



DuPont Fluorochemicals

Thermodynamic
Properties
of
HFC-23

(trifluoromethane)

DuPont Product Names:

Freon[®] 23

Thermodynamic Properties of HFC-23 Refrigerant (trifluoromethane)

SI Units

New tables of the thermodynamic properties of HFC-23 have been developed and are presented here. These tables are based on experimental data developed by Y. C. Hou and J. J. Martin, and presented in their paper, "Physical and Thermodynamic Properties of Trifluoromethane" (A. I. Ch. E. Journal 5:125–29). Equations have been developed, based on the Martin-Hou equation of state, which represent the data with accuracy and consistency throughout the entire range of temperature, pressure, and density.

Physical Properties

Chemical Formula	CHF ₃	
Molecular Weight	70.02	
Boiling Point at One Atmosphere	–82.03°C	(–115.64°F)
Critical Temperature, T _c	25.92°C	(78.66°F)
	299.07 K	(583.33°R)
Critical Pressure, P _c	4836.0 kPa (abs)	(701.4 psia)
Critical Density, D _c	525.02 kg/m ³	(32.78 lb/ft ³)
Critical Volume, V _c	0.00190 m ³ /kg	(0.0305 ft ³ /lb)

Units and Factors

t	= temperature in °C
T	= temperature in K = °C + 273.15
P	= pressure in kiloPascals absolute [kPa (abs)]
v _f	= volume of saturated liquid in m ³ /kg
v _g	= volume of saturated vapor in m ³ /kg
V	= volume of superheated vapor in m ³ /kg
d _f	= 1/v _f = density of saturated liquid in kg/m ³
d _g	= 1/v _g = density of saturated vapor in kg/m ³
h _f	= enthalpy of saturated liquid in kJ/kg
h _{fg}	= enthalpy of vaporization in kJ/kg
h _g	= enthalpy of saturated vapor in kJ/kg
H	= enthalpy of superheated vapor in kJ/kg
s _f	= entropy of saturated liquid in kJ/(kg) (K)
s _g	= entropy of saturated vapor in kJ/(kg) (K)
S	= entropy of superheated vapor in kJ/(kg) (K)
C _p	= heat capacity at constant pressure in kJ/(kg) (°C)
C _v	= heat capacity at constant volume in kJ/(kg) (°C)
v _s	= velocity of sound in m/sec

The gas constant, R = 8.314 J/(mole) (K)
for HFC-23, R = 0.1187 kJ/kg · K

One atmosphere = 101.325 kPa

Reference point for enthalpy and entropy:

h_f = 200 kJ/kg at 0°C

s_f = 1 kJ/kg · K at 0°C

Equations

1. Conversion Factors—SI Units to IP Units

Properties listed in the following thermodynamic tables in SI units can be converted to I/P units using the conversion factors shown below. Please note that in converting enthalpy and entropy from SI to I/P 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°F for I/P units). In the conversion equation below, H (ref) and S (ref) are the saturated liquid enthalpy and entropy at –40°C. For HFC-23, H (ref) = 141.5 kJ/kg and S (ref) = 0.7748 kJ/kg·K.

P (psia)	= P (kPa)·0.14504
T (°F)	= (T[°C]·1.8) + 32
D (lb/ft ³)	= D (kg/m ³)·0.062428
V (ft ³ /lg)	= V (m ³ /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

2. Martin-Hou Equation of State

Coefficients for the Martin-Hou equation of state are presented below:

$$P = RT/(V-b) + \sum_{i=2}^6 (A_i + B_i T + C_i \exp [-kT/T_c])/(V-b)^i$$

For SI units

T and T_c are in $K = ^\circ C + 273.15$, V is in m^3/kg , and P is in kPa.

$R = 0.1187 \text{ kJ/kg}\cdot K$ for HFC-23

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

$$A_2 = -1.257406 \text{ E-01} \quad A_4 = 2.165681 \text{ E-07}$$

$$B_2 = 1.679677 \text{ E-04} \quad B_4 = -6.944729 \text{ E-10}$$

$$C_2 = -4.293246 \text{ E+00} \quad C_4 = 0.000000 \text{ E+00}$$

$$A_3 = -2.092649 \text{ E-05} \quad A_5 = -2.529079 \text{ E-10}$$

$$B_3 = 2.335060 \text{ E-07} \quad B_5 = 7.596729 \text{ E-13}$$

$$C_3 = 9.966228 \text{ E-03} \quad C_5 = -4.833999 \text{ E-09}$$

$$A_6 = 0.000000 \text{ E+00}$$

$$B_6 = 0.000000 \text{ E+00}$$

$$C_6 = 0.000000 \text{ E+00}$$

$$b = 7.803500 \text{ E-05} \quad k = 5.500000 \text{ E+00}$$

X and Y are constants used in the enthalpy and entropy equations for the Martin-Hou equation of state:

$$X = 2.385000 \text{ E+02} \quad Y = 2.225000 \text{ E-01}$$

For I/P units

T and T_c are in $^{\circ}R = ^{\circ}F + 459.67$, V is in ft^3/lb , and P is in psia.

$R = 0.1533 \text{ (psia) (ft}^3\text{)/lb}\cdot^{\circ}R$ for HFC-23

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

$$A_2 = -4.679499 \text{ E+00} \quad A_4 = 2.068042 \text{ E-03}$$

$$B_2 = 3.472778 \text{ E-03} \quad B_4 = -3.684238 \text{ E-06}$$

$$C_2 = -1.597752 \text{ E+02} \quad C_4 = 0.000000 \text{ E+00}$$

$$A_3 = -1.247500 \text{ E-02} \quad A_5 = -3.868546 \text{ E-05}$$

$$B_3 = 7.733388 \text{ E-05} \quad B_5 = 6.455643 \text{ E-08}$$

$$C_3 = 5.941212 \text{ E+00} \quad C_5 = -7.394214 \text{ E-04}$$

$$A_6 = 7.502357 \text{ E+07}$$

$$B_6 = -1.114202 \text{ E+05}$$

$$C_6 = 0.000000 \text{ E+00}$$

$$b = 1.250000 \text{ E-03} \quad k = 5.500000 \text{ E+00}$$

X and Y are constants used in the enthalpy and entropy equations for the Martin-Hou equation of state:

$$X = 4.170000 \text{ E+01} \quad Y = -2.557000 \text{ E-01}$$

Ideal Gas Heat Capacity (at constant volume):

$$C_v^{\circ} = a + bT + cT^2 + dT^3 + f/T^2$$

For SI units

$$C_v^{\circ} = \text{kJ/kg}\cdot K$$

T is in $K = ^\circ C + 273.15$

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

$$a = 3.191536 \text{ E-01} \quad d = -5.990234 \text{ E-09}$$

$$b = -5.694947 \text{ E-05} \quad f = 0.000000 \text{ E+00}$$

$$c = 5.295808 \text{ E-06}$$

For I/P units

$$C_v^{\circ} = \text{Btu/lb}\cdot^{\circ}R$$

T is in $^{\circ}R = ^{\circ}F + 459.67$

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

$$a = 7.628087 \text{ E-02} \quad d = -2.454905 \text{ E-10}$$

$$b = -7.561805 \text{ E-06} \quad f = 0.000000 \text{ E+00}$$

$$c = 3.906570 \text{ E-07}$$

3. Vapor Pressure

$$\log_{10} P_{\text{sat}} = A + B/T + C \log_{10} T + D T + E (T)^2 + F(T)^3$$

For SI units

T is in $K = ^\circ C + 273.15$ and P is in kPa

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

$$A = 2.928566 \text{ E+02} \quad D = 4.358070 \text{ E-01}$$

$$B = -4.418205 \text{ E+03} \quad E = -6.894935 \text{ E-04}$$

$$C = -1.445142 \text{ E+02} \quad F = 5.502466 \text{ E-07}$$

For I/P units

T is in $^{\circ}R = ^{\circ}F + 459.67$ and P is in psia

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

$$A = 3.289085 \text{ E+02} \quad D = 2.421150 \text{ E-01}$$

$$B = -7.952769 \text{ E+03} \quad E = -2.128067 \text{ E-04}$$

$$C = -1.445142 \text{ E+02} \quad F = 9.434955 \text{ E-08}$$

4. 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/m³

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

$$A_f = 5.250179 \text{ E}+02 \quad D_f = 2.309251 \text{ E}+03$$

$$B_f = 1.015216 \text{ E}+03 \quad E_f = -1.700080 \text{ E}+03$$

$$C_f = -4.053520 \text{ E}+02$$

For I/P units

$T_r = T/T_c$, both in °R = °F + 459.67 and d_f is in lb/ft³

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

$$A_f = 3.277580 \text{ E}+01 \quad D_f = 1.441618 \text{ E}+02$$

$$B_f = 6.337784 \text{ E}+01 \quad E_f = -1.061328 \text{ E}+02$$

$$C_f = -2.530533 \text{ E}+01$$

TABLE 1
HFC-23 Saturation Properties—Temperature Table

TEMP. °C	PRESSURE kPa (abs)	VOLUME m ³ /kg		DENSITY kg/m ³		ENTHALPY kJ/kg			ENTROPY kJ/(kg)(K)		TEMP. °C
		LIQUID v _f	VAPOR v _g	LIQUID 1/v _f	VAPOR 1/v _g	LIQUID h _f	LATENT h _{fg}	VAPOR h _g	LIQUID s _f	VAPOR s _g	
-150	0.133	0.00062	110.1256	1611.545	0.009	-6.5	301.4	294.9	-0.1011	2.3464	-150
-149	0.157	0.00062	94.0688	1609.633	0.011	-4.4	299.8	295.4	-0.0842	2.3307	-149
-148	0.184	0.00062	80.6283	1607.705	0.012	-2.3	298.3	295.9	-0.0678	2.3155	-148
-147	0.216	0.00062	69.3371	1605.760	0.014	-0.3	296.8	296.4	-0.0518	2.3006	-147
-146	0.252	0.00062	59.8183	1603.799	0.017	1.6	295.3	296.9	-0.0362	2.2861	-146
-145	0.294	0.00062	51.7665	1601.822	0.019	3.6	293.8	297.4	-0.0210	2.2719	-145
-144	0.341	0.00063	44.9332	1599.828	0.022	5.5	292.4	297.9	-0.0063	2.2581	-144
-143	0.395	0.00063	39.1154	1597.818	0.026	7.3	291.1	298.4	0.0082	2.2446	-143
-142	0.456	0.00063	34.1469	1595.791	0.029	9.2	289.7	298.9	0.0222	2.2314	-142
-141	0.524	0.00063	29.8910	1593.746	0.033	11.0	288.4	299.4	0.0359	2.2185	-141
-140	0.602	0.00063	26.2348	1591.685	0.038	12.8	287.2	299.9	0.0492	2.2060	-140
-139	0.689	0.00063	23.0849	1589.607	0.043	14.5	285.9	300.4	0.0623	2.1937	-139
-138	0.787	0.00063	20.3639	1587.512	0.049	16.2	284.7	300.9	0.0750	2.1817	-138
-137	0.896	0.00063	18.0069	1585.400	0.056	17.9	283.5	301.4	0.0874	2.1699	-137
-136	1.019	0.00063	15.9601	1583.270	0.063	19.6	282.4	301.9	0.0995	2.1585	-136
-135	1.155	0.00063	14.1780	1581.123	0.071	21.2	281.3	302.4	0.1114	2.1472	-135
-134	1.306	0.00063	12.6228	1578.958	0.079	22.8	280.2	302.9	0.1230	2.1363	-134
-133	1.474	0.00063	11.2622	1576.776	0.089	24.4	279.1	303.4	0.1343	2.1255	-133
-132	1.660	0.00064	10.0692	1574.576	0.099	25.9	278.0	303.9	0.1453	2.1150	-132
-131	1.866	0.00064	9.0207	1572.358	0.111	27.5	277.0	304.4	0.1561	2.1047	-131
-130	2.093	0.00064	8.0973	1570.122	0.123	29.0	276.0	304.9	0.1667	2.0946	-130
-129	2.343	0.00064	7.2823	1567.867	0.137	30.5	275.0	305.4	0.1771	2.0848	-129
-128	2.618	0.00064	6.5615	1565.595	0.152	31.9	274.0	305.9	0.1873	2.0751	-128
-127	2.919	0.00064	5.9226	1563.304	0.169	33.4	273.1	306.4	0.1972	2.0657	-127
-126	3.249	0.00064	5.3554	1560.995	0.187	34.8	272.1	306.9	0.2069	2.0564	-126
-125	3.611	0.00064	4.8507	1558.667	0.206	36.2	271.2	307.4	0.2165	2.0473	-125
-124	4.005	0.00064	4.4008	1556.321	0.227	37.6	270.3	307.9	0.2259	2.0384	-124
-123	4.435	0.00064	3.9992	1553.956	0.250	39.0	269.5	308.4	0.2351	2.0297	-123
-122	4.904	0.00064	3.6398	1551.571	0.275	40.3	268.6	308.9	0.2441	2.0211	-122
-121	5.413	0.00065	3.3179	1549.168	0.301	41.7	267.7	309.4	0.2530	2.0127	-121
-120	5.966	0.00065	3.0289	1546.745	0.330	43.0	266.9	309.9	0.2617	2.0045	-120
-119	6.565	0.00065	2.7691	1544.303	0.361	44.3	266.1	310.4	0.2703	1.9964	-119
-118	7.214	0.00065	2.5351	1541.842	0.394	45.6	265.3	310.9	0.2787	1.9885	-118
-117	7.915	0.00065	2.3241	1539.361	0.430	46.9	264.5	311.4	0.2870	1.9807	-117
-116	8.673	0.00065	2.1336	1536.860	0.469	48.2	263.7	311.9	0.2951	1.9731	-116
-115	9.490	0.00065	1.9612	1534.340	0.510	49.5	262.9	312.4	0.3032	1.9656	-115
-114	10.370	0.00065	1.8050	1531.799	0.554	50.7	262.1	312.9	0.3111	1.9582	-114
-113	11.317	0.00065	1.6633	1529.238	0.601	52.0	261.4	313.4	0.3189	1.9510	-113
-112	12.334	0.00066	1.5346	1526.657	0.652	53.2	260.6	313.8	0.3266	1.9439	-112
-111	13.427	0.00066	1.4176	1524.055	0.705	54.4	259.9	314.3	0.3342	1.9369	-111
-110	14.598	0.00066	1.3110	1521.432	0.763	55.7	259.1	314.8	0.3417	1.9300	-110
-109	15.852	0.00066	1.2137	1518.789	0.824	56.9	258.4	315.3	0.3491	1.9233	-109
-108	17.195	0.00066	1.1249	1516.125	0.889	58.1	257.7	315.8	0.3564	1.9166	-108
-107	18.630	0.00066	1.0437	1513.440	0.958	59.3	257.0	316.2	0.3636	1.9101	-107
-106	20.162	0.00066	0.9694	1510.733	1.032	60.5	256.2	316.7	0.3708	1.9037	-106
-105	21.796	0.00066	0.9013	1508.005	1.110	61.7	255.5	317.2	0.3779	1.8974	-105
-104	23.538	0.00066	0.8388	1505.256	1.192	62.8	254.8	317.6	0.3849	1.8912	-104
-103	25.392	0.00067	0.7815	1502.484	1.280	64.0	254.1	318.1	0.3918	1.8851	-103
-102	27.365	0.00067	0.7287	1499.691	1.372	65.2	253.4	318.6	0.3986	1.8791	-102
-101	29.461	0.00067	0.6801	1496.876	1.470	66.4	252.7	319.0	0.4055	1.8732	-101
-100	31.687	0.00067	0.6354	1494.038	1.574	67.5	252.0	319.5	0.4122	1.8674	-100
-99	34.048	0.00067	0.5941	1491.177	1.683	68.7	251.3	319.9	0.4189	1.8616	-99
-98	36.552	0.00067	0.5560	1488.294	1.799	69.9	250.5	320.4	0.4255	1.8560	-98
-97	39.203	0.00067	0.5207	1485.388	1.920	71.0	249.8	320.8	0.4321	1.8504	-97
-96	42.008	0.00067	0.4881	1482.459	2.049	72.2	249.1	321.3	0.4386	1.8449	-96
-95	44.975	0.00068	0.4580	1479.507	2.183	73.3	248.4	321.7	0.4451	1.8395	-95
-94	48.109	0.00068	0.4300	1476.531	2.326	74.5	247.7	322.2	0.4516	1.8342	-94
-93	51.418	0.00068	0.4041	1473.532	2.475	75.6	247.0	322.6	0.4580	1.8290	-93
-92	54.909	0.00068	0.3800	1470.508	2.632	76.8	246.3	323.0	0.4644	1.8238	-92
-91	58.589	0.00068	0.3576	1467.461	2.796	77.9	245.5	323.5	0.4707	1.8187	-91

