2		0.42157	178.5	0.3053	0.2673	1.1125	622.6	350
360	0.45325	181.4	0.3098	0.2679	1.1086	629.3		0.42799	181.2	0.3086	0.2685	1.1104	627.8	360
370	0.46007	184.1	0.3131	0.2693	1.1067	634.4		0.43452	183.9	0.3118	0.2698	1.1083	632.9	370
380	0.46677	186.8	0.3163	0.2706	1.1049	639.3		0.44098	186.6	0.3151	0.2712	1.1064	637.9	380
390	0.47344	189.5	0.3195	0.2720	1.1032	644.2		0.44731	189.3	0.3183	0.2725	1.1047	642.8	390
400	0.48015	192.2	0.3227	0.2734	1.1016	649.0		0.45366	192.1	0.3215	0.2739	1.1030	647.7	400
410	0.48681	195.0	0.3259	0.2748	1.1000	653.8		0.46007	194.8	0.3247	0.2752	1.1013	652.5	410
420	0.49336	197.7	0.3290	0.2762	1.0986	658.5		0.46633	197.6	0.3278	0.2766	1.0998	657.3	420
430	—	—	—	—	—	—		0.47257	200.3	0.3310	0.2780	1.0984	661.9	430

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 200.00 psia							Pressure = 220.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
125.2	0.01465	54.3	0.1076	0.3801	1.6574	1253.0	SAT LIQ	0.01491	57.0	0.1120	0.3884	1.6807	1189.8	132.2
125.2	0.23026	118.8	0.2178	0.2966	1.3582	445.6	SAT VAP	0.20685	119.3	0.2174	0.3085	1.3919	439.5	132.2
130	0.23544	120.2	0.2202	0.2908	1.3352	452.3		—	—	—	—	—	—	130
140	0.24565	123.0	0.2250	0.2816	1.2969	465.3		0.21486	121.7	0.2213	0.2975	1.3488	451.1	140
150	0.25521	125.8	0.2296	0.2749	1.2678	477.0		0.22440	124.6	0.2262	0.2874	1.3075	464.5	150
160	0.26428	128.5	0.2340	0.2700	1.2449	487.8		0.23331	127.5	0.2308	0.2801	1.2764	476.6	160
170	0.27294	131.2	0.2383	0.2664	1.2263	497.8		0.24174	130.2	0.2352	0.2748	1.2520	487.6	170
180	0.28129	133.9	0.2425	0.2637	1.2110	507.2		0.24979	133.0	0.2395	0.2708	1.2324	497.9	180
190	0.28930	136.5	0.2466	0.2618	1.1981	516.1		0.25749	135.7	0.2437	0.2678	1.2163	507.5	190
200	0.29712	139.1	0.2505	0.2604	1.1872	524.5		0.26498	138.3	0.2478	0.2657	1.2027	516.5	200
210	0.30477	141.7	0.2545	0.2595	1.1777	532.5		0.27217	141.0	0.2517	0.2641	1.1913	525.1	210
220	0.31217	144.3	0.2583	0.2590	1.1694	540.2		0.27919	143.6	0.2557	0.2631	1.1814	533.3	220
230	0.31946	146.9	0.2621	0.2587	1.1622	547.5		0.28605	146.2	0.2595	0.2624	1.1728	541.1	230
240	0.32658	149.5	0.2658	0.2588	1.1557	554.6		0.29278	148.9	0.2633	0.2621	1.1652	548.6	240
250	0.33360	152.1	0.2695	0.2590	1.1500	561.5		0.29932	151.5	0.2670	0.2620	1.1585	555.8	250
260	0.34046	154.7	0.2731	0.2594	1.1448	568.1		0.30584	154.1	0.2707	0.2621	1.1525	562.8	260
270	0.34727	157.3	0.2767	0.2600	1.1401	574.6		0.31217	156.7	0.2743	0.2625	1.1472	569.5	270
280	0.35398	159.9	0.2802	0.2607	1.1359	580.9		0.31842	159.3	0.2778	0.2630	1.1423	576.1	280
290	0.36063	162.5	0.2837	0.2615	1.1320	587.0		0.32462	162.0	0.2814	0.2636	1.1379	582.5	290
300	0.36716	165.1	0.2872	0.2624	1.1285	593.0		0.33069	164.6	0.2849	0.2643	1.1339	588.7	300
310	0.37365	167.7	0.2906	0.2634	1.1252	598.8		0.33677	167.3	0.2883	0.2652	1.1303	594.7	310
320	0.38008	170.4	0.2941	0.2645	1.1222	604.5		0.34274	169.9	0.2918	0.2661	1.1269	600.6	320
330	0.38646	173.0	0.2974	0.2656	1.1194	610.1		0.34863	172.6	0.2952	0.2671	1.1238	606.4	330
340	0.39282	175.7	0.3008	0.2667	1.1168	615.5		0.35447	175.3	0.2985	0.2682	1.1209	612.0	340
350	0.39909	178.3	0.3041	0.2679	1.1144	620.9		0.36032	177.9	0.3019	0.2693	1.1182	617.6	350
360	0.40532	181.0	0.3074	0.2692	1.1121	626.2		0.36605	180.6	0.3052	0.2704	1.1157	623.0	360
370	0.41151	183.7	0.3107	0.2704	1.1100	631.3		0.37182	183.4	0.3085	0.2716	1.1134	628.3	370
380	0.41762	186.4	0.3139	0.2717	1.1080	636.4		0.37743	186.1	0.3117	0.2728	1.1112	633.5	380
390	0.42375	189.2	0.3171	0.2730	1.1061	641.5		0.38314	188.8	0.3150	0.2741	1.1091	638.7	390
400	0.42989	191.9	0.3203	0.2743	1.1044	646.4		0.38873	191.6	0.3182	0.2753	1.1072	643.7	400
410	0.43590	194.7	0.3235	0.2757	1.1027	651.3		0.39434	194.3	0.3214	0.2766	1.1054	648.7	410
420	0.44191	197.4	0.3267	0.2770	1.1011	656.1		0.39987	197.1	0.3246	0.2779	1.1037	653.6	420
430	0.44791	200.2	0.3298	0.2784	1.0996	660.8		0.40538	199.9	0.3277	0.2792	1.1020	658.5	430
440	—	—	—	—	—	—		0.41088	202.7	0.3308	0.2806	1.1005	663.2	440

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 240.00 psia							Pressure = 260 .00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
138.7	0.01517	59.5	0.1162	0.3972	1.7064	1130.0	SAT LIQ	0.01543	61.9	0.1201	0.4067	1.7349	1073.0	144.9
138.7	0.18715	119.8	0.2169	0.3214	1.4297	433.3	SAT VAP	0.17030	120.2	0.2165	0.3355	1.4725	426.9	144.9
140	0.18846	120.2	0.2176	0.3189	1.4201	435.4		—	—	—	—	—	—	140
150	0.19819	123.3	0.2227	0.3032	1.3589	450.9		0.17540	121.9	0.2193	0.3240	1.4284	435.9	150
160	0.20712	126.3	0.2276	0.2924	1.3154	464.6		0.18452	125.0	0.2244	0.3077	1.3653	451.6	160
170	0.21545	129.2	0.2322	0.2846	1.2829	476.9		0.19288	128.1	0.2292	0.2965	1.3207	465.5	170
180	0.22330	132.0	0.2366	0.2789	1.2575	488.1		0.20068	131.0	0.2338	0.2884	1.2874	477.9	180
190	0.23083	134.8	0.2409	0.2747	1.2371	498.6		0.20805	133.8	0.2383	0.2826	1.2614	489.3	190
200	0.23799	137.5	0.2451	0.2716	1.2204	508.3		0.21507	136.6	0.2425	0.2782	1.2405	499.9	200
210	0.24495	140.2	0.2492	0.2692	1.2064	517.5		0.22178	139.4	0.2467	0.2749	1.2234	509.8	210
220	0.25165	142.9	0.2531	0.2675	1.1945	526.2		0.22824	142.1	0.2507	0.2724	1.2092	519.0	220
230	0.25818	145.6	0.2570	0.2664	1.1843	534.5		0.23450	144.9	0.2547	0.2707	1.1970	527.8	230
240	0.26457	148.2	0.2609	0.2656	1.1754	542.5		0.24061	147.6	0.2586	0.2694	1.1866	536.2	240
250	0.27079	150.9	0.2646	0.2652	1.1677	550.1		0.24657	150.2	0.2624	0.2685	1.1775	544.2	250
260	0.27685	153.5	0.2683	0.2650	1.1608	557.4		0.25233	152.9	0.2662	0.2680	1.1696	551.9	260
270	0.28289	156.2	0.2720	0.2651	1.1546	564.4		0.25804	155.6	0.2699	0.2678	1.1626	559.3	270
280	0.28878	158.8	0.2756	0.2653	1.1491	571.3		0.26362	158.3	0.2735	0.2678	1.1563	566.4	280
290	0.29459	161.5	0.2792	0.2658	1.1441	577.9		0.26915	161.0	0.2771	0.2680	1.1507	573.3	290
300	0.30028	164.1	0.2827	0.2663	1.1396	584.3		0.27456	163.6	0.2807	0.2684	1.1456	580.0	300