TABLE 1 (continued)
HFC-23 Saturation Properties—Temperature Table

TEMP. °C	PRESSURE kPa (abs)	VOLUME m ³ /kg		DENSITY kg/m ³		ENTHALPY kJ/kg			ENTROPY kJ/(kg)(K)		TEMP. °C
		LIQUID v _f	VAPOR v _g	LIQUID 1/v _f	VAPOR 1/v _g	LIQUID h _f	LATENT h _{fg}	VAPOR h _g	LIQUID s _f	VAPOR s _g	
-90	62.465	0.00068	0.3368	1464.389	2.969	79.1	244.8	323.9	0.4770	1.8137	-90
-89	66.546	0.00068	0.3174	1461.293	3.151	80.3	244.1	324.3	0.4833	1.8087	-89
-88	70.838	0.00069	0.2993	1458.171	3.341	81.4	243.3	324.8	0.4896	1.8038	-88
-87	75.351	0.00069	0.2825	1455.025	3.540	82.6	242.6	325.2	0.4958	1.7990	-87
-86	80.091	0.00069	0.2668	1451.854	3.748	83.7	241.9	325.6	0.5020	1.7943	-86
-85	85.067	0.00069	0.2521	1448.656	3.967	84.9	241.1	326.0	0.5082	1.7896	-85
-84	90.287	0.00069	0.2384	1445.434	4.195	86.1	240.3	326.4	0.5143	1.7849	-84
-83	95.761	0.00069	0.2256	1442.185	4.433	87.2	239.6	326.8	0.5204	1.7804	-83
-82	101.495	0.00069	0.2136	1438.910	4.682	88.4	238.8	327.2	0.5266	1.7759	-82
-81	107.500	0.00070	0.2023	1435.608	4.943	89.6	238.0	327.6	0.5327	1.7714	-81
-80	113.785	0.00070	0.1918	1432.280	5.214	90.7	237.2	328.0	0.5387	1.7670	-80
-79	120.357	0.00070	0.1819	1428.924	5.498	91.9	236.4	328.4	0.5448	1.7627	-79
-78	127.228	0.00070	0.1727	1425.541	5.790	93.1	235.6	328.8	0.5509	1.7584	-78
-77	134.404	0.00070	0.1640	1422.131	6.098	94.3	234.8	329.1	0.5569	1.7541	-77
-76	141.898	0.00070	0.1558	1418.692	6.418	95.5	234.0	329.5	0.5629	1.7500	-76
-75	149.717	0.00071	0.1481	1415.225	6.752	96.7	233.2	329.9	0.5689	1.7458	-75
-74	157.871	0.00071	0.1409	1411.730	7.097	97.9	232.4	330.2	0.5749	1.7417	-74
-73	166.371	0.00071	0.1340	1408.206	7.463	99.1	231.5	330.6	0.5809	1.7377	-73
-72	175.226	0.00071	0.1276	1404.652	7.837	100.3	230.7	331.0	0.5869	1.7337	-72
-71	184.447	0.00071	0.1216	1401.070	8.224	101.5	229.8	331.3	0.5929	1.7298	-71
-70	194.043	0.00072	0.1159	1397.457	8.628	102.7	229.0	331.7	0.5988	1.7259	-70
-69	204.025	0.00072	0.1105	1393.814	9.050	103.9	228.1	332.0	0.6048	1.7220	-69
-68	214.403	0.00072	0.1054	1390.140	9.488	105.2	227.2	332.3	0.6108	1.7182	-68
-67	225.188	0.00072	0.1006	1386.435	9.940	106.4	226.3	332.7	0.6167	1.7144	-67
-66	236.389	0.00072	0.0961	1382.699	10.406	107.6	225.4	333.0	0.6226	1.7107	-66
-65	248.019	0.00073	0.0918	1378.932	10.893	108.9	224.5	333.3	0.6286	1.7070	-65
-64	260.087	0.00073	0.0877	1375.132	11.403	110.1	223.6	333.7	0.6345	1.7033	-64
-63	272.604	0.00073	0.0838	1371.300	11.933	111.4	222.6	334.0	0.6404	1.6997	-63
-62	285.582	0.00073	0.0802	1367.435	12.469	112.6	221.7	334.3	0.6463	1.6962	-62
-61	299.031	0.00073	0.0767	1363.536	13.038	113.9	220.7	334.6	0.6522	1.6926	-61
-60	312.962	0.00074	0.0735	1359.604	13.605	115.1	219.8	334.9	0.6581	1.6891	-60
-59	327.387	0.00074	0.0704	1355.637	14.205	116.4	218.8	335.2	0.6640	1.6857	-59
-58	342.316	0.00074	0.0674	1351.636	14.837	117.7	217.8	335.5	0.6699	1.6822	-58
-57	357.761	0.00074	0.0646	1347.599	15.480	119.0	216.8	335.8	0.6758	1.6788	-57
-56	373.734	0.00074	0.0619	1343.527	16.155	120.2	215.8	336.1	0.6817	1.6755	-56
-55	390.245	0.00075	0.0594	1339.418	16.835	121.5	214.8	336.3	0.6876	1.6722	-55
-54	407.306	0.00075	0.0570	1335.273	17.544	122.8	213.8	336.6	0.6934	1.6689	-54
-53	424.929	0.00075	0.0547	1331.091	18.282	124.1	212.7	336.9	0.6993	1.6656	-53
-52	443.126	0.00075	0.0525	1326.870	19.048	125.4	211.7	337.1	0.7051	1.6624	-52
-51	461.907	0.00076	0.0505	1322.612	19.802	126.8	210.6	337.4	0.7110	1.6592	-51
-50	481.285	0.00076	0.0485	1318.314	20.619	128.1	209.6	337.6	0.7168	1.6560	-50
-49	501.272	0.00076	0.0466	1313.977	21.459	129.4	208.5	337.9	0.7227	1.6528	-49
-48	521.878	0.00076	0.0448	1309.600	22.321	130.7	207.4	338.1	0.7285	1.6497	-48
-47	543.118	0.00077	0.0431	1305.181	23.202	132.0	206.3	338.4	0.7343	1.6466	-47
-46	565.001	0.00077	0.0414	1300.721	24.155	133.4	205.2	338.6	0.7401	1.6436	-46
-45	587.541	0.00077	0.0399	1296.219	25.063	134.7	204.1	338.8	0.7459	1.6405	-45
-44	610.749	0.00077	0.0384	1291.674	26.042	136.1	203.0	339.0	0.7517	1.6375	-44
-43	634.637	0.00078	0.0370	1287.085	27.027	137.4	201.8	339.2	0.7575	1.6345	-43
-42	659.219	0.00078	0.0356	1282.452	28.090	138.8	200.7	339.5	0.7633	1.6316	-42
-41	684.505	0.00078	0.0343	1277.774	29.155	140.1	199.5	339.7	0.7691	1.6286	-41
-40	710.509	0.00079	0.0331	1273.049	30.211	141.5	198.4	339.9	0.7748	1.6257	-40
-39	737.244	0.00079	0.0319	1268.277	31.348	142.8	197.2	340.0	0.7806	1.6228	-39
-38	764.720	0.00079	0.0307	1263.458	32.573	144.2	196.0	340.2	0.7863	1.6199	-38
-37	792.952	0.00079	0.0296	1258.590	33.784	145.6	194.8	340.4	0.7921	1.6170	-37
-36	821.952	0.00080	0.0286	1253.672	34.965	147.0	193.6	340.6	0.7978	1.6142	-36
-35	851.732	0.00080	0.0276	1248.703	36.232	148.3	192.4	340.7	0.8035	1.6114	-35
-34	882.307	0.00080	0.0266	1243.683	37.594	149.7	191.2	340.9	0.8092	1.6086	-34
-33	913.688	0.00081	0.0257	1238.610	38.911	151.1	189.9	341.0	0.8149	1.6058	-33
-32	945.890	0.00081	0.0248	1233.482	40.323	152.5	188.7	341.2	0.8206	1.6030	-32
-31	978.925	0.00081	0.0239	1228.300	41.841	153.9	187.4	341.3	0.8263	1.6002	-31

TABLE 1 (continued)
HFC-23 Saturation Properties—Temperature Table

TEMP. °C	PRESSURE kPa (abs)	VOLUME m ³ /kg		DENSITY kg/m ³		ENTHALPY kJ/kg			ENTROPY kJ/(kg)(K)		TEMP. °C
		LIQUID v _f	VAPOR v _g	LIQUID 1/v _f	VAPOR 1/v _g	LIQUID h _f	LATENT h _{fg}	VAPOR h _g	LIQUID s _f	VAPOR s _g	
-30	1012.807	0.00082	0.0231	1223.061	43.290	155.3	186.1	341.5	0.8319	1.5975	-30
-29	1047.549	0.00082	0.0223	1217.765	44.843	156.7	184.9	341.6	0.8376	1.5947	-29
-28	1083.166	0.00082	0.0216	1212.409	46.296	158.1	183.6	341.7	0.8432	1.5920	-28
-27	1119.672	0.00083	0.0209	1206.993	47.847	159.5	182.3	341.8	0.8489	1.5893	-27
-26	1157.080	0.00083	0.0202	1201.515	49.505	161.0	180.9	341.9	0.8545	1.5866	-26
-25	1195.405	0.00084	0.0195	1195.974	51.282	162.4	179.6	342.0	0.8601	1.5839	-25
-24	1234.662	0.00084	0.0189	1190.368	52.910	163.8	178.3	342.1	0.8657	1.5812	-24
-23	1274.866	0.00084	0.0182	1184.694	54.945	165.2	176.9	342.2	0.8713	1.5785	-23
-22	1316.031	0.00085	0.0176	1178.953	56.818	166.7	175.5	342.2	0.8769	1.5758	-22
-21	1358.173	0.00085	0.0171	1173.141	58.480	168.1	174.2	342.3	0.8825	1.5732	-21
-20	1401.308	0.00086	0.0165	1167.256	60.606	169.6	172.8	342.3	0.8880	1.5705	-20
-19	1445.452	0.00086	0.0160	1161.297	62.500	171.0	171.3	342.4	0.8936	1.5678	-19
-18	1490.620	0.00087	0.0154	1155.261	64.935	172.5	169.9	342.4	0.8992	1.5651	-18
-17	1536.830	0.00087	0.0149	1149.146	67.114	173.9	168.5	342.4	0.9047	1.5624	-17
-16	1584.098	0.00087	0.0145	1142.950	68.966	175.4	167.0	342.4	0.9103	1.5597	-16
-15	1632.442	0.00088	0.0140	1136.669	71.429	176.9	165.5	342.4	0.9158	1.5571	-15
-14	1681.880	0.00088	0.0135	1130.302	74.074	178.3	164.0	342.4	0.9213	1.5544	-14
-13	1732.430	0.00089	0.0131	1123.844	76.336	179.8	162.5	342.4	0.9269	1.5516	-13
-12	1784.110	0.00090	0.0127	1117.293	78.740	181.3	161.0	342.3	0.9324	1.5489	-12
-11	1836.940	0.00090	0.0123	1110.646	81.301	182.8	159.4	342.2	0.9380	1.5462	-11
-10	1890.939	0.00091	0.0119	1103.899	84.034	184.3	157.9	342.2	0.9435	1.5434	-10
-9	1946.127	0.00091	0.0115	1097.047	86.957	185.8	156.3	342.1	0.9491	1.5406	-9
-8	2002.526	0.00092	0.0111	1090.088	90.090	187.4	154.6	342.0	0.9547	1.5378	-8
-7	2060.156	0.00092	0.0108	1083.016	92.593	188.9	153.0	341.9	0.9603	1.5350	-7
-6	2119.040	0.00093	0.0104	1075.826	96.154	190.4	151.3	341.7	0.9659	1.5321	-6
-5	2179.200	0.00094	0.0101	1068.514	99.010	192.0	149.6	341.6	0.9715	1.5293	-5
-4	2240.660	0.00094	0.0098	1061.073	102.041	193.6	147.8	341.4	0.9771	1.5263	-4
-3	2303.444	0.00095	0.0095	1053.497	105.263	195.2	146.0	341.2	0.9828	1.5234	-3
-2	2367.576	0.00096	0.0092	1045.781	108.696	196.8	144.2	341.0	0.9885	1.5204	-2
-1	2433.082	0.00096	0.0089	1037.915	112.360	198.4	142.4	340.8	0.9942	1.5173	-1
0	2499.990	0.00097	0.0086	1029.893	116.279	200.0	140.4	340.5	1.0000	1.5142	0
1	2568.325	0.00098	0.0083	1021.706	120.482	201.7	138.5	340.2	1.0059	1.5110	1
2	2638.118	0.00099	0.0080	1013.343	125.000	203.4	136.5	339.9	1.0117	1.5078	2
3	2709.396	0.00100	0.0078	1004.793	128.205	205.1	134.4	339.5	1.0177	1.5045	3
4	2782.192	0.00100	0.0075	996.046	133.333	206.8	132.3	339.1	1.0237	1.5011	4
5	2856.535	0.00101	0.0072	987.086	138.889	208.6	130.1	338.7	1.0298	1.4976	5
6	2932.459	0.00102	0.0070	977.898	142.857	210.4	127.9	338.3	1.0360	1.4941	6
7	3009.998	0.00103	0.0068	968.466	147.059	212.2	125.5	337.8	1.0423	1.4904	7
8	3089.187	0.00104	0.0065	958.770	153.846	214.1	123.1	337.2	1.0486	1.4866	8
9	3170.062	0.00105	0.0063	948.786	158.730	216.0	120.6	336.6	1.0552	1.4826	9
10	3252.661	0.00107	0.0061	938.488	163.934	218.0	118.0	336.0	1.0618	1.4786	10
11	3337.023	0.00108	0.0058	927.845	172.414	220.0	115.3	335.3	1.0687	1.4743	11
12	3423.190	0.00109	0.0056	916.821	178.571	222.1	112.4	334.5	1.0757	1.4699	12
13	3511.203	0.00110	0.0054	905.372	185.185	224.3	109.4	333.7	1.0829	1.4652	13
14	3601.107	0.00112	0.0052	893.446	192.308	226.5	106.2	332.8	1.0904	1.4603	14
15	3692.946	0.00114	0.0050	880.977	200.000	228.9	102.9	331.7	1.0981	1.4552	15
16	3786.770	0.00115	0.0048	867.886	208.333	231.3	99.3	330.6	1.1062	1.4496	16
17	3882.626	0.00117	0.0046	854.067	217.391	233.8	95.5	329.3	1.1146	1.4437	17
18	3980.567	0.00119	0.0044	839.387	227.273	236.5	91.4	327.9	1.1235	1.4374	18
19	4080.647	0.00121	0.0042	823.661	238.095	239.4	86.9	326.3	1.1330	1.4304	19
20	4182.919	0.00124	0.0039	806.631	256.410	242.5	82.0	324.5	1.1431	1.4227	20
21	4287.443	0.00127	0.0037	787.914	270.270	245.9	76.5	322.3	1.1540	1.4141	21
22	4394.278	0.00130	0.0035	766.902	285.714	249.6	70.2	319.8	1.1661	1.4041	22
23	4503.488	0.00135	0.0033	742.520	303.030	253.8	62.9	316.7	1.1798	1.3922	23
24	4615.137	0.00140	0.0030	712.530	333.333	258.8	53.7	312.5	1.1962	1.3770	24
25	4729.293	0.00149	0.0027	670.465	370.370	265.4	40.7	306.1	1.2180	1.3545	25

TABLE 2
HFC-23 Superheated Vapor—Constant Pressure Tables

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec
Cp = Heat Capacity at Constant Pressure in kJ/(kg)(°C) Cp/Cv = Heat Capacity Ratio (Dimensionless)

TEMP °C	PRESSURE = 10.00 kPa (abs)						SAT VAP	PRESSURE = 20.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-114.41	1.8674	312.7	1.9612	0.5522	1.2954	154.8		0.9768	316.7	1.9044	0.5717	1.2963	157.9	-106.1
-110	1.9212	315.1	1.9764	0.5561	1.2904	156.8		—	—	—	—	—	—	-110
-105	1.9821	317.9	1.9933	0.5608	1.2850	159.0		0.9836	317.3	1.9081	0.5724	1.2949	158.4	-105
-100	2.0428	320.7	2.0098	0.5658	1.2799	161.2		1.0146	320.2	1.9250	0.5762	1.2884	160.6	-100
-95	2.1033	323.6	2.0259	0.5710	1.2751	163.3		1.0455	323.1	1.9414	0.5804	1.2824	162.8	-95
-90	2.1637	326.4	2.0418	0.5765	1.2704	165.4		1.0762	326.0	1.9575	0.5849	1.2768	164.9	-90
-85	2.2240	329.3	2.0574	0.5821	1.2659	167.4		1.1069	328.9	1.9734	0.5897	1.2715	167.0	-85
-80	2.2842	332.3	2.0728	0.5880	1.2615	169.4		1.1374	331.9	1.9889	0.5947	1.2664	169.0	-80
-75	2.3443	335.2	2.0879	0.5940	1.2573	171.4		1.1678	334.9	2.0042	0.6001	1.2616	171.0	-75
-70	2.4044	338.2	2.1028	0.6001	1.2533	173.3		1.1982	337.9	2.0192	0.6056	1.2571	173.0	-70
-65	2.4643	341.2	2.1174	0.6064	1.2493	175.2		1.2285	340.9	2.0340	0.6114	1.2527	174.9	-65
-60	2.5243	344.3	2.1319	0.6128	1.2455	177.1		1.2587	344.0	2.0486	0.6173	1.2485	176.8	-60
-55	2.5841	347.3	2.1462	0.6194	1.2418	178.9		1.2889	347.1	2.0629	0.6235	1.2444	178.7	-55
-50	2.6439	350.5	2.1603	0.6260	1.2381	180.7		1.3190	350.2	2.0771	0.6297	1.2405	180.5	-50
-45	2.7037	353.6	2.1742	0.6328	1.2346	182.5		1.3491	353.4	2.0912	0.6362	1.2367	182.3	-45
-40	2.7634	356.8	2.1880	0.6396	1.2312	184.3		1.3791	356.6	2.1050	0.6427	1.2331	184.1	-40
-35	2.8231	360.0	2.2017	0.6466	1.2279	186.0		1.4091	359.8	2.1187	0.6494	1.2296	185.8	-35
-30	2.8828	363.3	2.2152	0.6536	1.2246	187.7		1.4391	363.1	2.1323	0.6561	1.2262	187.6	-30
-25	2.9424	366.5	2.2286	0.6606	1.2215	189.4		1.4691	366.4	2.1457	0.6630	1.2228	189.3	-25
-20	3.0021	369.9	2.2418	0.6678	1.2184	191.1		1.4990	369.7	2.1590	0.6699	1.2196	191.0	-20
-15	3.0617	373.2	2.2549	0.6750	1.2154	192.8		1.5289	373.1	2.1722	0.6769	1.2165	192.6	-15
-10	3.1212	376.6	2.2680	0.6822	1.2124	194.4		1.5588	376.5	2.1852	0.6840	1.2135	194.3	-10
-5	3.1808	380.0	2.2809	0.6895	1.2096	196.0		1.5887	379.9	2.1982	0.6912	1.2105	195.9	-5
0	3.2403	383.5	2.2937	0.6969	1.2068	197.6		1.6185	383.4	2.2110	0.6983	1.2077	197.5	0
5	3.2999	387.0	2.3064	0.7042	1.2041	199.2		1.6484	386.9	2.2238	0.7056	1.2049	199.1	5
10	3.3594	390.5	2.3190	0.7116	1.2015	200.8		1.6782	390.4	2.2364	0.7129	1.2022	200.7	10
15	3.4189	394.1	2.3315	0.7190	1.1989	202.4		1.7081	394.0	2.2489	0.7202	1.1996	202.3	15
20	3.4784	397.7	2.3439	0.7265	1.1964	203.9		1.7379	397.6	2.2614	0.7275	1.1970	203.8	20
25	3.5379	401.4	2.3563	0.7339	1.1939	205.4		1.7677	401.3	2.2737	0.7349	1.1945	205.4	25
30	3.5974	405.1	2.3686	0.7413	1.1916	207.0		1.7975	405.0	2.2860	0.7422	1.1921	206.9	30
35	3.6569	408.8	2.3807	0.7488	1.1892	208.5		1.8273	408.7	2.2982	0.7496	1.1897	208.4	35
40	3.7163	412.6	2.3929	0.7562	1.1870	210.0		1.8570	412.5	2.3104	0.7570	1.1875	209.9	40
45	—	—	—	—	—	—		1.8868	416.3	2.3224	0.7643	1.1852	211.4	45

TEMP °C	PRESSURE = 30.00 kPa (abs)						SAT VAP	PRESSURE = 40.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-100.75	0.6687	319.1	1.8717	0.5865	1.2984	159.7		0.5110	321.0	1.8488	0.5991	1.3008	161.0	-96.71
-100	0.6719	319.6	1.8743	0.5869	1.2973	160.1		—	—	—	—	—	—	-100
-95	0.6929	322.5	1.8910	0.5899	1.2901	162.3		0.5165	322.0	1.8546	0.5998	1.2980	161.8	-95
-90	0.7137	325.5	1.9074	0.5934	1.2834	164.5		0.5324	325.0	1.8712	0.6022	1.2902	164.0	-90
-85	0.7345	328.5	1.9234	0.5973	1.2772	166.6		0.5482	328.0	1.8875	0.6052	1.2832	166.2	-85
-80	0.7551	331.5	1.9392	0.6016	1.2715	168.6		0.5639	331.1	1.9034	0.6087	1.2766	168.3	-80
-75	0.7756	334.5	1.9546	0.6063	1.2661	170.7		0.5795	334.1	1.9190	0.6126	1.2706	170.3	-75
-70	0.7961	337.5	1.9698	0.6112	1.2609	172.7		0.5950	337.2	1.9343	0.6169	1.2649	172.3	-70
-65	0.8165	340.6	1.9847	0.6165	1.2561	174.6		0.6105	340.3	1.9494	0.6216	1.2596	174.3	-65
-60	0.8368	343.7	1.9994	0.6219	1.2515	176.5		0.6259	343.4	1.9642	0.6265	1.2546	176.2	-60
-55	0.8571	346.8	2.0139	0.6276	1.2471	178.4		0.6412	346.5	1.9788	0.6318	1.2498	178.1	-55
-50	0.8773	350.0	2.0282	0.6335	1.2429	180.3		0.6565	349.7	1.9932	0.6373	1.2453	180.0	-50
-45	0.8975	353.2	2.0423	0.6396	1.2389	182.1		0.6717	352.9	2.0073	0.6430	1.2411	181.9	-45
-40	0.9177	356.4	2.0562	0.6458	1.2350	183.9		0.6869	356.2	2.0214	0.6489	1.2370	183.7	-40
-35	0.9378	359.6	2.0700	0.6522	1.2313	185.6		0.7021	359.4	2.0352	0.6550	1.2330	185.4	-35
-30	0.9579	362.9	2.0836	0.6587	1.2277	187.4		0.7173	362.7	2.0489	0.6612	1.2293	187.2	-30
-25	0.9779	366.2	2.0971	0.6653	1.2243	189.1		0.7324	366.0	2.0624	0.6676	1.2257	188.9	-25
-20	0.9980	369.5	2.1104	0.6720	1.2209	190.8		0.7475	369.4	2.0758	0.6742	1.2222	190.6	-20
-15	1.0180	372.9	2.1236	0.6789	1.2177	192.5		0.7625	372.8	2.0890	0.6808	1.2188	192.3	-15
-10	1.0380	376.3	2.1367	0.6858	1.2145	194.1		0.7776	376.2	2.1021	0.6876	1.2156	194.0	-10
-5	1.0580	379.8	2.1497	0.6928	1.2115	195.8		0.7926	379.6	2.1151	0.6944	1.2125	195.6	-5
0	1.0779	383.3	2.1625	0.6998	1.2086	197.4		0.8076	383.1	2.1280	0.7013	1.2095	197.3	0
5	1.0979	386.8	2.1753	0.7069	1.2057	199.0		0.8226	386.7	2.1408	0.7083	1.2065	198.9	5
10	1.1178	390.3	2.1880	0.7141	1.2029	200.6		0.8376	390.2	2.1535	0.7154	1.2037	200.5	10
15	1.1378	393.9	2.2005	0.7213	1.2003	202.2		0.8526	393.8	2.1661	0.7225	1.2009	202.0	15
20	1.1577	397.5	2.2130	0.7286	1.1976	203.7		0.8676	397.4	2.1786	0.7296	1.1983	203.6	20
25	1.1776	401.2	2.2254	0.7358	1.1951	205.3		0.8826	401.1	2.1910	0.7368	1.1957	205.2	25
30	1.1975	404.9	2.2377	0.7431	1.1926	206.8		0.8975	404.8	2.2033	0.7440	1.1932	206.7	30
35	1.2174	408.6	2.2499	0.7504	1.1903	208.3		0.9125	408.5	2.2155	0.7512	1.1908	208.2	35
40	1.2373	412.4	2.2620	0.7577	1.1879	209.8		0.9274	412.3	2.2277	0.7585	1.1884	209.7	40
45	1.2572	416.2	2.2741	0.7650	1.1857	211.3		0.9423	416.1	2.2397	0.7657	1.1861	211.2	45
50	1.2770	420.1	2.2861	0.7723	1.1835	212.8		0.9573	420.0	2.2517	0.7730	1.1839	212.7	50
55	—	—	—	—	—	—		0.9722	423.9	2.2637	0.7802	1.1817	214.2	55

TABLE 2 (continued)
HFC-23 Superheated Vapor—Constant Pressure Tables

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec
 Cp = Heat Capacity at Constant Pressure in kJ/(kg)(°C) Cp/Cv = Heat Capacity Ratio (Dimensionless)

TEMP °C	PRESSURE = 50.00 kPa (abs)						SAT VAP	PRESSURE = 60.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-93.42	0.4148	322.4	1.8312	0.6102	1.3032	162.0		0.3497	323.6	1.8168	0.6203	1.3057	162.8	-90.63
-90	0.4236	324.5	1.8427	0.6112	1.2973	163.5		0.3511	324.0	1.8190	0.6204	1.3045	163.1	-90
-85	0.4365	327.6	1.8592	0.6132	1.2892	165.7		0.3619	327.1	1.8357	0.6214	1.2955	165.3	-85
-80	0.4492	330.7	1.8753	0.6158	1.2819	167.9		0.3727	330.2	1.8520	0.6231	1.2873	167.5	-80
-75	0.4618	333.7	1.8911	0.6190	1.2752	170.0		0.3834	333.4	1.8680	0.6256	1.2799	169.6	-75
-70	0.4744	336.8	1.9065	0.6227	1.2689	172.0		0.3940	336.5	1.8836	0.6285	1.2730	171.7	-70
-65	0.4869	340.0	1.9217	0.6268	1.2631	174.0		0.4045	339.7	1.8989	0.6320	1.2667	173.7	-65
-60	0.4993	343.1	1.9367	0.6312	1.2577	176.0		0.4149	342.8	1.9140	0.6360	1.2609	175.7	-60
-55	0.5117	346.3	1.9514	0.6360	1.2526	177.9		0.4253	346.0	1.9288	0.6403	1.2554	177.6	-55
-50	0.5240	349.5	1.9658	0.6411	1.2478	179.8		0.4356	349.2	1.9433	0.6450	1.2503	179.5	-50
-45	0.5363	352.7	1.9801	0.6465	1.2433	181.6		0.4459	352.5	1.9577	0.6499	1.2455	181.4	-45
-40	0.5485	355.9	1.9942	0.6520	1.2389	183.5		0.4562	355.7	1.9718	0.6552	1.2409	183.2	-40
-35	0.5607	359.2	2.0081	0.6578	1.2348	185.2		0.4664	359.0	1.9858	0.6607	1.2366	185.1	-35
-30	0.5729	362.5	2.0218	0.6638	1.2309	187.0		0.4766	362.3	1.9996	0.6664	1.2325	186.8	-30
-25	0.5850	365.9	2.0354	0.6700	1.2271	188.8		0.4868	365.7	2.0132	0.6724	1.2285	188.6	-25
-20	0.5972	369.2	2.0488	0.6763	1.2235	190.5		0.4969	369.1	2.0267	0.6785	1.2248	190.3	-20
-15	0.6093	372.6	2.0621	0.6828	1.2200	192.2		0.5071	372.5	2.0400	0.6847	1.2212	192.0	-15
-10	0.6213	376.0	2.0752	0.6894	1.2167	193.8		0.5172	375.9	2.0532	0.6912	1.2177	193.7	-10
-5	0.6334	379.5	2.0883	0.6960	1.2135	195.5		0.5273	379.4	2.0663	0.6977	1.2144	195.4	-5
0	0.6455	383.0	2.1012	0.7028	1.2103	197.1		0.5373	382.9	2.0792	0.7043	1.2112	197.0	0
5	0.6575	386.5	2.1140	0.7097	1.2073	198.8		0.5474	386.4	2.0921	0.7111	1.2082	198.6	5
10	0.6695	390.1	2.1267	0.7166	1.2044	200.4		0.5574	390.0	2.1048	0.7179	1.2052	200.2	10
15	0.6815	393.7	2.1393	0.7236	1.2016	201.9		0.5675	393.6	2.1174	0.7248	1.2023	201.8	15
20	0.6935	397.3	2.1518	0.7307	1.1989	203.5		0.5775	397.2	2.1299	0.7317	1.1996	203.4	20
25	0.7055	401.0	2.1643	0.7378	1.1963	205.1		0.5875	400.9	2.1424	0.7388	1.1969	205.0	25
30	0.7175	404.7	2.1766	0.7449	1.1938	206.6		0.5975	404.6	2.1547	0.7458	1.1943	206.5	30
35	0.7295	408.5	2.1888	0.7521	1.1913	208.1		0.6075	408.4	2.1670	0.7529	1.1918	208.0	35
40	0.7415	412.2	2.2010	0.7593	1.1889	209.6		0.6175	412.2	2.1792	0.7600	1.1894	209.5	40
45	0.7534	416.1	2.2131	0.7664	1.1866	211.1		0.6275	416.0	2.1912	0.7672	1.1870	211.0	45
50	0.7654	419.9	2.2251	0.7736	1.1843	212.6		0.6375	419.8	2.2033	0.7743	1.1847	212.5	50
55	0.7773	423.8	2.2370	0.7808	1.1821	214.1		0.6475	423.7	2.2152	0.7814	1.1825	214.0	55
60	0.7893	427.7	2.2489	0.7880	1.1800	215.5		0.6574	427.6	2.2271	0.7886	1.1804	215.5	60

TEMP °C	PRESSURE = 70.00 kPa (abs)						SAT VAP	PRESSURE = 80.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-88.19	0.3027	324.7	1.8048	0.6297	1.3082	163.4		0.2671	325.6	1.7944	0.6385	1.3107	164.0	-86.02
-85	0.3087	326.7	1.8155	0.6298	1.3019	164.9		0.2688	326.2	1.7978	0.6383	1.3085	164.4	-85
-80	0.3181	329.8	1.8321	0.6306	1.2929	167.1		0.2771	329.4	1.8146	0.6382	1.2986	166.7	-80
-75	0.3273	333.0	1.8482	0.6322	1.2847	169.2		0.2853	332.6	1.8309	0.6390	1.2896	168.9	-75
-70	0.3365	336.2	1.8640	0.6345	1.2772	171.4		0.2934	335.8	1.8468	0.6405	1.2815	171.0	-70
-65	0.3456	339.3	1.8795	0.6374	1.2704	173.4		0.3014	339.0	1.8624	0.6428	1.2742	173.1	-65
-60	0.3546	342.5	1.8946	0.6407	1.2641	175.4		0.3094	342.2	1.8777	0.6456	1.2674	175.1	-60
-55	0.3636	345.7	1.9095	0.6446	1.2583	177.4		0.3173	345.5	1.8927	0.6490	1.2612	177.1	-55
-50	0.3725	349.0	1.9242	0.6488	1.2528	179.3		0.3252	348.7	1.9075	0.6528	1.2554	179.1	-50
-45	0.3814	352.2	1.9386	0.6535	1.2477	181.2		0.3330	352.0	1.9220	0.6570	1.2500	181.0	-45
-40	0.3903	355.5	1.9528	0.6584	1.2429	183.0		0.3408	355.3	1.9363	0.6616	1.2449	182.8	-40
-35	0.3991	358.8	1.9668	0.6636	1.2384	184.9		0.3486	358.6	1.9504	0.6665	1.2402	184.7	-35
-30	0.4079	362.1	1.9807	0.6691	1.2341	186.6		0.3563	362.0	1.9643	0.6717	1.2357	186.5	-30
-25	0.4166	365.5	1.9944	0.6748	1.2300	188.4		0.3640	365.3	1.9780	0.6772	1.2315	188.2	-25
-20	0.4254	368.9	2.0079	0.6807	1.2261	190.2		0.3717	368.7	1.9916	0.6828	1.2274	190.0	-20
-15	0.4341	372.3	2.0213	0.6867	1.2224	191.9		0.3793	372.2	2.0050	0.6887	1.2236	191.7	-15
-10	0.4428	375.8	2.0345	0.6930	1.2188	193.6		0.3870	375.6	2.0182	0.6948	1.2199	193.4	-10
-5	0.4514	379.2	2.0476	0.6993	1.2154	195.2		0.3946	379.1	2.0314	0.7010	1.2164	195.1	-5
0	0.4601	382.8	2.0606	0.7058	1.2121	196.9		0.4022	382.6	2.0444	0.7073	1.2131	196.8	0
5	0.4687	386.3	2.0734	0.7124	1.2090	198.5		0.4098	386.2	2.0573	0.7138	1.2098	198.4	5
10	0.4774	389.9	2.0862	0.7192	1.2060	200.1		0.4173	389.8	2.0700	0.7204	1.2067	200.0	10
15	0.4860	393.5	2.0988	0.7260	1.2030	201.7		0.4249	393.4	2.0827	0.7271	1.2037	201.6	15
20	0.4946	397.1	2.1114	0.7328	1.2002	203.3		0.4324	397.0	2.0953	0.7339	1.2009	203.2	20
25	0.5032	400.8	2.1238	0.7397	1.1975	204.9		0.4400	400.7	2.1077	0.7407	1.1981	204.8	25
30	0.5118	404.5	2.1362	0.7467	1.1949	206.4		0.4475	404.4	2.1201	0.7476	1.1954	206.3	30
35	0.5204	408.3	2.1485	0.7537	1.1923	207.9		0.4550	408.2	2.1324	0.7546	1.1928	207.8	35
40	0.5290	412.1	2.1607	0.7608	1.1899	209.5		0.4626	412.0	2.1446	0.7616	1.1903	209.4	40
45	0.5375	415.9	2.1728	0.7679	1.1875	211.0		0.4701	415.8	2.1567	0.7686	1.1879	210.9	45
50	0.5461	419.8	2.1848	0.7750	1.1852	212.4		0.4776	419.7	2.1688	0.7756	1.1856	212.4	50
55	0.5547	423.6	2.1967	0.7821	1.1829	213.9		0.4851	423.6	2.1807	0.7827	1.1833	213.9	55
60	0.5632	427.6	2.2086	0.7891	1.1808	215.4		0.4926	427.5	2.1926	0.7897	1.1811	215.3	60
65	0.5718	431.5	2.2204	0.7962	1.1787	216.8		0.5001	431.5	2.2044	0.7968	1.1790	216.8	65

TABLE 2 (continued)
HFC-23 Superheated Vapor—Constant Pressure Tables

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec
Cp = Heat Capacity at Constant Pressure in kJ/(kg)(°C) Cp/Cv = Heat Capacity Ratio (Dimensionless)

TEMP °C	PRESSURE = 90.00 kPa (abs)						SAT VAP	PRESSURE = 100.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-84.05	0.2391	326.4	1.7852	0.6468	1.3132	164.4		0.2166	327.1	1.7770	0.6547	1.3156	164.8	-82.26
-80	0.2452	329.0	1.7989	0.6459	1.3044	166.3		0.2197	328.6	1.7847	0.6539	1.3104	165.9	-80
-75	0.2526	332.2	1.8154	0.6458	1.2946	168.5		0.2264	331.8	1.8014	0.6528	1.2998	168.1	-75
-70	0.2599	335.5	1.8315	0.6466	1.2859	170.7		0.2330	335.1	1.8177	0.6529	1.2903	170.3	-70
-65	0.2671	338.7	1.8472	0.6482	1.2780	172.8		0.2396	338.4	1.8335	0.6538	1.2818	172.5	-65
-60	0.2742	341.9	1.8627	0.6505	1.2707	174.8		0.2461	341.6	1.8491	0.6555	1.2741	174.6	-60
-55	0.2814	345.2	1.8778	0.6534	1.2641	176.8		0.2526	344.9	1.8643	0.6578	1.2671	176.6	-55
-50	0.2884	348.5	1.8926	0.6567	1.2580	178.8		0.2589	348.2	1.8792	0.6608	1.2606	178.6	-50
-45	0.2954	351.8	1.9072	0.6606	1.2523	180.7		0.2653	351.5	1.8939	0.6642	1.2546	180.5	-45
-40	0.3024	355.1	1.9216	0.6648	1.2470	182.6		0.2716	354.9	1.9084	0.6681	1.2491	182.4	-40
-35	0.3093	358.4	1.9357	0.6694	1.2420	184.5		0.2779	358.2	1.9226	0.6724	1.2439	184.3	-35
-30	0.3162	361.8	1.9497	0.6744	1.2373	186.3		0.2841	361.6	1.9366	0.6770	1.2390	186.1	-30
-25	0.3231	365.2	1.9635	0.6796	1.2329	188.1		0.2903	365.0	1.9504	0.6820	1.2344	187.9	-25
-20	0.3299	368.6	1.9771	0.6850	1.2288	189.8		0.2965	368.4	1.9641	0.6872	1.2301	189.7	-20
-15	0.3368	372.0	1.9905	0.6907	1.2248	191.6		0.3027	371.9	1.9776	0.6927	1.2260	191.4	-15
-10	0.3436	375.5	2.0038	0.6966	1.2210	193.3		0.3088	375.3	1.9909	0.6984	1.2221	193.1	-10
-5	0.3503	379.0	2.0170	0.7027	1.2174	195.0		0.3150	378.8	2.0041	0.7043	1.2184	194.8	-5
0	0.3571	382.5	2.0301	0.7089	1.2140	196.6		0.3211	382.4	2.0172	0.7104	1.2149	196.5	0
5	0.3639	386.1	2.0430	0.7152	1.2107	198.3		0.3272	385.9	2.0301	0.7166	1.2115	198.1	5
10	0.3706	389.7	2.0558	0.7217	1.2075	199.9		0.3333	389.5	2.0430	0.7230	1.2083	199.8	10
15	0.3774	393.3	2.0685	0.7283	1.2044	201.5		0.3393	393.2	2.0557	0.7295	1.2052	201.4	15
20	0.3841	396.9	2.0810	0.7350	1.2015	203.1		0.3454	396.8	2.0683	0.7360	1.2022	203.0	20
25	0.3908	400.6	2.0935	0.7417	1.1987	204.7		0.3515	400.5	2.0808	0.7427	1.1993	204.6	25
30	0.3975	404.4	2.1059	0.7485	1.1960	206.2		0.3575	404.3	2.0932	0.7494	1.1965	206.1	30
35	0.4042	408.1	2.1182	0.7554	1.1934	207.8		0.3636	408.0	2.1055	0.7563	1.1939	207.7	35
40	0.4109	411.9	2.1304	0.7623	1.1908	209.3		0.3696	411.8	2.1177	0.7631	1.1913	209.2	40
45	0.4176	415.7	2.1426	0.7693	1.1884	210.8		0.3756	415.7	2.1299	0.7700	1.1888	210.7	45
50	0.4243	419.6	2.1546	0.7763	1.1860	212.3		0.3816	419.5	2.1419	0.7769	1.1864	212.2	50
55	0.4310	423.5	2.1666	0.7833	1.1837	213.8		0.3877	423.4	2.1539	0.7839	1.1841	213.7	55
60	0.4376	427.4	2.1785	0.7903	1.1815	215.2		0.3937	427.4	2.1658	0.7909	1.1819	215.2	60
65	0.4443	431.4	2.1903	0.7973	1.1794	216.7		0.3997	431.3	2.1777	0.7978	1.1797	216.6	65
70	0.4510	435.4	2.2021	0.8043	1.1773	218.2		0.4057	435.3	2.1894	0.8048	1.1776	218.1	70