310	0.30593	166.8	0.2862	0.2670	1.1355	590.6		0.27988	166.3	0.2842	0.2689	1.1410	586.5	310
320	0.31156	169.5	0.2896	0.2678	1.1318	596.7		0.28517	169.0	0.2877	0.2696	1.1368	592.8	320
330	0.31709	172.2	0.2931	0.2687	1.1283	602.7		0.29033	171.7	0.2911	0.2703	1.1330	598.9	330
340	0.32253	174.8	0.2965	0.2696	1.1251	608.5		0.29553	174.4	0.2945	0.2711	1.1295	605.0	340
350	0.32794	177.5	0.2998	0.2706	1.1222	614.2		0.30059	177.1	0.2979	0.2721	1.1262	610.8	350
360	0.33332	180.3	0.3031	0.2717	1.1194	619.8		0.30565	179.9	0.3012	0.2730	1.1232	616.6	360
370	0.33866	183.0	0.3064	0.2728	1.1169	625.3		0.31066	182.6	0.3045	0.2741	1.1204	622.2	370
380	0.34395	185.7	0.3097	0.2740	1.1145	630.6		0.31560	185.3	0.3078	0.2751	1.1178	627.7	380
390	0.34921	188.5	0.3130	0.2751	1.1122	635.9		0.32052	188.1	0.3111	0.2762	1.1154	633.1	390
400	0.35443	191.2	0.3162	0.2764	1.1101	641.1		0.32540	190.9	0.3143	0.2774	1.1131	638.5	400
410	0.35962	194.0	0.3194	0.2776	1.1081	646.2		0.33026	193.7	0.3175	0.2786	1.1110	643.7	410
420	0.36478	196.8	0.3226	0.2788	1.1063	651.2		0.33509	196.4	0.3207	0.2798	1.1090	648.8	420
430	0.36990	199.6	0.3257	0.2801	1.1045	656.2		0.33988	199.2	0.3239	0.2810	1.1071	653.9	430
440	0.37501	202.4	0.3289	0.2814	1.1028	661.0		0.34465	202.1	0.3271	0.2822	1.1053	658.9	440
450	—	—	—	—	—	—		0.34939	204.9	0.3302	0.2835	1.1036	663.8	450

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 280.00 psia							Pressure = 300.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
150.6	0.01570	64.3	0.1238	0.4172	1.7668	1018.2	SAT LIQ	0.01598	66.5	0.1274	0.4287	1.8027	965.6	156.1
150.6	0.15571	120.5	0.2160	0.3512	1.5212	420.5	SAT VAP	0.14292	120.7	0.2154	0.3688	1.5771	413.9	156.1
160	0.16463	123.7	0.2211	0.3275	1.4317	437.5		0.14674	122.1	0.2177	0.3549	1.5251	421.9	160
170	0.17318	126.8	0.2262	0.3111	1.3684	453.2		0.15567	125.5	0.2232	0.3298	1.4305	440.1	170
180	0.18101	129.9	0.2310	0.2998	1.3235	467.1		0.16367	128.7	0.2282	0.3135	1.3683	455.7	180
190	0.18832	132.9	0.2356	0.2916	1.2899	479.6		0.17099	131.8	0.2330	0.3024	1.3241	469.5	190
200	0.19519	135.7	0.2400	0.2857	1.2637	491.1		0.17783	134.8	0.2375	0.2943	1.2907	482.0	200
210	0.20178	138.6	0.2443	0.2812	1.2427	501.7		0.18434	137.7	0.2419	0.2883	1.2647	493.4	210
220	0.20809	141.4	0.2484	0.2778	1.2254	511.7		0.19050	140.6	0.2462	0.2838	1.2437	504.1	220
230	0.21413	144.1	0.2525	0.2753	1.2110	521.0		0.19641	143.4	0.2503	0.2805	1.2265	514.0	230
240	0.22001	146.9	0.2564	0.2735	1.1988	529.8		0.20210	146.2	0.2543	0.2779	1.2121	523.4	240
250	0.22573	149.6	0.2603	0.2722	1.1882	538.3		0.20763	148.9	0.2582	0.2761	1.1999	532.2	250
260	0.23127	152.3	0.2641	0.2713	1.1791	546.3		0.21302	151.7	0.2621	0.2747	1.1893	540.7	260
270	0.23672	155.0	0.2678	0.2707	1.1711	554.0		0.21823	154.4	0.2659	0.2738	1.1801	548.8	270
280	0.24208	157.7	0.2715	0.2704	1.1639	561.5		0.22332	157.2	0.2696	0.2732	1.1721	556.5	280
290	0.24728	160.4	0.2751	0.2704	1.1576	568.6		0.22834	159.9	0.2733	0.2729	1.1649	564.0	290