TEMP °C	PRESSURE = 101.325 kPa (abs)						SAT VAP	PRESSURE = 110.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-82.03	0.2139	327.2	1.7760	0.6557	1.3159	164.9		0.1980	327.8	1.7696	0.6623	1.3180	165.2	-80.6
-80	0.2166	328.5	1.7829	0.6549	1.3112	165.8		0.1988	328.1	1.7717	0.6619	1.3165	165.5	-80
-75	0.2233	331.8	1.7996	0.6538	1.3005	168.1		0.2050	331.4	1.7886	0.6600	1.3051	167.8	-75
-70	0.2299	335.1	1.8159	0.6537	1.2909	170.3		0.2111	334.7	1.8050	0.6592	1.2949	170.0	-70
-65	0.2364	338.3	1.8318	0.6545	1.2823	172.4		0.2171	338.0	1.8210	0.6594	1.2858	172.2	-65
-60	0.2428	341.6	1.8474	0.6561	1.2746	174.5		0.2231	341.3	1.8367	0.6605	1.2776	174.3	-60
-55	0.2492	344.9	1.8626	0.6584	1.2675	176.5		0.2290	344.6	1.8520	0.6623	1.2701	176.3	-55
-50	0.2555	348.2	1.8776	0.6613	1.2609	178.5		0.2348	348.0	1.8671	0.6648	1.2633	178.3	-50
-45	0.2617	351.5	1.8923	0.6647	1.2549	180.5		0.2407	351.3	1.8818	0.6678	1.2570	180.3	-45
-40	0.2680	354.8	1.9067	0.6685	1.2493	182.4		0.2464	354.6	1.8963	0.6714	1.2511	182.2	-40
-35	0.2742	358.2	1.9209	0.6728	1.2441	184.2		0.2522	358.0	1.9106	0.6754	1.2457	184.1	-35
-30	0.2803	361.6	1.9350	0.6774	1.2392	186.1		0.2579	361.4	1.9247	0.6797	1.2407	185.9	-30
-25	0.2865	365.0	1.9488	0.6823	1.2346	187.9		0.2635	364.8	1.9386	0.6844	1.2359	187.7	-25
-20	0.2926	368.4	1.9625	0.6875	1.2303	189.6		0.2692	368.2	1.9523	0.6895	1.2314	189.5	-20
-15	0.2987	371.8	1.9760	0.6930	1.2262	191.4		0.2748	371.7	1.9658	0.6947	1.2272	191.3	-15
-10	0.3047	375.3	1.9893	0.6987	1.2223	193.1		0.2804	375.2	1.9792	0.7003	1.2232	193.0	-10
-5	0.3108	378.8	2.0025	0.7045	1.2185	194.8		0.2860	378.7	1.9924	0.7060	1.2194	194.7	-5
0	0.3168	382.4	2.0156	0.7106	1.2150	196.5		0.2916	382.3	2.0055	0.7119	1.2158	196.4	0
5	0.3229	385.9	2.0285	0.7168	1.2116	198.1		0.2972	385.8	2.0185	0.7180	1.2123	198.0	5
10	0.3289	389.5	2.0414	0.7232	1.2084	199.8		0.3027	389.4	2.0314	0.7243	1.2090	199.7	10
15	0.3349	393.2	2.0541	0.7296	1.2053	201.4		0.3082	393.1	2.0441	0.7306	1.2059	201.3	15
20	0.3409	396.8	2.0667	0.7362	1.2023	203.0		0.3138	396.7	2.0567	0.7371	1.2028	202.9	20
25	0.3468	400.5	2.0792	0.7428	1.1994	204.5		0.3193	400.4	2.0692	0.7437	1.1999	204.5	25
30	0.3528	404.3	2.0916	0.7496	1.1966	206.1		0.3248	404.2	2.0817	0.7504	1.1971	206.0	30
35	0.3588	408.0	2.1039	0.7564	1.1940	207.7		0.3303	407.9	2.0940	0.7571	1.1944	207.6	35
40	0.3647	411.8	2.1161	0.7632	1.1914	209.2		0.3358	411.7	2.1062	0.7639	1.1918	209.1	40
45	0.3707	415.7	2.1283	0.7701	1.1889	210.7		0.3413	415.6	2.1184	0.7707	1.1893	210.6	45
50	0.3766	419.5	2.1404	0.7770	1.1865	212.2		0.3468	419.5	2.1305	0.7776	1.1869	212.1	50
55	0.3826	423.4	2.1523	0.7840	1.1842	213.7		0.3522	423.4	2.1424	0.7845	1.1845	213.6	55
60	0.3885	427.4	2.1642	0.7909	1.1819	215.2		0.3577	427.3	2.1544	0.7914	1.1823	215.1	60
65	0.3944	431.3	2.1761	0.7979	1.1798	216.6		0.3632	431.3	2.1662	0.7983	1.1801	216.6	65
70	0.4004	435.3	2.1878	0.8048	1.1777	218.1		0.3687	435.3	2.1780	0.8053	1.1780	218.0	70

TABLE 2 (continued)
HFC-23 Superheated Vapor—Constant Pressure Tables

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec
Cp = Heat Capacity at Constant Pressure in kJ/(kg)(°C) Cp/Cv = Heat Capacity Ratio (Dimensionless)

TEMP °C	PRESSURE = 120.00 kPa (abs)						SAT VAP	PRESSURE = 130.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-79.05	0.1824	328.3	1.7629	0.6695	1.3204	165.5		0.1692	328.9	1.7567	0.6765	1.3227	165.8	-77.61
-75	0.1871	331.1	1.7767	0.6672	1.3105	167.4		0.1720	330.7	1.7657	0.6747	1.3160	167.0	-75
-70	0.1928	334.4	1.7933	0.6656	1.2995	169.7		0.1773	334.0	1.7824	0.6722	1.3043	169.3	-70
-65	0.1984	337.7	1.8095	0.6651	1.2898	171.8		0.1825	337.4	1.7988	0.6709	1.2939	171.5	-65
-60	0.2039	341.0	1.8253	0.6656	1.2810	174.0		0.1876	340.7	1.8147	0.6708	1.2846	173.7	-60
-55	0.2093	344.4	1.8407	0.6669	1.2731	176.0		0.1927	344.1	1.8302	0.6715	1.2763	175.8	-55
-50	0.2148	347.7	1.8559	0.6689	1.2659	178.1		0.1978	347.5	1.8455	0.6730	1.2687	177.8	-50
-45	0.2201	351.1	1.8707	0.6715	1.2593	180.0		0.2027	350.8	1.8604	0.6752	1.2617	179.8	-45
-40	0.2254	354.4	1.8853	0.6747	1.2533	182.0		0.2077	354.2	1.8751	0.6780	1.2554	181.8	-40
-35	0.2307	357.8	1.8997	0.6784	1.2476	183.9		0.2126	357.6	1.8895	0.6814	1.2495	183.7	-35
-30	0.2360	361.2	1.9138	0.6824	1.2423	185.7		0.2175	361.0	1.9037	0.6852	1.2440	185.5	-30
-25	0.2412	364.6	1.9277	0.6869	1.2374	187.5		0.2223	364.5	1.9177	0.6894	1.2390	187.4	-25
-20	0.2464	368.1	1.9415	0.6917	1.2328	189.3		0.2271	367.9	1.9315	0.6939	1.2342	189.2	-20
-15	0.2516	371.6	1.9551	0.6968	1.2285	191.1		0.2319	371.4	1.9451	0.6988	1.2297	190.9	-15
-10	0.2567	375.1	1.9685	0.7021	1.2243	192.8		0.2367	374.9	1.9586	0.7040	1.2255	192.7	-10
-5	0.2619	378.6	1.9817	0.7077	1.2204	194.5		0.2415	378.4	1.9719	0.7094	1.2215	194.4	-5
0	0.2670	382.1	1.9949	0.7135	1.2167	196.2		0.2462	382.0	1.9850	0.7150	1.2177	196.1	0
5	0.2721	385.7	2.0079	0.7194	1.2132	197.9		0.2510	385.6	1.9980	0.7208	1.2140	197.8	5
10	0.2772	389.3	2.0207	0.7256	1.2098	199.5		0.2557	389.2	2.0109	0.7268	1.2106	199.4	10
15	0.2823	393.0	2.0335	0.7318	1.2066	201.2		0.2604	392.9	2.0237	0.7330	1.2073	201.1	15
20	0.2874	396.6	2.0461	0.7382	1.2035	202.8		0.2651	396.5	2.0364	0.7393	1.2042	202.7	20
25	0.2925	400.3	2.0587	0.7447	1.2005	204.4		0.2698	400.3	2.0489	0.7457	1.2011	204.3	25
30	0.2975	404.1	2.0711	0.7513	1.1977	205.9		0.2744	404.0	2.0614	0.7522	1.1982	205.8	30
35	0.3026	407.9	2.0835	0.7579	1.1949	207.5		0.2791	407.8	2.0737	0.7588	1.1955	207.4	35
40	0.3076	411.7	2.0957	0.7647	1.1923	209.0		0.2838	411.6	2.0860	0.7654	1.1928	208.9	40
45	0.3127	415.5	2.1079	0.7714	1.1898	210.5		0.2884	415.4	2.0982	0.7722	1.1902	210.5	45
50	0.3177	419.4	2.1200	0.7783	1.1873	212.1		0.2931	419.3	2.1103	0.7789	1.1877	212.0	50
55	0.3227	423.3	2.1320	0.7851	1.1849	213.6		0.2977	423.2	2.1223	0.7857	1.1853	213.5	55
60	0.3277	427.2	2.1439	0.7920	1.1827	215.0		0.3024	427.2	2.1342	0.7926	1.1830	215.0	60
65	0.3328	431.2	2.1557	0.7989	1.1804	216.5		0.3070	431.1	2.1461	0.7994	1.1808	216.4	65
70	0.3378	435.2	2.1675	0.8058	1.1783	218.0		0.3117	435.2	2.1579	0.8063	1.1787	217.9	70
75	0.3428	439.3	2.1792	0.8126	1.1763	219.4		0.3163	439.2	2.1696	0.8131	1.1766	219.4	75

TEMP °C	PRESSURE = 140.00 kPa (abs)						SAT VAP	PRESSURE = 150.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-76.25	0.1578	329.4	1.7510	0.6833	1.3251	166.0		0.1478	329.9	1.7457	0.6899	1.3274	166.3	-74.96
-75	0.1590	330.3	1.7553	0.6822	1.3216	166.6		—	—	—	—	—	—	-75
-70	0.1640	333.7	1.7723	0.6788	1.3091	169.0		0.1525	333.3	1.7627	0.6856	1.3141	168.6	-70
-65	0.1689	337.1	1.7887	0.6768	1.2980	171.2		0.1571	336.7	1.7793	0.6828	1.3023	170.9	-65
-60	0.1737	340.4	1.8048	0.6760	1.2882	173.4		0.1617	340.1	1.7955	0.6813	1.2919	173.1	-60
-55	0.1785	343.8	1.8205	0.6762	1.2794	175.5		0.1661	343.5	1.8113	0.6809	1.2826	175.2	-55
-50	0.1832	347.2	1.8358	0.6772	1.2714	177.6		0.1706	346.9	1.8267	0.6814	1.2742	177.3	-50
-45	0.1878	350.6	1.8508	0.6790	1.2642	179.6		0.1749	350.4	1.8418	0.6828	1.2667	179.3	-45
-40	0.1925	354.0	1.8656	0.6814	1.2575	181.5		0.1793	353.8	1.8567	0.6848	1.2597	181.3	-40
-35	0.1970	357.4	1.8801	0.6844	1.2514	183.5		0.1836	357.2	1.8712	0.6875	1.2534	183.3	-35
-30	0.2016	360.8	1.8943	0.6879	1.2458	185.3		0.1878	360.6	1.8855	0.6907	1.2475	185.2	-30
-25	0.2061	364.3	1.9084	0.6918	1.2405	187.2		0.1921	364.1	1.8996	0.6943	1.2420	187.0	-25
-20	0.2106	367.8	1.9222	0.6962	1.2356	189.0		0.1963	367.6	1.9135	0.6984	1.2370	188.8	-20
-15	0.2151	371.2	1.9359	0.7008	1.2309	190.8		0.2005	371.1	1.9272	0.7029	1.2322	190.6	-15
-10	0.2195	374.8	1.9494	0.7058	1.2266	192.5		0.2047	374.6	1.9408	0.7077	1.2277	192.4	-10
-5	0.2240	378.3	1.9627	0.7111	1.2225	194.3		0.2088	378.2	1.9541	0.7128	1.2235	194.1	-5
0	0.2284	381.9	1.9759	0.7166	1.2186	196.0		0.2129	381.7	1.9673	0.7181	1.2195	195.8	0
5	0.2328	385.5	1.9889	0.7223	1.2149	197.7		0.2171	385.4	1.9804	0.7237	1.2158	197.5	5
10	0.2372	389.1	2.0018	0.7281	1.2114	199.3		0.2212	389.0	1.9934	0.7294	1.2122	199.2	10
15	0.2416	392.8	2.0146	0.7342	1.2080	200.9		0.2253	392.6	2.0062	0.7354	1.2088	200.8	15
20	0.2459	396.4	2.0273	0.7404	1.2048	202.6		0.2294	396.3	2.0189	0.7415	1.2055	202.5	20
25	0.2503	400.2	2.0399	0.7467	1.2018	204.2		0.2334	400.1	2.0315	0.7477	1.2024	204.1	25
30	0.2547	403.9	2.0524	0.7531	1.1988	205.7		0.2375	403.8	2.0440	0.7540	1.1994	205.6	30
35	0.2590	407.7	2.0647	0.7596	1.1960	207.3		0.2416	407.6	2.0564	0.7605	1.1965	207.2	35
40	0.2633	411.5	2.0770	0.7662	1.1933	208.8		0.2456	411.4	2.0686	0.7670	1.1938	208.8	40
45	0.2677	415.4	2.0892	0.7729	1.1907	210.4		0.2497	415.3	2.0808	0.7736	1.1911	210.3	45
50	0.2720	419.2	2.1013	0.7796	1.1882	211.9		0.2537	419.2	2.0930	0.7803	1.1886	211.8	50
55	0.2763	423.1	2.1133	0.7864	1.1857	213.4		0.2578	423.1	2.1050	0.7870	1.1862	213.3	55
60	0.2806	427.1	2.1253	0.7931	1.1834	214.9		0.2618	427.0	2.1169	0.7937	1.1838	214.8	60
65	0.2850	431.1	2.1371	0.7999	1.1812	216.4		0.2658	431.0	2.1288	0.8005	1.1815	216.3	65
70	0.2893	435.1	2.1489	0.8068	1.1790	217.8		0.2699	435.0	2.1406	0.8072	1.1793	217.8	70
75	0.2936	439.1	2.1607	0.8136	1.1769	219.3		0.2739	439.1	2.1523	0.8140	1.1772	219.2	75
80	—	—	—	—	—	—		0.2779	443.2	2.1640	0.8208	1.1752	220.7	80

TABLE 2 (continued)
HFC-23 Superheated Vapor—Constant Pressure Tables

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec
Cp = Heat Capacity at Constant Pressure in kJ/(kg)(°C) Cp/Cv = Heat Capacity Ratio (Dimensionless)

TEMP °C	PRESSURE = 160.00 kPa (abs)						SAT VAP	PRESSURE = 170.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-73.75	0.1391	330.3	1.7407	0.6963	1.3296	166.5		0.1313	330.8	1.7360	0.7025	1.3319	166.6	-72.59
-70	0.1424	332.9	1.7536	0.6925	1.3191	168.3		0.1335	332.6	1.7450	0.6995	1.3243	167.9	-70
-65	0.1468	336.4	1.7704	0.6888	1.3066	170.6		0.1377	336.0	1.7620	0.6950	1.3111	170.2	-65
-60	0.1511	339.8	1.7867	0.6866	1.2956	172.8		0.1418	339.5	1.7784	0.6921	1.2994	172.5	-60
-55	0.1553	343.3	1.8026	0.6856	1.2859	175.0		0.1458	343.0	1.7944	0.6905	1.2892	174.7	-55
-50	0.1595	346.7	1.8182	0.6857	1.2771	177.1		0.1497	346.4	1.8101	0.6900	1.2800	176.8	-50
-45	0.1636	350.1	1.8334	0.6866	1.2692	179.1		0.1537	349.9	1.8254	0.6904	1.2717	178.9	-45
-40	0.1677	353.5	1.8483	0.6882	1.2619	181.1		0.1575	353.3	1.8404	0.6917	1.2642	180.9	-40
-35	0.1718	357.0	1.8629	0.6906	1.2553	183.1		0.1614	356.8	1.8551	0.6937	1.2573	182.9	-35
-30	0.1758	360.5	1.8773	0.6935	1.2492	185.0		0.1652	360.3	1.8695	0.6963	1.2510	184.8	-30
-25	0.1798	363.9	1.8914	0.6969	1.2436	186.8		0.1690	363.8	1.8837	0.6994	1.2452	186.7	-25
-20	0.1838	367.4	1.9054	0.7007	1.2384	188.7		0.1727	367.3	1.8977	0.7030	1.2398	188.5	-20
-15	0.1877	370.9	1.9191	0.7050	1.2335	190.5		0.1764	370.8	1.9115	0.7071	1.2347	190.3	-15
-10	0.1916	374.5	1.9327	0.7096	1.2289	192.3		0.1801	374.3	1.9251	0.7115	1.2300	192.1	-10
-5	0.1955	378.0	1.9461	0.7145	1.2246	194.0		0.1838	377.9	1.9385	0.7162	1.2256	193.9	-5
0	0.1994	381.6	1.9593	0.7197	1.2205	195.7		0.1875	381.5	1.9518	0.7212	1.2214	195.6	0
5	0.2033	385.2	1.9724	0.7251	1.2166	197.4		0.1912	385.1	1.9649	0.7265	1.2175	197.3	5
10	0.2072	388.9	1.9854	0.7307	1.2130	199.1		0.1948	388.8	1.9779	0.7320	1.2138	199.0	10
15	0.2110	392.5	1.9982	0.7366	1.2095	200.7		0.1984	392.4	1.9908	0.7378	1.2102	200.6	15
20	0.2149	396.2	2.0110	0.7426	1.2062	202.4		0.2021	396.1	2.0035	0.7437	1.2068	202.2	20
25	0.2187	400.0	2.0236	0.7487	1.2030	204.0		0.2057	399.9	2.0161	0.7497	1.2036	203.9	25
30	0.2225	403.7	2.0361	0.7550	1.2000	205.5		0.2093	403.6	2.0287	0.7559	1.2005	205.5	30
35	0.2263	407.5	2.0485	0.7613	1.1971	207.1		0.2129	407.4	2.0411	0.7622	1.1976	207.0	35
40	0.2301	411.3	2.0608	0.7678	1.1943	208.7		0.2165	411.3	2.0534	0.7686	1.1948	208.6	40
45	0.2339	415.2	2.0730	0.7743	1.1916	210.2		0.2201	415.1	2.0656	0.7751	1.1921	210.1	45
50	0.2377	419.1	2.0851	0.7809	1.1890	211.7		0.2236	419.0	2.0778	0.7816	1.1895	211.7	50
55	0.2415	423.0	2.0972	0.7876	1.1866	213.3		0.2272	422.9	2.0898	0.7882	1.1870	213.2	55
60	0.2453	427.0	2.1091	0.7943	1.1842	214.7		0.2308	426.9	2.1018	0.7949	1.1846	214.7	60
65	0.2491	430.9	2.1210	0.8010	1.1819	216.2		0.2343	430.9	2.1137	0.8015	1.1822	216.2	65
70	0.2529	435.0	2.1328	0.8077	1.1797	217.7		0.2379	434.9	2.1255	0.8082	1.1800	217.6	70
75	0.2567	439.0	2.1446	0.8145	1.1775	219.2		0.2415	439.0	2.1372	0.8150	1.1779	219.1	75
80	0.2604	443.1	2.1562	0.8212	1.1755	220.6		0.2450	443.1	2.1489	0.8217	1.1758	220.6	80

TEMP °C	PRESSURE = 180.00 kPa (abs)						SAT VAP	PRESSURE = 190.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-71.48	0.1244	331.1	1.7316	0.7086	1.3341	166.8		0.1182	331.5	1.7275	0.7145	1.3363	167.0	-70.42
-70	0.1256	332.2	1.7368	0.7066	1.3296	167.5		0.1185	331.8	1.7289	0.7139	1.3350	167.2	-70
-65	0.1296	335.7	1.7539	0.7013	1.3156	169.9		0.1223	335.4	1.7462	0.7076	1.3202	169.6	-65
-60	0.1335	339.2	1.7705	0.6976	1.3033	172.2		0.1261	338.9	1.7630	0.7032	1.3073	171.9	-60
-55	0.1373	342.7	1.7867	0.6954	1.2925	174.4		0.1297	342.4	1.7792	0.7003	1.2959	174.1	-55
-50	0.1411	346.2	1.8024	0.6943	1.2829	176.6		0.1333	345.9	1.7951	0.6987	1.2858	176.3	-50
-45	0.1448	349.6	1.8178	0.6943	1.2742	178.6		0.1369	349.4	1.8106	0.6982	1.2768	178.4	-45
-40	0.1485	353.1	1.8328	0.6952	1.2664	180.7		0.1404	352.9	1.8257	0.6987	1.2687	180.5	-40
-35	0.1521	356.6	1.8476	0.6968	1.2593	182.7		0.1439	356.4	1.8405	0.6999	1.2613	182.4	-35
-30	0.1557	360.1	1.8621	0.6991	1.2528	184.6		0.1473	359.9	1.8551	0.7019	1.2546	184.4	-30
-25	0.1593	363.6	1.8764	0.7019	1.2468	186.5		0.1507	363.4	1.8694	0.7045	1.2484	186.3	-25
-20	0.1629	367.1	1.8904	0.7053	1.2412	188.3		0.1541	366.9	1.8835	0.7076	1.2426	188.2	-20
-15	0.1664	370.6	1.9042	0.7091	1.2360	190.2		0.1574	370.5	1.8974	0.7112	1.2373	190.0	-15
-10	0.1699	374.2	1.9179	0.7134	1.2312	192.0		0.1608	374.0	1.9110	0.7153	1.2324	191.8	-10
-5	0.1734	377.8	1.9313	0.7179	1.2267	193.7		0.1641	377.6	1.9245	0.7197	1.2277	193.6	-5
0	0.1769	381.4	1.9447	0.7228	1.2224	195.5		0.1674	381.2	1.9379	0.7244	1.2234	195.3	0
5	0.1804	385.0	1.9578	0.7280	1.2184	197.2		0.1707	384.9	1.9511	0.7294	1.2193	197.0	5
10	0.1838	388.6	1.9708	0.7334	1.2146	198.8		0.1740	388.5	1.9641	0.7347	1.2154	198.7	10
15	0.1873	392.3	1.9837	0.7390	1.2110	200.5		0.1773	392.2	1.9770	0.7402	1.2117	200.4	15
20	0.1907	396.0	1.9965	0.7448	1.2075	202.1		0.1805	395.9	1.9898	0.7459	1.2082	202.0	20
25	0.1941	399.8	2.0091	0.7507	1.2043	203.8		0.1838	399.7	2.0025	0.7517	1.2049	203.7	25
30	0.1975	403.5	2.0217	0.7568	1.2011	205.4		0.1870	403.5	2.0150	0.7578	1.2017	205.3	30
35	0.2009	407.3	2.0341	0.7630	1.1981	206.9		0.1902	407.3	2.0275	0.7639	1.1987	206.8	35
40	0.2043	411.2	2.0464	0.7694	1.1953	208.5		0.1934	411.1	2.0398	0.7702	1.1958	208.4	40
45	0.2077	415.0	2.0587	0.7758	1.1925	210.1		0.1967	415.0	2.0521	0.7765	1.1930	210.0	45
50	0.2111	418.9	2.0708	0.7823	1.1899	211.6		0.1999	418.9	2.0642	0.7830	1.1903	211.5	50
55	0.2145	422.9	2.0829	0.7888	1.1874	213.1		0.2031	422.8	2.0763	0.7895	1.1878	213.0	55
60	0.2179	426.8	2.0948	0.7954	1.1849	214.6		0.2063	426.8	2.0883	0.7960	1.1853	214.5	60
65	0.2212	430.8	2.1067	0.8021	1.1826	216.1		0.2095	430.7	2.1002	0.8026	1.1830	216.0	65
70	0.2246	434.8	2.1186	0.8087	1.1804	217.6		0.2127	434.8	2.1120	0.8092	1.1807	217.5	70
75	0.2280	438.9	2.1303	0.8154	1.1782	219.0		0.2159	438.8	2.1238	0.8159	1.1785	219.0	75
80	0.2313	443.0	2.1420	0.8221	1.1761	220.5		0.2190	442.9	2.1355	0.8225	1.1764	220.4	80

TABLE 2 (continued)
HFC-23 Superheated Vapor—Constant Pressure Tables

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec
Cp = Heat Capacity at Constant Pressure in kJ/(kg)(°C) Cp/Cv = Heat Capacity Ratio (Dimensionless)

TEMP °C	PRESSURE = 200.00 kPa (abs)						SAT VAP	PRESSURE = 210.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-69.4	0.1126	331.9	1.7235	0.7203	1.3385	167.1		0.1075	332.2	1.7198	0.7260	1.3407	167.2	-68.42
-65	0.1158	335.0	1.7388	0.7141	1.3249	169.2		0.1099	334.7	1.7318	0.7206	1.3297	168.9	-65
-60	0.1194	338.6	1.7557	0.7089	1.3113	171.6		0.1133	338.3	1.7488	0.7146	1.3154	171.3	-60
-55	0.1229	342.1	1.7721	0.7053	1.2994	173.8		0.1167	341.8	1.7653	0.7104	1.3029	173.6	-55
-50	0.1263	345.6	1.7881	0.7032	1.2889	176.0		0.1200	345.4	1.7814	0.7077	1.2919	175.8	-50
-45	0.1297	349.1	1.8036	0.7022	1.2795	178.2		0.1233	348.9	1.7970	0.7062	1.2821	177.9	-45
-40	0.1331	352.7	1.8189	0.7022	1.2710	180.2		0.1265	352.4	1.8123	0.7058	1.2733	180.0	-40
-35	0.1364	356.2	1.8338	0.7031	1.2634	182.2		0.1297	356.0	1.8273	0.7063	1.2654	182.0	-35
-30	0.1397	359.7	1.8484	0.7048	1.2564	184.2		0.1328	359.5	1.8420	0.7076	1.2582	184.0	-30
-25	0.1429	363.2	1.8628	0.7071	1.2500	186.1		0.1359	363.0	1.8564	0.7097	1.2516	185.9	-25
-20	0.1462	366.8	1.8769	0.7100	1.2441	188.0		0.1390	366.6	1.8706	0.7123	1.2455	187.8	-20
-15	0.1494	370.3	1.8908	0.7134	1.2386	189.9		0.1421	370.2	1.8846	0.7155	1.2399	189.7	-15
-10	0.1526	373.9	1.9045	0.7172	1.2335	191.7		0.1451	373.8	1.8983	0.7191	1.2347	191.5	-10
-5	0.1557	377.5	1.9181	0.7214	1.2288	193.4		0.1481	377.4	1.9119	0.7232	1.2299	193.3	-5
0	0.1589	381.1	1.9314	0.7260	1.2243	195.2		0.1511	381.0	1.9253	0.7276	1.2253	195.1	0
5	0.1620	384.8	1.9447	0.7309	1.2201	196.9		0.1541	384.6	1.9385	0.7323	1.2210	196.8	5
10	0.1651	388.4	1.9577	0.7360	1.2162	198.6		0.1571	388.3	1.9516	0.7373	1.2170	198.5	10
15	0.1682	392.1	1.9707	0.7414	1.2124	200.3		0.1601	392.0	1.9646	0.7426	1.2132	200.2	15
20	0.1713	395.8	1.9835	0.7470	1.2089	201.9		0.1631	395.7	1.9774	0.7481	1.2096	201.8	20
25	0.1744	399.6	1.9961	0.7528	1.2055	203.6		0.1660	399.5	1.9901	0.7538	1.2061	203.5	25
30	0.1775	403.4	2.0087	0.7587	1.2023	205.2		0.1689	403.3	2.0027	0.7596	1.2029	205.1	30
35	0.1806	407.2	2.0212	0.7648	1.1992	206.8		0.1719	407.1	2.0152	0.7656	1.1998	206.7	35
40	0.1837	411.0	2.0335	0.7710	1.1963	208.3		0.1748	410.9	2.0275	0.7718	1.1968	208.2	40
45	0.1867	414.9	2.0458	0.7773	1.1935	209.9		0.1777	414.8	2.0398	0.7780	1.1940	209.8	45
50	0.1898	418.8	2.0580	0.7836	1.1908	211.4		0.1806	418.7	2.0520	0.7843	1.1912	211.3	50
55	0.1928	422.7	2.0700	0.7901	1.1882	213.0		0.1835	422.6	2.0641	0.7907	1.1886	212.9	55
60	0.1959	426.7	2.0820	0.7966	1.1857	214.5		0.1865	426.6	2.0761	0.7972	1.1861	214.4	60
65	0.1989	430.7	2.0940	0.8032	1.1833	216.0		0.1894	430.6	2.0880	0.8037	1.1837	215.9	65
70	0.2019	434.7	2.1058	0.8097	1.1810	217.4		0.1922	434.7	2.0999	0.8102	1.1814	217.4	70
75	0.2050	438.8	2.1176	0.8163	1.1788	218.9		0.1951	438.7	2.1116	0.8168	1.1791	218.8	75
80	0.2080	442.9	2.1292	0.8230	1.1767	220.4		0.1980	442.8	2.1233	0.8234	1.1770	220.3	80
85	0.2110	447.0	2.1409	0.8296	1.1746	221.8		0.2009	447.0	2.1349	0.8300	1.1749	221.8	85

TEMP °C	PRESSURE = 220.00 kPa (abs)						SAT VAP	PRESSURE = 230.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-67.48	0.1028	332.5	1.7162	0.7315	1.3429	167.3		0.0986	332.8	1.7128	0.7370	1.3450	167.4	-66.57
-65	0.1045	334.3	1.7249	0.7273	1.3346	168.6		0.0996	334.0	1.7183	0.7341	1.3396	168.2	-65
-60	0.1078	337.9	1.7421	0.7205	1.3195	171.0		0.1028	337.6	1.7357	0.7264	1.3238	170.7	-60
-55	0.1111	341.5	1.7588	0.7155	1.3065	173.3		0.1059	341.2	1.7524	0.7207	1.3101	173.0	-55
-50	0.1143	345.1	1.7749	0.7122	1.2950	175.5		0.1090	344.8	1.7687	0.7168	1.2981	175.3	-50
-45	0.1174	348.7	1.7907	0.7102	1.2848	177.7		0.1120	348.4	1.7846	0.7143	1.2875	177.4	-45
-40	0.1205	352.2	1.8061	0.7094	1.2757	179.8		0.1150	352.0	1.8001	0.7130	1.2781	179.6	-40
-35	0.1235	355.8	1.8211	0.7095	1.2675	181.8		0.1179	355.5	1.8152	0.7128	1.2696	181.6	-35
-30	0.1265	359.3	1.8359	0.7105	1.2601	183.8		0.1208	359.1	1.8300	0.7135	1.2619	183.6	-30
-25	0.1295	362.9	1.8504	0.7123	1.2533	185.8		0.1237	362.7	1.8445	0.7149	1.2549	185.6	-25
-20	0.1325	366.4	1.8646	0.7147	1.2470	187.7		0.1266	366.3	1.8588	0.7170	1.2485	187.5	-20
-15	0.1354	370.0	1.8786	0.7176	1.2412	189.5		0.1294	369.9	1.8729	0.7198	1.2426	189.4	-15
-10	0.1383	373.6	1.8924	0.7210	1.2359	191.4		0.1322	373.5	1.8867	0.7230	1.2371	191.2	-10
-5	0.1412	377.2	1.9060	0.7249	1.2309	193.2		0.1349	377.1	1.9003	0.7267	1.2320	193.0	-5
0	0.1441	380.9	1.9194	0.7292	1.2263	194.9		0.1377	380.7	1.9138	0.7308	1.2273	194.8	0
5	0.1470	384.5	1.9327	0.7338	1.2219	196.7		0.1405	384.4	1.9271	0.7352	1.2228	196.5	5
10	0.1498	388.2	1.9458	0.7387	1.2178	198.4		0.1432	388.1	1.9402	0.7400	1.2186	198.3	10
15	0.1527	391.9	1.9588	0.7438	1.2139	200.1		0.1459	391.8	1.9532	0.7450	1.2147	199.9	15
20	0.1555	395.6	1.9716	0.7492	1.2103	201.7		0.1486	395.5	1.9661	0.7503	1.2110	201.6	20
25	0.1583	399.4	1.9844	0.7548	1.2068	203.4		0.1513	399.3	1.9788	0.7558	1.2074	203.3	25
30	0.1612	403.2	1.9970	0.7606	1.2035	205.0		0.1540	403.1	1.9915	0.7615	1.2041	204.9	30
35	0.1640	407.0	2.0094	0.7665	1.2003	206.6		0.1567	406.9	2.0040	0.7674	1.2009	206.5	35
40	0.1668	410.8	2.0218	0.7725	1.1973	208.2		0.1594	410.8	2.0164	0.7733	1.1978	208.1	40
45	0.1695	414.7	2.0341	0.7787	1.1944	209.7		0.1621	414.6	2.0287	0.7795	1.1949	209.6	45
50	0.1723	418.6	2.0463	0.7850	1.1917	211.3		0.1647	418.6	2.0409	0.7857	1.1921	211.2	50
55	0.1751	422.6	2.0584	0.7913	1.1890	212.8		0.1674	422.5	2.0530	0.7920	1.1894	212.7	55
60	0.1779	426.5	2.0704	0.7978	1.1865	214.3		0.1701	426.5	2.0650	0.7983	1.1869	214.2	60
65	0.1807	430.5	2.0824	0.8042	1.1841	215.8		0.1727	430.5	2.0769	0.8048	1.1844	215.8	65
70	0.1834	434.6	2.0942	0.8107	1.1817	217.3		0.1754	434.5	2.0888	0.8112	1.1821	217.2	70
75	0.1862	438.7	2.1060	0.8173	1.1795	218.8		0.1780	438.6	2.1006	0.8177	1.1798	218.7	75
80	0.1890	442.8	2.1177	0.8238	1.1773	220.3		0.1807	442.7	2.1123	0.8243	1.1776	220.2	80
85	0.1917	446.9	2.1293	0.8304	1.1752	221.7		0.1833	446.8	2.1239	0.8308	1.1755	221.6	85