300	0.25246	163.1	0.2787	0.2706	1.1519	575.6		0.23327	162.6	0.2769	0.2729	1.1586	571.2	300
310	0.25753	165.9	0.2823	0.2709	1.1468	582.3		0.23810	165.4	0.2804	0.2730	1.1529	578.2	310
320	0.26250	168.6	0.2858	0.2714	1.1422	588.9		0.24289	168.1	0.2840	0.2733	1.1477	584.9	320
330	0.26744	171.3	0.2892	0.2720	1.1379	595.2		0.24756	170.8	0.2875	0.2738	1.1430	591.5	330
340	0.27230	174.0	0.2927	0.2727	1.1340	601.4		0.25219	173.6	0.2909	0.2743	1.1387	597.9	340
350	0.27712	176.7	0.2960	0.2735	1.1305	607.5		0.25677	176.3	0.2943	0.2750	1.1348	604.1	350
360	0.28188	179.5	0.2994	0.2744	1.1272	613.4		0.26129	179.1	0.2977	0.2758	1.1312	610.2	360
370	0.28661	182.2	0.3027	0.2753	1.1241	619.2		0.26577	181.8	0.3010	0.2766	1.1279	616.1	370
380	0.29128	185.0	0.3060	0.2763	1.1213	624.8		0.27020	184.6	0.3044	0.2776	1.1248	621.9	380
390	0.29592	187.7	0.3093	0.2774	1.1186	630.4		0.27460	187.4	0.3077	0.2785	1.1220	627.6	390
400	0.30053	190.5	0.3126	0.2785	1.1162	635.8		0.27896	190.2	0.3109	0.2795	1.1193	633.2	400
410	0.30509	193.3	0.3158	0.2796	1.1138	641.2		0.28328	193.0	0.3142	0.2806	1.1168	638.6	410
420	0.30964	196.1	0.3190	0.2807	1.1117	646.4		0.28757	195.8	0.3174	0.2817	1.1145	644.0	420
430	0.31414	198.9	0.3222	0.2819	1.1096	651.6		0.29183	198.6	0.3206	0.2828	1.1123	649.3	430
440	0.31862	201.8	0.3253	0.2831	1.1077	656.7		0.29607	201.4	0.3237	0.2840	1.1102	654.5	440
450	0.32308	204.6	0.3285	0.2843	1.1059	661.7		0.30027	204.3	0.3269	0.2851	1.1083	659.6	450
460	0.32751	207.4	0.3316	0.2855	1.1042	666.6		0.30446	207.1	0.3300	0.2863	1.1064	664.6	460

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 320.00 psia							Pressure = 340.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
161.3	0.01627	68.7	0.1308	0.4415	1.8437	914.5	SAT LIQ	0.01658	70.8	0.1341	0.4560	1.8908	865.0	166.3
161.3	0.13160	120.9	0.2148	0.3889	1.6421	407.2	SAT VAP	0.12149	120.9	0.2142	0.4120	1.7183	400.5	166.3
170	0.13984	124.1	0.2200	0.3548	1.5153	425.6		0.12520	122.4	0.2166	0.3907	1.6395	409.5	170
180	0.14815	127.5	0.2254	0.3308	1.4254	443.4		0.13405	126.1	0.2224	0.3533	1.5011	430.1	180
190	0.15562	130.7	0.2304	0.3152	1.3655	458.8		0.14177	129.5	0.2277	0.3309	1.4174	447.4	190
200	0.16251	133.8	0.2351	0.3043	1.3225	472.5		0.14877	132.8	0.2326	0.3161	1.3606	462.5	200
210	0.16893	136.8	0.2396	0.2964	1.2899	484.9		0.15519	135.9	0.2373	0.3057	1.3194	476.0	210
220	0.17500	139.7	0.2439	0.2905	1.2644	496.3		0.16124	138.9	0.2418	0.2980	1.2879	488.2	220
230	0.18080	142.6	0.2482	0.2861	1.2438	506.8		0.16696	141.8	0.2461	0.2924	1.2631	499.5	230
240	0.18638	145.5	0.2523	0.2828	1.2267	516.8		0.17241	144.7	0.2503	0.2881	1.2429	510.0	240
250	0.19175	148.3	0.2563	0.2803	1.2125	526.1		0.17766	147.6	0.2543	0.2848	1.2263	519.9	250
260	0.19694	151.1	0.2602	0.2784	1.2003	535.0		0.18273	150.4	0.2583	0.2824	1.2122	529.2	260
270	0.20198	153.8	0.2640	0.2771	1.1898	543.4		0.18765	153.2	0.2622	0.2806	1.2002	538.1	270