TABLE 2 (continued)
HFC-23 Superheated Vapor—Constant Pressure Tables

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec
Cp = Heat Capacity at Constant Pressure in kJ/(kg)(°C) Cp/Cv = Heat Capacity Ratio (Dimensionless)

TEMP °C	PRESSURE = 240.00 kPa (abs)						SAT VAP	PRESSURE = 250.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-65.69	0.0947	333.1	1.7095	0.7424	1.3472	167.5		0.0911	333.4	1.7064	0.7477	1.3493	167.6	-64.83
-65	0.0951	333.6	1.7120	0.7410	1.3447	167.9		—	—	—	—	—	—	-65
-60	0.0982	337.3	1.7295	0.7324	1.3281	170.3		0.0940	337.0	1.7234	0.7385	1.3325	170.0	-60
-55	0.1012	340.9	1.7464	0.7260	1.3138	172.7		0.0969	340.7	1.7405	0.7313	1.3176	172.4	-55
-50	0.1042	344.6	1.7628	0.7214	1.3013	175.0		0.0998	344.3	1.7570	0.7261	1.3045	174.7	-50
-45	0.1071	348.2	1.7787	0.7184	1.2903	177.2		0.1026	347.9	1.7730	0.7226	1.2931	177.0	-45
-40	0.1100	351.8	1.7943	0.7167	1.2805	179.3		0.1054	351.5	1.7887	0.7204	1.2830	179.1	-40
-35	0.1128	355.3	1.8095	0.7161	1.2717	181.4		0.1081	355.1	1.8039	0.7194	1.2739	181.2	-35
-30	0.1156	358.9	1.8243	0.7164	1.2638	183.4		0.1108	358.7	1.8189	0.7194	1.2657	183.2	-30
-25	0.1184	362.5	1.8389	0.7176	1.2566	185.4		0.1134	362.3	1.8335	0.7202	1.2583	185.2	-25
-20	0.1211	366.1	1.8533	0.7194	1.2500	187.3		0.1161	365.9	1.8479	0.7218	1.2515	187.2	-20
-15	0.1238	369.7	1.8674	0.7219	1.2439	189.2		0.1187	369.5	1.8621	0.7241	1.2453	189.1	-15
-10	0.1265	373.3	1.8812	0.7249	1.2383	191.1		0.1213	373.2	1.8760	0.7269	1.2395	190.9	-10
-5	0.1292	376.9	1.8949	0.7285	1.2331	192.9		0.1239	376.8	1.8897	0.7302	1.2342	192.7	-5
0	0.1318	380.6	1.9084	0.7324	1.2283	194.7		0.1264	380.5	1.9032	0.7340	1.2293	194.5	0
5	0.1345	384.3	1.9217	0.7367	1.2237	196.4		0.1290	384.1	1.9166	0.7382	1.2246	196.3	5
10	0.1371	388.0	1.9349	0.7413	1.2195	198.1		0.1315	387.9	1.9297	0.7427	1.2203	198.0	10
15	0.1397	391.7	1.9479	0.7463	1.2154	199.8		0.1340	391.6	1.9428	0.7475	1.2162	199.7	15
20	0.1423	395.4	1.9608	0.7514	1.2117	201.5		0.1365	395.3	1.9557	0.7526	1.2124	201.4	20
25	0.1449	399.2	1.9735	0.7568	1.2081	203.2		0.1390	399.1	1.9685	0.7579	1.2087	203.1	25
30	0.1475	403.0	1.9862	0.7624	1.2047	204.8		0.1415	402.9	1.9811	0.7634	1.2053	204.7	30
35	0.1501	406.8	1.9987	0.7682	1.2014	206.4		0.1440	406.7	1.9936	0.7691	1.2020	206.3	35
40	0.1527	410.7	2.0111	0.7741	1.1983	208.0		0.1465	410.6	2.0061	0.7749	1.1988	207.9	40
45	0.1552	414.6	2.0234	0.7802	1.1954	209.6		0.1489	414.5	2.0184	0.7809	1.1959	209.5	45
50	0.1578	418.5	2.0356	0.7864	1.1926	211.1		0.1514	418.4	2.0306	0.7870	1.1930	211.0	50
55	0.1604	422.4	2.0478	0.7926	1.1899	212.6		0.1539	422.4	2.0428	0.7932	1.1903	212.6	55
60	0.1629	426.4	2.0598	0.7989	1.1873	214.2		0.1563	426.3	2.0548	0.7995	1.1877	214.1	60
65	0.1654	430.4	2.0717	0.8053	1.1848	215.7		0.1588	430.4	2.0668	0.8059	1.1852	215.6	65
70	0.1680	434.5	2.0836	0.8117	1.1824	217.2		0.1612	434.4	2.0786	0.8122	1.1828	217.1	70
75	0.1705	438.5	2.0954	0.8182	1.1801	218.7		0.1636	438.5	2.0904	0.8187	1.1805	218.6	75
80	0.1731	442.6	2.1071	0.8247	1.1779	220.1		0.1661	442.6	2.1021	0.8251	1.1782	220.1	80
85	0.1756	446.8	2.1188	0.8312	1.1758	221.6		0.1685	446.7	2.1138	0.8316	1.1761	221.5	85
90	—	—	—	—	—	—		0.1709	450.9	2.1254	0.8381	1.1740	223.0	90

TEMP °C	PRESSURE = 260.00 kPa (abs)						SAT VAP	PRESSURE = 270.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-64.01	0.0877	333.7	1.7034	0.7529	1.3514	167.7		0.0846	333.9	1.7005	0.7580	1.3535	167.7	-63.21
-60	0.0901	336.7	1.7176	0.7447	1.3370	169.7		0.0864	336.3	1.7119	0.7510	1.3416	169.4	-60
-55	0.0929	340.4	1.7348	0.7367	1.3214	172.1		0.0892	340.1	1.7292	0.7422	1.3253	171.8	-55
-50	0.0957	344.0	1.7514	0.7309	1.3078	174.5		0.0919	343.8	1.7460	0.7357	1.3112	174.2	-50
-45	0.0984	347.7	1.7675	0.7268	1.2959	176.7		0.0945	347.4	1.7622	0.7310	1.2988	176.5	-45
-40	0.1011	351.3	1.7833	0.7241	1.2854	178.9		0.0971	351.1	1.7780	0.7279	1.2879	178.7	-40
-35	0.1037	354.9	1.7986	0.7227	1.2760	181.0		0.0997	354.7	1.7934	0.7261	1.2782	180.8	-35
-30	0.1063	358.5	1.8136	0.7223	1.2676	183.0		0.1022	358.3	1.8085	0.7254	1.2695	182.8	-30
-25	0.1089	362.1	1.8283	0.7229	1.2600	185.0		0.1047	362.0	1.8233	0.7256	1.2617	184.9	-25
-20	0.1115	365.8	1.8428	0.7242	1.2530	187.0		0.1072	365.6	1.8378	0.7267	1.2545	186.8	-20
-15	0.1140	369.4	1.8569	0.7263	1.2466	188.9		0.1096	369.2	1.8520	0.7284	1.2480	188.7	-15
-10	0.1165	373.0	1.8709	0.7289	1.2408	190.8		0.1120	372.9	1.8660	0.7309	1.2420	190.6	-10
-5	0.1190	376.7	1.8846	0.7320	1.2353	192.6		0.1144	376.5	1.8798	0.7338	1.2364	192.5	-5
0	0.1214	380.3	1.8982	0.7356	1.2303	194.4		0.1168	380.2	1.8934	0.7373	1.2313	194.3	0
5	0.1239	384.0	1.9116	0.7397	1.2255	196.2		0.1192	383.9	1.9068	0.7411	1.2265	196.0	5
10	0.1263	387.7	1.9248	0.7440	1.2211	197.9		0.1215	387.6	1.9200	0.7454	1.2220	197.8	10
15	0.1288	391.5	1.9379	0.7487	1.2170	199.6		0.1239	391.4	1.9331	0.7500	1.2177	199.5	15
20	0.1312	395.2	1.9508	0.7537	1.2131	201.3		0.1262	395.1	1.9460	0.7548	1.2138	201.2	20
25	0.1336	399.0	1.9636	0.7589	1.2094	203.0		0.1285	398.9	1.9588	0.7600	1.2100	202.8	25
30	0.1360	402.8	1.9762	0.7643	1.2059	204.6		0.1308	402.7	1.9715	0.7653	1.2065	204.5	30
35	0.1384	406.6	1.9888	0.7700	1.2025	206.2		0.1332	406.6	1.9841	0.7708	1.2031	206.1	35
40	0.1407	410.5	2.0012	0.7757	1.1994	207.8		0.1354	410.4	1.9965	0.7766	1.1999	207.7	40
45	0.1431	414.4	2.0136	0.7817	1.1963	209.4		0.1377	414.3	2.0089	0.7824	1.1968	209.3	45
50	0.1455	418.3	2.0258	0.7877	1.1935	211.0		0.1400	418.3	2.0211	0.7884	1.1939	210.9	50
55	0.1479	422.3	2.0379	0.7939	1.1907	212.5		0.1423	422.2	2.0333	0.7945	1.1911	212.4	55
60	0.1502	426.3	2.0500	0.8001	1.1881	214.0		0.1446	426.2	2.0454	0.8007	1.1885	214.0	60
65	0.1526	430.3	2.0620	0.8064	1.1855	215.5		0.1469	430.2	2.0573	0.8069	1.1859	215.5	65
70	0.1549	434.3	2.0738	0.8128	1.1831	217.0		0.1491	434.3	2.0692	0.8133	1.1835	217.0	70
75	0.1573	438.4	2.0856	0.8191	1.1808	218.5		0.1514	438.4	2.0810	0.8196	1.1811	218.5	75
80	0.1596	442.5	2.0974	0.8256	1.1785	220.0		0.1536	442.5	2.0928	0.8260	1.1789	219.9	80
85	0.1620	446.7	2.1090	0.8320	1.1764	221.5		0.1559	446.6	2.1044	0.8324	1.1767	221.4	85
90	0.1643	450.8	2.1206	0.8385	1.1743	222.9		0.1582	450.8	2.1160	0.8388	1.1746	222.9	90

TABLE 2 (continued)
HFC-23 Superheated Vapor—Constant Pressure Tables

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec
Cp = Heat Capacity at Constant Pressure in kJ/(kg)(°C) Cp/Cv = Heat Capacity Ratio (Dimensionless)

TEMP °C	PRESSURE = 280.00 kPa (abs)						SAT VAP	PRESSURE = 290.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-62.43	0.0817	334.2	1.6977	0.7631	1.3556	167.8		0.0790	334.4	1.6950	0.7680	1.3576	167.9	-61.67
-60	0.0831	336.0	1.7064	0.7574	1.3463	169.1		0.0799	335.7	1.7010	0.7639	1.3510	168.7	-60
-55	0.0857	339.8	1.7238	0.7478	1.3292	171.5		0.0825	339.5	1.7186	0.7534	1.3332	171.2	-55
-50	0.0884	343.5	1.7407	0.7406	1.3145	173.9		0.0851	343.2	1.7356	0.7455	1.3180	173.6	-50
-45	0.0909	347.2	1.7570	0.7353	1.3017	176.2		0.0876	346.9	1.7520	0.7397	1.3047	176.0	-45
-40	0.0935	350.8	1.7729	0.7317	1.2905	178.4		0.0900	350.6	1.7680	0.7355	1.2930	178.2	-40
-35	0.0959	354.5	1.7884	0.7295	1.2805	180.6		0.0925	354.3	1.7836	0.7329	1.2827	180.4	-35
-30	0.0984	358.1	1.8036	0.7284	1.2715	182.6		0.0948	357.9	1.7988	0.7314	1.2735	182.4	-30
-25	0.1008	361.8	1.8184	0.7283	1.2634	184.7		0.0972	361.6	1.8137	0.7310	1.2652	184.5	-25
-20	0.1032	365.4	1.8329	0.7291	1.2561	186.6		0.0995	365.2	1.8283	0.7316	1.2576	186.5	-20
-15	0.1055	369.1	1.8472	0.7306	1.2494	188.6		0.1018	368.9	1.8426	0.7329	1.2508	188.4	-15
-10	0.1079	372.7	1.8613	0.7328	1.2432	190.5		0.1040	372.6	1.8567	0.7348	1.2445	190.3	-10
-5	0.1102	376.4	1.8751	0.7356	1.2375	192.3		0.1063	376.3	1.8705	0.7374	1.2387	192.2	-5
0	0.1125	380.1	1.8887	0.7389	1.2323	194.1		0.1085	379.9	1.8842	0.7405	1.2333	194.0	0
5	0.1148	383.8	1.9021	0.7426	1.2274	195.9		0.1107	383.7	1.8976	0.7441	1.2283	195.8	5
10	0.1171	387.5	1.9154	0.7467	1.2228	197.7		0.1129	387.4	1.9109	0.7481	1.2236	197.5	10
15	0.1193	391.3	1.9285	0.7512	1.2185	199.4		0.1151	391.1	1.9241	0.7524	1.2193	199.3	15
20	0.1216	395.0	1.9415	0.7560	1.2145	201.1		0.1173	394.9	1.9370	0.7571	1.2152	201.0	20
25	0.1238	398.8	1.9543	0.7610	1.2107	202.7		0.1195	398.7	1.9499	0.7620	1.2113	202.6	25
30	0.1261	402.6	1.9670	0.7663	1.2071	204.4		0.1216	402.5	1.9626	0.7672	1.2077	204.3	30
35	0.1283	406.5	1.9796	0.7717	1.2036	206.0		0.1238	406.4	1.9752	0.7726	1.2042	205.9	35
40	0.1305	410.3	1.9920	0.7774	1.2004	207.6		0.1259	410.3	1.9877	0.7782	1.2009	207.5	40
45	0.1327	414.2	2.0044	0.7832	1.1973	209.2		0.1281	414.2	2.0000	0.7839	1.1978	209.1	45
50	0.1350	418.2	2.0167	0.7891	1.1944	210.8		0.1302	418.1	2.0123	0.7898	1.1948	210.7	50
55	0.1372	422.1	2.0288	0.7951	1.1915	212.3		0.1324	422.1	2.0245	0.7958	1.1920	212.3	55
60	0.1394	426.1	2.0409	0.8013	1.1889	213.9		0.1345	426.1	2.0366	0.8019	1.1893	213.8	60
65	0.1415	430.2	2.0529	0.8075	1.1863	215.4		0.1366	430.1	2.0486	0.8080	1.1867	215.3	65
70	0.1437	434.2	2.0648	0.8138	1.1838	216.9		0.1387	434.1	2.0605	0.8143	1.1842	216.8	70
75	0.1459	438.3	2.0766	0.8201	1.1814	218.4		0.1408	438.2	2.0723	0.8206	1.1818	218.3	75
80	0.1481	442.4	2.0883	0.8265	1.1792	219.9		0.1429	442.3	2.0840	0.8269	1.1795	219.8	80
85	0.1503	446.6	2.1000	0.8328	1.1770	221.4		0.1450	446.5	2.0957	0.8332	1.1773	221.3	85
90	0.1525	450.7	2.1116	0.8392	1.1749	222.8		0.1471	450.7	2.1073	0.8396	1.1752	222.8	90

TEMP °C	PRESSURE = 300.00 kPa (abs)						SAT VAP	PRESSURE = 310.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-60.93	0.0765	334.6	1.6924	0.7729	1.3597	167.9		0.0741	334.8	1.6899	0.7778	1.3617	168.0	-60.21
-60	0.0770	335.3	1.6958	0.7705	1.3559	168.4		0.0742	335.0	1.6906	0.7772	1.3609	168.1	-60
-55	0.0795	339.2	1.7135	0.7592	1.3373	170.9		0.0767	338.8	1.7085	0.7650	1.3415	170.6	-55
-50	0.0820	342.9	1.7306	0.7505	1.3215	173.4		0.0792	342.6	1.7257	0.7556	1.3250	173.1	-50
-45	0.0845	346.7	1.7471	0.7441	1.3077	175.7		0.0815	346.4	1.7424	0.7485	1.3107	175.5	-45
-40	0.0868	350.4	1.7632	0.7394	1.2956	178.0		0.0839	350.1	1.7586	0.7433	1.2983	177.7	-40
-35	0.0892	354.1	1.7789	0.7363	1.2850	180.1		0.0861	353.8	1.7743	0.7398	1.2873	179.9	-35
-30	0.0915	357.7	1.7941	0.7345	1.2755	182.2		0.0884	357.5	1.7896	0.7376	1.2775	182.0	-30
-25	0.0938	361.4	1.8091	0.7338	1.2669	184.3		0.0906	361.2	1.8046	0.7366	1.2687	184.1	-25
-20	0.0960	365.1	1.8237	0.7340	1.2592	186.3		0.0928	364.9	1.8193	0.7365	1.2608	186.1	-20
-15	0.0982	368.7	1.8381	0.7351	1.2522	188.3		0.0949	368.6	1.8337	0.7373	1.2536	188.1	-15
-10	0.1004	372.4	1.8522	0.7369	1.2457	190.2		0.0971	372.3	1.8479	0.7389	1.2470	190.0	-10
-5	0.1026	376.1	1.8661	0.7393	1.2398	192.0		0.0992	376.0	1.8618	0.7411	1.2409	191.9	-5
0	0.1048	379.8	1.8798	0.7422	1.2343	193.9		0.1013	379.7	1.8755	0.7439	1.2354	193.7	0
5	0.1069	383.5	1.8933	0.7456	1.2292	195.7		0.1034	383.4	1.8891	0.7471	1.2302	195.5	5
10	0.1091	387.3	1.9066	0.7495	1.2245	197.4		0.1055	387.2	1.9024	0.7508	1.2253	197.3	10
15	0.1112	391.0	1.9198	0.7537	1.2201	199.2		0.1075	390.9	1.9156	0.7549	1.2208	199.0	15
20	0.1133	394.8	1.9328	0.7582	1.2159	200.9		0.1096	394.7	1.9286	0.7594	1.2166	200.8	20
25	0.1154	398.6	1.9456	0.7631	1.2120	202.5		0.1116	398.5	1.9415	0.7641	1.2126	202.4	25
30	0.1175	402.4	1.9584	0.7682	1.2083	204.2		0.1136	402.4	1.9542	0.7691	1.2089	204.1	30
35	0.1196	406.3	1.9710	0.7735	1.2048	205.8		0.1157	406.2	1.9669	0.7744	1.2053	205.8	35
40	0.1217	410.2	1.9835	0.7790	1.2014	207.5		0.1177	410.1	1.9794	0.7798	1.2020	207.4	40
45	0.1237	414.1	1.9958	0.7847	1.1983	209.1		0.1197	414.0	1.9918	0.7854	1.1988	209.0	45
50	0.1258	418.0	2.0081	0.7905	1.1953	210.6		0.1217	418.0	2.0041	0.7912	1.1957	210.6	50
55	0.1279	422.0	2.0203	0.7964	1.1924	212.2		0.1237	421.9	2.0163	0.7970	1.1928	212.1	55
60	0.1299	426.0	2.0324	0.8024	1.1897	213.7		0.1257	425.9	2.0284	0.8030	1.1901	213.7	60
65	0.1320	430.0	2.0444	0.8086	1.1870	215.3		0.1277	430.0	2.0404	0.8091	1.1874	215.2	65
70	0.1340	434.1	2.0563	0.8148	1.1845	216.8		0.1296	434.0	2.0523	0.8153	1.1849	216.7	70
75	0.1361	438.2	2.0681	0.8210	1.1821	218.3		0.1316	438.1	2.0641	0.8215	1.1824	218.2	75
80	0.1381	442.3	2.0799	0.8273	1.1798	219.8		0.1336	442.2	2.0759	0.8278	1.1801	219.7	80
85	0.1402	446.4	2.0916	0.8337	1.1776	221.2		0.1356	446.4	2.0876	0.8341	1.1779	221.2	85
90	0.1422	450.6	2.1032	0.8400	1.1754	222.7		0.1376	450.6	2.0992	0.8404	1.1757	222.6	90

TABLE 2 (continued)
HFC-23 Superheated Vapor—Constant Pressure Tables

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec
Cp = Heat Capacity at Constant Pressure in kJ/(kg)(°C) Cp/Cv = Heat Capacity Ratio (Dimensionless)

TEMP °C	PRESSURE = 320.00 kPa (abs)						SAT VAP	PRESSURE = 330.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-59.51	0.0719	335.0	1.6874	0.7826	1.3638	168.0		0.0698	335.2	1.6851	0.7873	1.3658	168.0	-58.82
-55	0.0741	338.5	1.7036	0.7708	1.3458	170.3		0.0716	338.2	1.6989	0.7768	1.3501	170.0	-55
-50	0.0765	342.4	1.7210	0.7607	1.3286	172.8		0.0740	342.1	1.7164	0.7659	1.3323	172.5	-50
-45	0.0788	346.2	1.7378	0.7530	1.3138	175.2		0.0762	345.9	1.7332	0.7575	1.3169	174.9	-45
-40	0.0811	349.9	1.7540	0.7473	1.3009	177.5		0.0784	349.7	1.7496	0.7513	1.3036	177.3	-40
-35	0.0833	353.6	1.7698	0.7433	1.2896	179.7		0.0806	353.4	1.7655	0.7468	1.2919	179.5	-35
-30	0.0855	357.3	1.7852	0.7407	1.2795	181.8		0.0827	357.1	1.7810	0.7439	1.2816	181.6	-30
-25	0.0876	361.0	1.8003	0.7393	1.2705	183.9		0.0848	360.9	1.7961	0.7421	1.2723	183.7	-25
-20	0.0897	364.7	1.8150	0.7390	1.2624	186.0		0.0869	364.6	1.8109	0.7415	1.2640	185.8	-20
-15	0.0918	368.4	1.8295	0.7396	1.2550	187.9		0.0889	368.3	1.8254	0.7418	1.2564	187.8	-15
-10	0.0939	372.1	1.8437	0.7409	1.2483	189.9		0.0910	372.0	1.8396	0.7429	1.2496	189.7	-10
-5	0.0960	375.8	1.8577	0.7429	1.2421	191.7		0.0930	375.7	1.8536	0.7448	1.2432	191.6	-5
0	0.0980	379.6	1.8714	0.7455	1.2364	193.6		0.0950	379.4	1.8674	0.7472	1.2374	193.5	0
5	0.1001	383.3	1.8850	0.7486	1.2311	195.4		0.0969	383.2	1.8810	0.7502	1.2321	195.3	5
10	0.1021	387.0	1.8983	0.7522	1.2262	197.2		0.0989	386.9	1.8944	0.7536	1.2271	197.1	10
15	0.1041	390.8	1.9115	0.7562	1.2216	198.9		0.1008	390.7	1.9076	0.7575	1.2224	198.8	15
20	0.1061	394.6	1.9246	0.7605	1.2173	200.6		0.1028	394.5	1.9207	0.7617	1.2181	200.5	20
25	0.1080	398.4	1.9375	0.7652	1.2133	202.3		0.1047	398.3	1.9336	0.7662	1.2140	202.2	25
30	0.1100	402.3	1.9502	0.7701	1.2095	204.0		0.1066	402.2	1.9464	0.7711	1.2101	203.9	30
35	0.1120	406.1	1.9629	0.7752	1.2059	205.7		0.1085	406.0	1.9590	0.7761	1.2065	205.6	35
40	0.1139	410.0	1.9754	0.7806	1.2025	207.3		0.1104	409.9	1.9716	0.7814	1.2030	207.2	40
45	0.1159	413.9	1.9878	0.7862	1.1993	208.9		0.1123	413.9	1.9840	0.7869	1.1997	208.8	45
50	0.1178	417.9	2.0001	0.7919	1.1962	210.5		0.1142	417.8	1.9963	0.7925	1.1966	210.4	50
55	0.1198	421.8	2.0123	0.7977	1.1932	212.0		0.1161	421.8	2.0085	0.7983	1.1937	212.0	55
60	0.1217	425.9	2.0244	0.8036	1.1905	213.6		0.1179	425.8	2.0206	0.8042	1.1909	213.5	60
65	0.1236	429.9	2.0364	0.8097	1.1878	215.1		0.1198	429.8	2.0326	0.8102	1.1882	215.1	65
70	0.1255	433.9	2.0484	0.8158	1.1852	216.7		0.1217	433.9	2.0446	0.8163	1.1856	216.6	70
75	0.1275	438.0	2.0602	0.8220	1.1828	218.2		0.1235	438.0	2.0564	0.8225	1.1831	218.1	75
80	0.1294	442.2	2.0720	0.8282	1.1804	219.6		0.1254	442.1	2.0682	0.8287	1.1807	219.6	80
85	0.1313	446.3	2.0837	0.8345	1.1782	221.1		0.1273	446.3	2.0799	0.8349	1.1785	221.1	85
90	0.1332	450.5	2.0953	0.8408	1.1760	222.6		0.1291	450.5	2.0915	0.8411	1.1763	222.5	90
95	0.1351	454.7	2.1068	0.8471	1.1739	224.0		0.1310	454.7	2.1031	0.8474	1.1742	224.0	95

TEMP °C	PRESSURE = 340.00 kPa (abs)						SAT VAP	PRESSURE = 350.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-58.15	0.0678	335.4	1.6828	0.7920	1.3679	168.1		0.0660	335.6	1.6805	0.7966	1.3699	168.1	-57.5
-55	0.0693	337.9	1.6942	0.7829	1.3545	169.7		0.0671	337.6	1.6897	0.7890	1.3590	169.4	-55
-50	0.0716	341.8	1.7118	0.7711	1.3360	172.3		0.0693	341.5	1.7074	0.7764	1.3397	172.0	-50
-45	0.0738	345.6	1.7288	0.7621	1.3201	174.7		0.0715	345.4	1.7245	0.7667	1.3233	174.4	-45
-40	0.0760	349.4	1.7453	0.7553	1.3064	177.0		0.0736	349.2	1.7410	0.7594	1.3091	176.8	-40
-35	0.0781	353.2	1.7612	0.7504	1.2943	179.3		0.0757	353.0	1.7571	0.7540	1.2967	179.1	-35
-30	0.0801	356.9	1.7768	0.7470	1.2836	181.4		0.0777	356.7	1.7727	0.7502	1.2857	181.2	-30
-25	0.0822	360.7	1.7920	0.7450	1.2741	183.6		0.0797	360.5	1.7880	0.7478	1.2760	183.4	-25
-20	0.0842	364.4	1.8068	0.7441	1.2656	185.6		0.0817	364.2	1.8029	0.7466	1.2672	185.4	-20
-15	0.0862	368.1	1.8214	0.7441	1.2579	187.6		0.0836	367.9	1.8175	0.7464	1.2593	187.4	-15
-10	0.0882	371.8	1.8356	0.7450	1.2508	189.5		0.0855	371.7	1.8318	0.7471	1.2521	189.4	-10
-5	0.0901	375.6	1.8497	0.7466	1.2444	191.5		0.0874	375.4	1.8459	0.7485	1.2456	191.3	-5
0	0.0921	379.3	1.8635	0.7489	1.2385	193.3		0.0893	379.2	1.8597	0.7506	1.2395	193.2	0
5	0.0940	383.0	1.8771	0.7517	1.2330	195.1		0.0912	382.9	1.8733	0.7532	1.2340	195.0	5
10	0.0959	386.8	1.8905	0.7550	1.2279	196.9		0.0931	386.7	1.8868	0.7564	1.2288	196.8	10
15	0.0978	390.6	1.9038	0.7587	1.2232	198.7		0.0949	390.5	1.9001	0.7600	1.2240	198.6	15
20	0.0997	394.4	1.9169	0.7628	1.2188	200.4		0.0967	394.3	1.9132	0.7640	1.2195	200.3	20
25	0.1015	398.2	1.9298	0.7673	1.2146	202.1		0.0985	398.1	1.9261	0.7684	1.2153	202.0	25
30	0.1034	402.1	1.9426	0.7720	1.2107	203.8		0.1004	402.0	1.9389	0.7730	1.2113	203.7	30
35	0.1052	405.9	1.9553	0.7770	1.2070	205.5		0.1022	405.9	1.9516	0.7779	1.2076	205.4	35
40	0.1071	409.8	1.9678	0.7822	1.2035	207.1		0.1040	409.8	1.9642	0.7831	1.2041	207.0	40
45	0.1089	413.8	1.9803	0.7877	1.2002	208.7		0.1058	413.7	1.9766	0.7884	1.2007	208.6	45
50	0.1108	417.7	1.9926	0.7932	1.1971	210.3		0.1075	417.6	1.9890	0.7939	1.1976	210.2	50
55	0.1126	421.7	2.0048	0.7990	1.1941	211.9		0.1093	421.6	2.0012	0.7996	1.1945	211.8	55
60	0.1144	425.7	2.0169	0.8048	1.1913	213.5		0.1111	425.6	2.0133	0.8054	1.1917	213.4	60
65	0.1162	429.8	2.0290	0.8108	1.1885	215.0		0.1129	429.7	2.0254	0.8113	1.1889	214.9	65
70	0.1181	433.8	2.0409	0.8168	1.1859	216.5		0.1146	433.8	2.0373	0.8173	1.1863	216.5	70
75	0.1199	437.9	2.0528	0.8229	1.1834	218.0		0.1164	437.9	2.0492	0.8234	1.1838	218.0	75
80	0.1217	442.0	2.0645	0.8291	1.1811	219.5		0.1181	442.0	2.0610	0.8295	1.1814	219.5	80
85	0.1235	446.2	2.0762	0.8353	1.1788	221.0		0.1199	446.2	2.0727	0.8357	1.1791	221.0	85
90	0.1253	450.4	2.0879	0.8415	1.1766	222.5		0.1217	450.3	2.0843	0.8419	1.1769	222.4	90
95	0.1271	454.6	2.0994	0.8478	1.1745	223.9		0.1234	454.6	2.0959	0.8481	1.1747	223.9	95

TABLE 2 (continued)
HFC-23 Superheated Vapor—Constant Pressure Tables

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec
Cp = Heat Capacity at Constant Pressure in kJ/(kg)(°C) Cp/Cv = Heat Capacity Ratio (Dimensionless)

TEMP °C	PRESSURE = 360.00 kPa (abs)						SAT VAP	PRESSURE = 370.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-56.86	0.0642	335.8	1.6784	0.8012	1.3719	168.1		0.0625	336.0	1.6763	0.8057	1.3739	168.1	-56.23
-55	0.0650	337.3	1.6852	0.7953	1.3636	169.1		0.0631	337.0	1.6808	0.8016	1.3682	168.8	-55
-50	0.0672	341.2	1.7031	0.7818	1.3436	171.7		0.0652	340.9	1.6988	0.7873	1.3475	171.4	-50
-45	0.0693	345.1	1.7203	0.7714	1.3266	174.2		0.0673	344.9	1.7161	0.7762	1.3299	173.9	-45
-40	0.0714	349.0	1.7369	0.7635	1.3119	176.5		0.0693	348.7	1.7329	0.7676	1.3148	176.3	-40
-35	0.0734	352.8	1.7530	0.7576	1.2991	178.8		0.0713	352.5	1.7491	0.7613	1.3016	178.6	-35
-30	0.0754	356.5	1.7687	0.7534	1.2879	181.0		0.0732	356.3	1.7648	0.7567	1.2900	180.8	-30
-25	0.0774	360.3	1.7840	0.7507	1.2778	183.2		0.0751	360.1	1.7802	0.7536	1.2797	183.0	-25
-20	0.0793	364.0	1.7990	0.7492	1.2689	185.3		0.0770	363.9	1.7952	0.7517	1.2705	185.1	-20
-15	0.0812	367.8	1.8136	0.7487	1.2608	187.3		0.0789	367.6	1.8099	0.7510	1.2623	187.1	-15
-10	0.0831	371.5	1.8280	0.7491	1.2535	189.2		0.0807	371.4	1.8243	0.7512	1.2548	189.1	-10
-5	0.0849	375.3	1.8421	0.7503	1.2468	191.2		0.0825	375.1	1.8385	0.7522	1.2479	191.0	-5
0	0.0868	379.0	1.8560	0.7523	1.2406	193.0		0.0843	378.9	1.8524	0.7540	1.2417	192.9	0
5	0.0886	382.8	1.8697	0.7548	1.2349	194.9		0.0861	382.7	1.8661	0.7563	1.2359	194.8	5
10	0.0904	386.6	1.8831	0.7578	1.2297	196.7		0.0879	386.5	1.8796	0.7592	1.2306	196.6	10
15	0.0922	390.4	1.8964	0.7613	1.2248	198.5		0.0896	390.3	1.8929	0.7626	1.2256	198.4	15
20	0.0940	394.2	1.9096	0.7652	1.2202	200.2		0.0913	394.1	1.9060	0.7663	1.2210	200.1	20
25	0.0957	398.0	1.9225	0.7694	1.2160	201.9		0.0931	397.9	1.9190	0.7705	1.2166	201.8	25
30	0.0975	401.9	1.9354	0.7740	1.2120	203.6		0.0948	401.8	1.9319	0.7750	1.2126	203.5	30
35	0.0993	405.8	1.9481	0.7788	1.2082	205.3		0.0965	405.7	1.9446	0.7797	1.2088	205.2	35
40	0.1010	409.7	1.9606	0.7839	1.2046	206.9		0.0982	409.6	1.9572	0.7847	1.2051	206.8	40
45	0.1028	413.6	1.9731	0.7892	1.2012	208.6		0.0999	413.5	1.9697	0.7899	1.2017	208.5	45
50	0.1045	417.6	1.9855	0.7946	1.1980	210.2		0.1016	417.5	1.9820	0.7953	1.1985	210.1	50
55	0.1062	421.6	1.9977	0.8003	1.1950	211.7		0.1033	421.5	1.9943	0.8009	1.1954	211.7	55
60	0.1079	425.6	2.0098	0.8060	1.1921	213.3		0.1050	425.5	2.0064	0.8066	1.1925	213.2	60
65	0.1097	429.6	2.0219	0.8119	1.1893	214.9		0.1067	429.6	2.0185	0.8124	1.1897	214.8	65
70	0.1114	433.7	2.0339	0.8178	1.1866	216.4		0.1083	433.6	2.0305	0.8184	1.1870	216.3	70
75	0.1131	437.8	2.0457	0.8239	1.1841	217.9		0.1100	437.7	2.0423	0.8244	1.1845	217.8	75
80	0.1148	441.9	2.0575	0.8300	1.1817	219.4		0.1117	441.9	2.0541	0.8304	1.1820	219.3	80
85	0.1165	446.1	2.0692	0.8361	1.1794	220.9		0.1133	446.0	2.0659	0.8365	1.1797	220.8	85
90	0.1182	450.3	2.0809	0.8423	1.1771	222.4		0.1150	450.2	2.0775	0.8427	1.1774	222.3	90
95	0.1199	454.5	2.0924	0.8485	1.1750	223.8		0.1167	454.5	2.0891	0.8489	1.1753	223.8	95