280	0.20692	156.6	0.2678	0.2762	1.1807	551.5		0.19242	156.0	0.2660	0.2793	1.1899	546.5	280
290	0.21174	159.4	0.2715	0.2756	1.1727	559.3		0.19708	158.8	0.2697	0.2783	1.1808	554.6	290
300	0.21648	162.1	0.2751	0.2753	1.1655	566.8		0.20164	161.6	0.2734	0.2778	1.1729	562.3	300
310	0.22111	164.9	0.2787	0.2752	1.1592	574.0		0.20610	164.4	0.2770	0.2774	1.1658	569.8	310
320	0.22567	167.6	0.2823	0.2753	1.1535	581.0		0.21049	167.2	0.2806	0.2774	1.1595	577.0	320
330	0.23016	170.4	0.2858	0.2756	1.1483	587.7		0.21480	169.9	0.2842	0.2775	1.1538	584.0	330
340	0.23459	173.1	0.2892	0.2760	1.1436	594.3		0.21904	172.7	0.2876	0.2778	1.1487	590.8	340
350	0.23895	175.9	0.2927	0.2766	1.1393	600.7		0.22323	175.5	0.2911	0.2782	1.1440	597.4	350
360	0.24327	178.7	0.2961	0.2772	1.1354	607.0		0.22736	178.3	0.2945	0.2787	1.1397	603.8	360
370	0.24754	181.5	0.2994	0.2780	1.1318	613.1		0.23144	181.1	0.2979	0.2794	1.1358	610.0	370
380	0.25176	184.2	0.3028	0.2788	1.1285	619.0		0.23548	183.9	0.3013	0.2801	1.1322	616.1	380
390	0.25594	187.0	0.3061	0.2797	1.1254	624.8		0.23948	186.7	0.3046	0.2809	1.1289	622.1	390
400	0.26008	189.8	0.3094	0.2806	1.1225	630.5		0.24343	189.5	0.3079	0.2818	1.1258	627.9	400
410	0.26419	192.6	0.3126	0.2816	1.1198	636.1		0.24735	192.3	0.3111	0.2827	1.1229	633.6	410
420	0.26827	195.5	0.3158	0.2827	1.1173	641.6		0.25123	195.1	0.3144	0.2837	1.1202	639.2	420
430	0.27232	198.3	0.3190	0.2837	1.1150	647.0		0.25509	198.0	0.3176	0.2847	1.1177	644.7	430
440	0.27633	201.1	0.3222	0.2848	1.1127	652.3		0.25891	200.8	0.3208	0.2857	1.1153	650.1	440
450	0.28032	204.0	0.3254	0.2860	1.1107	657.5		0.26272	203.7	0.3239	0.2868	1.1131	655.4	450
460	0.28428	206.9	0.3285	0.2871	1.1087	662.6		0.26649	206.6	0.3271	0.2879	1.1110	660.6	460
470	0.28823	209.7	0.3316	0.2883	1.1069	667.6		0.27024	209.4	0.3302	0.2890	1.1091	665.8	470

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 360.00 psia							Pressure = 380.00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
171	0.01689	72.9	0.1373	0.4727	1.9458	816.6	SAT LIQ	0.01723	74.9	0.1404	0.4922	2.0110	769.2	175.6
171	0.11237	120.9	0.2135	0.4391	1.8089	393.7	SAT VAP	0.10408	120.8	0.2127	0.4714	1.9181	386.9	175.6
180	0.12101	124.6	0.2193	0.3841	1.6069	415.6		0.10867	122.8	0.2158	0.4302	1.7675	399.3	180
190	0.12915	128.2	0.2249	0.3508	1.4840	435.3		0.11748	126.8	0.2220	0.3771	1.5732	422.3	190
200	0.13633	131.6	0.2301	0.3303	1.4071	452.1		0.12497	130.4	0.2276	0.3478	1.4652	441.0	200
210	0.14285	134.9	0.2350	0.3164	1.3540	466.8		0.13161	133.8	0.2326	0.3292	1.3955	457.2	210
220	0.14888	138.0	0.2396	0.3066	1.3149	480.0		0.13772	137.0	0.2374	0.3164	1.3462	471.5	220
230	0.15458	141.0	0.2440	0.2993	1.2847	492.1		0.14338	140.1	0.2420	0.3072	1.3094	484.4	230
240	0.15998	144.0	0.2483	0.2939	1.2608	503.2		0.14874	143.2	0.2464	0.3003	1.2808	496.3	240
250	0.16513	146.9	0.2524	0.2898	1.2413	513.6		0.15382	146.2	0.2506	0.2952	1.2579	507.2	250
260	0.17007	149.8	0.2565	0.2867	1.2251	523.4		0.15869	149.1	0.2547	0.2913	1.2391	517.5	260
270	0.17486	152.6	0.2604	0.2843	1.2114	532.6		0.16338	152.0	0.2587	0.2883	1.2235	527.2	270
280	0.17950	155.5	0.2643	0.2825	1.1997	541.4		0.16791	154.9	0.2626	0.2860	1.2102	536.3	280
290	0.18402	158.3	0.2680	0.2813	1.1895	549.8		0.17231	157.7	0.2664	0.2844	1.1987	545.1	290
300	0.18843	161.1	0.2718	0.2804	1.1806	557.9		0.17660	160.6	0.2702	0.2831	1.1888	553.4	300
310	0.19275	163.9	0.2754	0.2798	1.1728	565.6		0.18079	163.4	0.2739	0.2823	1.1801	561.4	310
320	0.19698	166.7	0.2790	0.2795	1.1658	573.1		0.18488	166.2	0.2775	0.2818	1.1724	569.1	320
330	0.20113	169.5	0.2826	0.2794	1.1596	580.3		0.18890	169.0	0.2811	0.2815	1.1655	576.5	330
340	0.20522	172.3	0.2861	0.2796	1.1539	587.2		0.19285	171.8	0.2846	0.2814	1.1594	583.7	340
350	0.20925	175.1	0.2896	0.2798	1.1488	594.0		0.19673	174.6	0.2881	0.2815	1.1538	590.7	350
360	0.21322	177.9	0.2930	0.2803	1.1442	600.6		0.20055	177.5	0.2916	0.2818	1.1488	597.4	360
370	0.21713	180.7	0.2964	0.2808	1.1399	607.0		0.20433	180.3	0.2950	0.2822	1.1442	604.0	370
380	0.22100	183.5	0.2998	0.2814	1.1360	613.2		0.20805	183.1	0.2984	0.2828	1.1400	610.4	380
390	0.22483	186.3	0.3031	0.2821	1.1324	619.3		0.21173	185.9	0.3018	0.2834	1.1361	616.6	390
400	0.22862	189.1	0.3064	0.2829	1.1291	625.3		0.21537	188.8	0.3051	0.2841	1.1325	622.7	400
410	0.23237	192.0	0.3097	0.2838	1.1260	631.1		0.21897	191.6	0.3084	0.2849	1.1292	628.7	410
420	0.23609	194.8	0.3130	0.2847	1.1231	636.9		0.22254	194.5	0.3116	0.2857	1.1262	634.5	420
430	0.23978	197.7	0.3162	0.2856	1.1205	642.5		0.22608	197.3	0.3149	0.2866	1.1233	640.2	430
440	0.24343	200.5	0.3194	0.2866	1.1180	648.0		0.22958	200.2	0.3181	0.2876	1.1206	645.8	440
450	0.24707	203.4	0.3226	0.2877	1.1156	653.4		0.23306	203.1	0.3213	0.2885	1.1181	651.3	450
460	0.25066	206.3	0.3257	0.2887	1.1134	658.7		0.23651	206.0	0.3244	0.2896	1.1158	656.7	460
470	0.25425	209.2	0.3288	0.2898	1.1113	663.9		0.23994	208.9	0.3275	0.2906	1.1136	662.0	470
480	0.25781	212.1	0.3319	0.2909	1.1093	669.0		0.24334	211.8	0.3307	0.2917	1.1115	667.2	480

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)
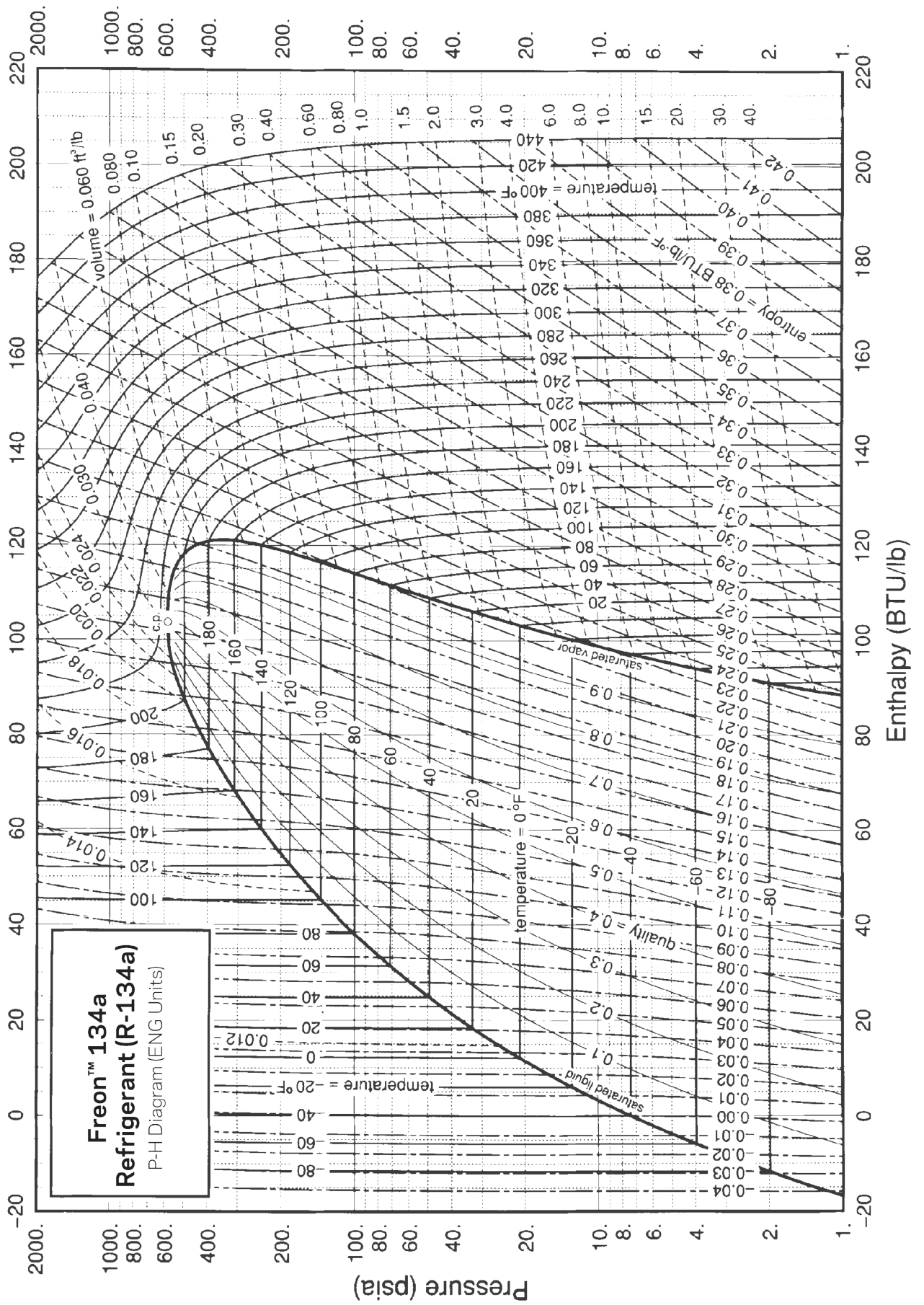
V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 400.00 psia							Pressure = 450 .00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
179.9	0.01759	76.9	0.1435	0.5155	2.0897	722.7	SAT LIQ	0.01863	81.9	0.1509	0.6009	2.3854	608.8	190.1
179.9	0.09649	120.7	0.2119	0.5106	2.0521	380.0	SAT VAP	0.07983	119.8	0.2093	0.6594	2.5670	362.7	190.1
180	0.09655	120.7	0.2119	0.5097	2.0487	380.2		—	—	—	—	—	—	180
190	0.10650	125.2	0.2190	0.4139	1.6998	408.0		—	—	—	—	—	—	190
200	0.11446	129.1	0.2249	0.3701	1.5401	429.3		0.09065	125.2	0.2175	0.4691	1.8802	395.7	200
210	0.12136	132.7	0.2303	0.3445	1.4457	447.2		0.09871	129.5	0.2239	0.4019	1.6381	419.8	210
220	0.12755	136.0	0.2352	0.3278	1.3828	462.7		0.10546	133.3	0.2296	0.3664	1.5097	439.3	220
230	0.13325	139.3	0.2399	0.3160	1.3375	476.6		0.11141	136.8	0.2348	0.3443	1.4287	456.1	230
240	0.13858	142.4	0.2444	0.3075	1.3031	489.2		0.11683	140.2	0.2396	0.3294	1.3726	470.9	240
250	0.14362	145.4	0.2487	0.3011	1.2762	500.8		0.12184	143.4	0.2442	0.3186	1.3311	484.2	250
260	0.14842	148.4	0.2529	0.2963	1.2544	511.6		0.12656	146.6	0.2486	0.3107	1.2991	496.5	260
270	0.15302	151.3	0.2570	0.2926	1.2364	521.7		0.13102	149.7	0.2529	0.3047	1.2737	507.8	270
280	0.15746	154.3	0.2609	0.2898	1.2214	531.2		0.13530	152.7	0.2570	0.3002	1.2530	518.4	280
290	0.16176	157.1	0.2648	0.2876	1.2085	540.3		0.13940	155.7	0.2610	0.2967	1.2358	528.3	290
300	0.16594	160.0	0.2686	0.2860	1.1974	548.9		0.14337	158.6	0.2649	0.2940	1.2212	537.8	300
310	0.17001	162.9	0.2724	0.2849	1.1878	557.2		0.14721	161.5	0.2687	0.2919	1.2087	546.8	310
320	0.17399	165.7	0.2760	0.2841	1.1793	565.1		0.15095	164.5	0.2725	0.2904	1.1979	555.3	320
330	0.17788	168.5	0.2796	0.2836	1.1717	572.8		0.15460	167.4	0.2762	0.2892	1.1885	563.5	330
340	0.18171	171.4	0.2832	0.2833	1.1650	580.2		0.15816	170.2	0.2798	0.2885	1.1801	571.5	340
350	0.18546	174.2	0.2867	0.2833	1.1590	587.3		0.16166	173.1	0.2834	0.2880	1.1727	579.1	350
360	0.18916	177.0	0.2902	0.2834	1.1535	594.3		0.16508	176.0	0.2869	0.2877	1.1660	586.4	360
370	0.19280	179.9	0.2937	0.2837	1.1485	601.0		0.16846	178.9	0.2904	0.2877	1.1600	593.6	370
380	0.19639	182.7	0.2971	0.2842	1.1440	607.5		0.17177	181.8	0.2939	0.2878	1.1546	600.5	380
390	0.19994	185.6	0.3004	0.2847	1.1399	613.9		0.17504	184.6	0.2973	0.2880	1.1496	607.2	390
400	0.20345	188.4	0.3038	0.2853	1.1360	620.1		0.17827	187.5	0.3007	0.2884	1.1451	613.8	400
410	0.20692	191.3	0.3071	0.2860	1.1325	626.2		0.18146	190.4	0.3040	0.2889	1.1410	620.2	410
420	0.21034	194.1	0.3103	0.2868	1.1292	632.2		0.18460	193.3	0.3073	0.2895	1.1371	626.4	420
430	0.21375	197.0	0.3136	0.2876	1.1262	638.0		0.18772	196.2	0.3106	0.2902	1.1336	632.5	430
440	0.21712	199.9	0.3168	0.2885	1.1233	643.7		0.19080	199.1	0.3138	0.2909	1.1303	638.4	440
450	0.22046	202.8	0.3200	0.2894	1.1207	649.3		0.19386	202.0	0.3171	0.2917	1.1273	644.3	450
460	0.22377	205.7	0.3232	0.2904	1.1182	654.8		0.19689	204.9	0.3202	0.2925	1.1244	650.0	460
470	0.22706	208.6	0.3263	0.2914	1.1159	660.2		0.19988	207.9	0.3234	0.2934	1.1217	655.6	470
480	0.23033	211.5	0.3294	0.2924	1.1137	665.5		0.20286	210.8	0.3266	0.2943	1.1192	661.1	480
490	—	—	—	—	—	—		0.20582	213.8	0.3297	0.2953	1.1169	666.5	490

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Tables (continued)

V = Volume in ft³/lb   H = Enthalpy in Btu/lb   S = Entropy in [Btu/lb·°R] v_s = Velocity of Sound in ft/sec

C_p = Heat Capacity at Constant Pressure in Btu/(lb)(°F) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°F]	Pressure = 500.00 psia							Pressure = 550 .00 psia						Temp [°F]
	V	H	S	C_p	C_p/C_v	v_s		V	H	S	C_p	C_p/C_v	v_s	
199.4	0.02000	86.9	0.1584	0.7816	3.0254	496.6	SAT LIQ	0.02220	92.6	0.1666	1.4681	5.4885	383.6	207.9
199.4	0.06538	118.1	0.2057	0.9822	3.6942	345.3	SAT VAP	0.05143	114.8	0.1999	2.1740	7.8546	326.9	207.9
200	0.06646	118.7	0.2065	0.9106	3.4381	348.6		—	—	—	—	—	—	200
210	0.07860	125.3	0.2164	0.5274	2.0697	387.4		0.05690	118.0	0.2047	1.1701	4.3182	342.5	210
220	0.08669	130.0	0.2234	0.4325	1.7319	413.4		0.06958	125.7	0.2160	0.5764	2.2242	383.6	220
230	0.09326	134.1	0.2294	0.3868	1.5687	434.1		0.07750	130.7	0.2234	0.4582	1.8079	410.4	230
240	0.09896	137.8	0.2348	0.3596	1.4704	451.7		0.08380	135.0	0.2296	0.4041	1.6167	431.7	240
250	0.10410	141.3	0.2397	0.3416	1.4041	467.2		0.08923	138.9	0.2351	0.3727	1.5046	449.7	250
260	0.10883	144.6	0.2444	0.3289	1.3561	481.1		0.09409	142.5	0.2402	0.3522	1.4302	465.5	260
270	0.11326	147.9	0.2489	0.3195	1.3196	493.8		0.09855	146.0	0.2449	0.3378	1.3769	479.7	270
280	0.11744	151.0	0.2532	0.3125	1.2909	505.5		0.10270	149.3	0.2494	0.3273	1.3368	492.7	280
290	0.12142	154.1	0.2573	0.3072	1.2677	516.4		0.10662	152.5	0.2538	0.3194	1.3055	504.6	290
300	0.12523	157.2	0.2614	0.3030	1.2486	526.7		0.11034	155.7	0.2580	0.3134	1.2803	515.8	300
310	0.12891	160.2	0.2653	0.2998	1.2325	536.4		0.11390	158.8	0.2620	0.3088	1.2595	526.3	310
320	0.13248	163.2	0.2692	0.2974	1.2188	545.6		0.11733	161.8	0.2660	0.3051	1.2422	536.2	320
330	0.13594	166.1	0.2730	0.2955	1.2070	554.4		0.12065	164.9	0.2699	0.3023	1.2275	545.6	330
340	0.13930	169.1	0.2767	0.2940	1.1966	562.9		0.12387	167.9	0.2737	0.3001	1.2148	554.5	340
350	0.14260	172.0	0.2803	0.2930	1.1876	571.0		0.12700	170.9	0.2774	0.2985	1.2038	563.1	350
360	0.14582	174.9	0.2839	0.2923	1.1795	578.8		0.13005	173.9	0.2810	0.2972	1.1941	571.4	360
370	0.14898	177.9	0.2874	0.2918	1.1723	586.3		0.13304	176.8	0.2846	0.2963	1.1855	579.3	370
380	0.15208	180.8	0.2909	0.2916	1.1659	593.6		0.13597	179.8	0.2882	0.2957	1.1779	587.0	380
390	0.15513	183.7	0.2944	0.2916	1.1600	600.7		0.13884	182.7	0.2917	0.2953	1.1710	594.4	390
400	0.15813	186.6	0.2978	0.2917	1.1547	607.6		0.14167	185.7	0.2951	0.2951	1.1648	601.6	400
410	0.16110	189.5	0.3012	0.2920	1.1499	614.3		0.14445	188.7	0.2985	0.2951	1.1592	608.6	410
420	0.16402	192.5	0.3045	0.2923	1.1454	620.8		0.14719	191.6	0.3019	0.2953	1.1541	615.4	420
430	0.16691	195.4	0.3078	0.2928	1.1413	627.1		0.14989	194.6	0.3053	0.2956	1.1494	622.0	430
440	0.16976	198.3	0.3111	0.2934	1.1376	633.4		0.15256	197.5	0.3086	0.2960	1.1451	628.4	440
450	0.17259	201.2	0.3143	0.2940	1.1341	639.4		0.15520	200.5	0.3118	0.2964	1.1411	634.7	450
460	0.17538	204.2	0.3176	0.2947	1.1308	645.4		0.15780	203.4	0.3151	0.2970	1.1374	640.9	460
470	0.17815	207.1	0.3208	0.2955	1.1278	651.2		0.16038	206.4	0.3183	0.2976	1.1340	646.9	470
480	0.18090	210.1	0.3239	0.2963	1.1249	656.9		0.16294	209.4	0.3215	0.2983	1.1308	652.8	480
490	0.18362	213.1	0.3271	0.2972	1.1223	662.5		0.16547	212.4	0.3246	0.2991	1.1278	658.6	490
500	0.18632	216.0	0.3302	0.2981	1.1198	668.0		0.16798	215.4	0.3278	0.2999	1.1250	664.3	500

Freon™ 134a
Refrigerant (R-134a)
P-H Diagram (ENG Units)