TEMP °C	PRESSURE = 380.00 kPa (abs)						SAT VAP	PRESSURE = 390.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-55.62	0.0610	336.2	1.6742	0.8102	1.3759	168.1		0.0594	336.3	1.6722	0.8147	1.3779	168.1	-55.01
-55	0.0612	336.7	1.6765	0.8081	1.3730	168.5		0.0595	336.3	1.6723	0.8146	1.3778	168.1	-55
-50	0.0633	340.7	1.6946	0.7928	1.3515	171.1		0.0615	340.4	1.6905	0.7984	1.3555	170.8	-50
-45	0.0654	344.6	1.7121	0.7810	1.3333	173.6		0.0635	344.3	1.7081	0.7858	1.3367	173.4	-45
-40	0.0673	348.5	1.7289	0.7718	1.3176	176.1		0.0655	348.2	1.7250	0.7761	1.3205	175.8	-40
-35	0.0693	352.3	1.7452	0.7650	1.3041	178.4		0.0674	352.1	1.7414	0.7687	1.3066	178.2	-35
-30	0.0712	356.1	1.7610	0.7599	1.2922	180.6		0.0692	355.9	1.7573	0.7632	1.2943	180.4	-30
-25	0.0730	359.9	1.7765	0.7565	1.2816	182.8		0.0711	359.7	1.7728	0.7594	1.2835	182.6	-25
-20	0.0749	363.7	1.7915	0.7543	1.2722	184.9		0.0729	363.5	1.7879	0.7570	1.2739	184.7	-20
-15	0.0767	367.5	1.8063	0.7533	1.2638	186.9		0.0746	367.3	1.8027	0.7557	1.2653	186.8	-15
-10	0.0785	371.2	1.8207	0.7533	1.2561	188.9		0.0764	371.1	1.8172	0.7554	1.2574	188.8	-10
-5	0.0803	375.0	1.8349	0.7541	1.2491	190.9		0.0781	374.9	1.8314	0.7560	1.2503	190.7	-5
0	0.0820	378.8	1.8489	0.7557	1.2428	192.8		0.0798	378.6	1.8454	0.7574	1.2438	192.6	0
5	0.0837	382.6	1.8626	0.7578	1.2369	194.6		0.0815	382.4	1.8592	0.7594	1.2379	194.5	5
10	0.0855	386.3	1.8761	0.7606	1.2315	196.5		0.0832	386.2	1.8727	0.7620	1.2323	196.3	10
15	0.0872	390.2	1.8894	0.7638	1.2264	198.2		0.0849	390.0	1.8861	0.7651	1.2272	198.1	15
20	0.0889	394.0	1.9026	0.7675	1.2217	200.0		0.0865	393.9	1.8993	0.7687	1.2225	199.9	20
25	0.0906	397.8	1.9156	0.7716	1.2173	201.7		0.0882	397.7	1.9123	0.7726	1.2180	201.6	25
30	0.0922	401.7	1.9285	0.7759	1.2132	203.4		0.0898	401.6	1.9252	0.7769	1.2138	203.3	30
35	0.0939	405.6	1.9412	0.7806	1.2093	205.1		0.0914	405.5	1.9379	0.7815	1.2099	205.0	35
40	0.0956	409.5	1.9538	0.7855	1.2057	206.8		0.0931	409.4	1.9506	0.7864	1.2062	206.7	40
45	0.0972	413.5	1.9663	0.7907	1.2022	208.4		0.0947	413.4	1.9630	0.7915	1.2027	208.3	45
50	0.0989	417.4	1.9787	0.7960	1.1989	210.0		0.0963	417.3	1.9754	0.7967	1.1994	209.9	50
55	0.1005	421.4	1.9910	0.8016	1.1958	211.6		0.0979	421.3	1.9877	0.8022	1.1963	211.5	55
60	0.1022	425.4	2.0031	0.8072	1.1929	213.2		0.0995	425.4	1.9999	0.8078	1.1933	213.1	60
65	0.1038	429.5	2.0152	0.8130	1.1901	214.7		0.1011	429.4	2.0120	0.8135	1.1904	214.6	65
70	0.1054	433.6	2.0272	0.8189	1.1874	216.3		0.1027	433.5	2.0239	0.8194	1.1877	216.2	70
75	0.1071	437.7	2.0390	0.8248	1.1848	217.8		0.1043	437.6	2.0358	0.8253	1.1851	217.7	75
80	0.1087	441.8	2.0509	0.8309	1.1823	219.3		0.1059	441.8	2.0476	0.8313	1.1827	219.2	80
85	0.1103	446.0	2.0626	0.8370	1.1800	220.8		0.1074	445.9	2.0594	0.8374	1.1803	220.7	85
90	0.1119	450.2	2.0742	0.8431	1.1777	222.3		0.1090	450.1	2.0710	0.8435	1.1780	222.2	90
95	0.1135	454.4	2.0858	0.8492	1.1756	223.7		0.1106	454.4	2.0826	0.8496	1.1758	223.7	95

TABLE 2 (continued)
HFC-23 Superheated Vapor—Constant Pressure Tables

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec
Cp = Heat Capacity at Constant Pressure in kJ/(kg)(°C) Cp/Cv = Heat Capacity Ratio (Dimensionless)

TEMP °C	PRESSURE = 400.00 kPa (abs)						SAT VAP	PRESSURE = 425.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-54.42	0.0580	336.5	1.6703	0.8191	1.3799	168.1		0.0547	336.9	1.6656	0.8299	1.3849	168.1	-53
-50	0.0598	340.1	1.6865	0.8041	1.3596	170.5		0.0559	339.3	1.6767	0.8187	1.3702	169.8	-50
-45	0.0618	344.1	1.7042	0.7907	1.3401	173.1		0.0578	343.4	1.6947	0.8033	1.3490	172.4	-45
-40	0.0637	348.0	1.7212	0.7804	1.3235	175.6		0.0596	347.4	1.7120	0.7913	1.3311	175.0	-40
-35	0.0655	351.9	1.7377	0.7724	1.3091	177.9		0.0614	351.3	1.7287	0.7820	1.3156	177.4	-35
-30	0.0674	355.7	1.7537	0.7665	1.2966	180.2		0.0631	355.2	1.7448	0.7750	1.3022	179.7	-30
-25	0.0692	359.5	1.7692	0.7624	1.2855	182.4		0.0648	359.1	1.7606	0.7698	1.2904	181.9	-25
-20	0.0709	363.3	1.7844	0.7596	1.2756	184.5		0.0665	362.9	1.7759	0.7662	1.2799	184.1	-20
-15	0.0727	367.1	1.7992	0.7580	1.2668	186.6		0.0681	366.7	1.7908	0.7640	1.2706	186.2	-15
-10	0.0744	370.9	1.8138	0.7575	1.2588	188.6		0.0698	370.5	1.8055	0.7629	1.2622	188.2	-10
-5	0.0761	374.7	1.8280	0.7579	1.2515	190.6		0.0714	374.4	1.8198	0.7627	1.2546	190.2	-5
0	0.0777	378.5	1.8420	0.7591	1.2449	192.5		0.0730	378.2	1.8339	0.7634	1.2477	192.2	0
5	0.0794	382.3	1.8558	0.7610	1.2388	194.4		0.0745	382.0	1.8478	0.7649	1.2413	194.0	5
10	0.0810	386.1	1.8694	0.7634	1.2332	196.2		0.0761	385.8	1.8614	0.7670	1.2355	195.9	10
15	0.0827	389.9	1.8828	0.7664	1.2280	198.0		0.0776	389.7	1.8749	0.7697	1.2301	197.7	15
20	0.0843	393.8	1.8960	0.7699	1.2232	199.8		0.0792	393.5	1.8882	0.7728	1.2251	199.5	20
25	0.0859	397.6	1.9091	0.7737	1.2187	201.5		0.0807	397.4	1.9012	0.7764	1.2204	201.3	25
30	0.0875	401.5	1.9220	0.7779	1.2145	203.2		0.0822	401.3	1.9142	0.7804	1.2161	203.0	30
35	0.0891	405.4	1.9347	0.7824	1.2105	204.9		0.0837	405.2	1.9270	0.7847	1.2120	204.7	35
40	0.0907	409.3	1.9474	0.7872	1.2068	206.6		0.0852	409.1	1.9397	0.7893	1.2081	206.4	40
45	0.0923	413.3	1.9599	0.7922	1.2032	208.2		0.0867	413.1	1.9522	0.7941	1.2045	208.0	45
50	0.0938	417.3	1.9723	0.7974	1.1999	209.8		0.0882	417.1	1.9646	0.7992	1.2011	209.6	50
55	0.0954	421.3	1.9845	0.8028	1.1967	211.4		0.0897	421.1	1.9769	0.8045	1.1978	211.2	55
60	0.0970	425.3	1.9967	0.8084	1.1937	213.0		0.0911	425.1	1.9891	0.8099	1.1947	212.8	60
65	0.0985	429.3	2.0088	0.8141	1.1908	214.6		0.0926	429.2	2.0012	0.8155	1.1918	214.4	65
70	0.1001	433.4	2.0208	0.8199	1.1881	216.1		0.0941	433.3	2.0133	0.8212	1.1890	216.0	70
75	0.1016	437.5	2.0327	0.8258	1.1855	217.7		0.0955	437.4	2.0252	0.8270	1.1863	217.5	75
80	0.1032	441.7	2.0445	0.8318	1.1830	219.2		0.0970	441.5	2.0370	0.8329	1.1838	219.0	80
85	0.1047	445.9	2.0563	0.8378	1.1806	220.7		0.0985	445.7	2.0488	0.8388	1.1813	220.5	85
90	0.1063	450.1	2.0679	0.8439	1.1783	222.2		0.0999	449.9	2.0604	0.8448	1.1790	222.0	90
95	0.1078	454.3	2.0795	0.8500	1.1761	223.6		0.1014	454.2	2.0720	0.8509	1.1768	223.5	95
100	0.1093	458.6	2.0910	0.8561	1.1740	225.1		0.1028	458.4	2.0836	0.8569	1.1746	225.0	100

TEMP °C	PRESSURE = 450.00 kPa (abs)						SAT VAP	PRESSURE = 475.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-51.63	0.0518	337.2	1.6612	0.8406	1.3898	168.1		0.0491	337.6	1.6570	0.8510	1.3947	168.1	-50.32
-50	0.0524	338.6	1.6673	0.8338	1.3813	169.1		0.0492	337.8	1.6582	0.8495	1.3929	168.3	-50
-45	0.0542	342.7	1.6856	0.8162	1.3583	171.8		0.0510	342.0	1.6768	0.8296	1.3679	171.1	-45
-40	0.0559	346.8	1.7031	0.8025	1.3389	174.3		0.0527	346.1	1.6946	0.8140	1.3470	173.7	-40
-35	0.0576	350.7	1.7200	0.7918	1.3223	176.8		0.0543	350.2	1.7118	0.8018	1.3292	176.2	-35
-30	0.0593	354.7	1.7364	0.7836	1.3080	179.2		0.0559	354.2	1.7283	0.7923	1.3139	178.6	-30
-25	0.0609	358.6	1.7523	0.7774	1.2954	181.4		0.0575	358.1	1.7444	0.7852	1.3006	181.0	-25
-20	0.0625	362.5	1.7678	0.7730	1.2843	183.6		0.0590	362.0	1.7600	0.7799	1.2889	183.2	-20
-15	0.0641	366.3	1.7828	0.7700	1.2745	185.8		0.0605	365.9	1.7752	0.7761	1.2785	185.3	-15
-10	0.0657	370.2	1.7976	0.7683	1.2657	187.8		0.0620	369.8	1.7901	0.7738	1.2692	187.4	-10
-5	0.0672	374.0	1.8120	0.7676	1.2577	189.8		0.0635	373.6	1.8046	0.7725	1.2609	189.5	-5
0	0.0687	377.8	1.8262	0.7678	1.2505	191.8		0.0649	377.5	1.8189	0.7723	1.2533	191.5	0
5	0.0702	381.7	1.8402	0.7689	1.2438	193.7		0.0663	381.4	1.8329	0.7729	1.2464	193.4	5
10	0.0717	385.5	1.8539	0.7706	1.2378	195.6		0.0677	385.2	1.8467	0.7742	1.2401	195.3	10
15	0.0732	389.4	1.8674	0.7729	1.2322	197.4		0.0691	389.1	1.8602	0.7762	1.2343	197.1	15
20	0.0746	393.3	1.8807	0.7758	1.2270	199.2		0.0705	393.0	1.8736	0.7788	1.2289	199.0	20
25	0.0761	397.1	1.8939	0.7791	1.2222	201.0		0.0719	396.9	1.8868	0.7819	1.2239	200.7	25
30	0.0775	401.1	1.9068	0.7829	1.2177	202.7		0.0733	400.8	1.8999	0.7854	1.2193	202.5	30
35	0.0789	405.0	1.9197	0.7870	1.2134	204.5		0.0746	404.8	1.9127	0.7893	1.2149	204.2	35
40	0.0803	408.9	1.9324	0.7914	1.2095	206.1		0.0760	408.7	1.9255	0.7935	1.2109	205.9	40
45	0.0818	412.9	1.9450	0.7961	1.2058	207.8		0.0773	412.7	1.9381	0.7980	1.2070	207.6	45
50	0.0832	416.9	1.9574	0.8010	1.2022	209.4		0.0787	416.7	1.9506	0.8028	1.2034	209.2	50
55	0.0846	420.9	1.9697	0.8061	1.1989	211.1		0.0800	420.7	1.9629	0.8078	1.2000	210.9	55
60	0.0860	424.9	1.9820	0.8114	1.1958	212.7		0.0813	424.8	1.9752	0.8130	1.1968	212.5	60
65	0.0874	429.0	1.9941	0.8169	1.1928	214.2		0.0827	428.8	1.9873	0.8183	1.1937	214.1	65
70	0.0887	433.1	2.0061	0.8225	1.1899	215.8		0.0840	433.0	1.9994	0.8238	1.1908	215.6	70
75	0.0901	437.2	2.0181	0.8282	1.1872	217.3		0.0853	437.1	2.0113	0.8294	1.1880	217.2	75
80	0.0915	441.4	2.0299	0.8340	1.1846	218.9		0.0866	441.2	2.0232	0.8351	1.1854	218.7	80
85	0.0929	445.6	2.0417	0.8399	1.1821	220.4		0.0879	445.4	2.0350	0.8409	1.1829	220.2	85
90	0.0943	449.8	2.0534	0.8458	1.1797	221.9		0.0892	449.7	2.0467	0.8468	1.1805	221.7	90
95	0.0956	454.0	2.0650	0.8518	1.1775	223.4		0.0905	453.9	2.0583	0.8527	1.1782	223.2	95
100	0.0970	458.3	2.0765	0.8578	1.1753	224.8		0.0918	458.2	2.0698	0.8586	1.1760	224.7	100

TABLE 2 (continued)
HFC-23 Superheated Vapor—Constant Pressure Tables

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec
 Cp = Heat Capacity at Constant Pressure in kJ/(kg)(°C) Cp/Cv = Heat Capacity Ratio (Dimensionless)

TEMP °C	PRESSURE = 500.00 kPa (abs)						SAT VAP	PRESSURE = 525.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-49.06	0.0467	337.9	1.6530	0.8612	1.3996	168.1		0.0445	338.2	1.6493	0.8713	1.4045	168.0	-47.85
-45	0.0481	341.3	1.6684	0.8434	1.3780	170.4		0.0455	340.6	1.6601	0.8577	1.3884	169.7	-45
-40	0.0497	345.5	1.6864	0.8258	1.3554	173.1		0.0471	344.9	1.6785	0.8380	1.3641	172.4	-40
-35	0.0513	349.6	1.7038	0.8121	1.3363	175.6		0.0486	349.0	1.6961	0.8226	1.3437	175.1	-35
-30	0.0529	353.6	1.7206	0.8013	1.3200	178.1		0.0501	353.1	1.7131	0.8105	1.3263	177.6	-30
-25	0.0544	357.6	1.7368	0.7931	1.3059	180.5		0.0515	357.1	1.7295	0.8011	1.3113	180.0	-25
-20	0.0558	361.6	1.7525	0.7869	1.2935	182.7		0.0530	361.1	1.7454	0.7940	1.2982	182.3	-20
-15	0.0573	365.5	1.7679	0.7824	1.2826	184.9		0.0544	365.1	1.7609	0.7887	1.2867	184.5	-15
-10	0.0587	369.4	1.7829	0.7793	1.2728	187.0		0.0557	369.0	1.7760	0.7849	1.2765	186.6	-10
-5	0.0601	373.3	1.7975	0.7775	1.2641	189.1		0.0571	372.9	1.7907	0.7826	1.2673	188.7	-5
0	0.0615	377.2	1.8119	0.7768	1.2562	191.1		0.0584	376.8	1.8051	0.7813	1.2591	190.8	0
5	0.0629	381.0	1.8260	0.7769	1.2490	193.1		0.0597	380.7	1.8193	0.7810	1.2516	192.7	5
10	0.0642	384.9	1.8398	0.7779	1.2424	195.0		0.0610	384.6	1.8332	0.7816	1.2448	194.7	10
15	0.0655	388.8	1.8534	0.7796	1.2364	196.9		0.0623	388.5	1.8469	0.7829	1.2386	196.6	15
20	0.0669	392.7	1.8669	0.7818	1.2309	198.7		0.0635	392.5	1.8604	0.7849	1.2328	198.4	20
25	0.0682	396.6	1.8801	0.7846	1.2257	200.5		0.0648	396.4	1.8737	0.7874	1.2275	200.2	25
30	0.0695	400.6	1.8932	0.7879	1.2209	202.2		0.0661	400.3	1.8868	0.7904	1.2226	202.0	30
35	0.0708	404.5	1.9061	0.7916	1.2165	204.0		0.0673	404.3	1.8998	0.7939	1.2180	203.8	35
40	0.0721	408.5	1.9189	0.7956	1.2123	205.7		0.0685	408.3	1.9126	0.7977	1.2137	205.5	40
45	0.0734	412.5	1.9315	0.7999	1.2083	207.4		0.0698	412.3	1.9253	0.8019	1.2096	207.2	45
50	0.0746	416.5	1.9440	0.8046	1.2046	209.0		0.0710	416.3	1.9378	0.8064	1.2059	208.8	50
55	0.0759	420.5	1.9564	0.8094	1.2012	210.7		0.0722	420.3	1.9502	0.8111	1.2023	210.5	55
60	0.0772	424.6	1.9687	0.8145	1.1979	212.3		0.0734	424.4	1.9625	0.8160	1.1989	212.1	60
65	0.0784	428.7	1.9809	0.8197	1.1947	213.9		0.0746	428.5	1.9747	0.8212	1.1957	213.7	65
70	0.0797	432.8	1.9929	0.8251	1.1917	215.5		0.0758	432.6	1.9868	0.8264	1.1927	215.3	70
75	0.0809	436.9	2.0049	0.8306	1.1889	217.0		0.0770	436.8	1.9988	0.8319	1.1898	216.9	75
80	0.0822	441.1	2.0168	0.8363	1.1862	218.6		0.0782	440.9	2.0107	0.8374	1.1871	218.4	80
85	0.0834	445.3	2.0286	0.8420	1.1837	220.1		0.0794	445.1	2.0225	0.8430	1.1844	219.9	85
90	0.0847	449.5	2.0403	0.8478	1.1812	221.6		0.0806	449.4	2.0342	0.8488	1.1819	221.5	90
95	0.0859	453.8	2.0519	0.8536	1.1789	223.1		0.0818	453.6	2.0459	0.8545	1.1796	223.0	95
100	0.0872	458.1	2.0635	0.8595	1.1766	224.6		0.0829	457.9	2.0575	0.8604	1.1773	224.5	100
105	0.0884	462.4	2.0750	0.8654	1.1745	226.1		0.0841	462.2	2.0689	0.8662	1.1751	225.9	105

TEMP °C	PRESSURE = 550.00 kPa (abs)						SAT VAP	PRESSURE = 575.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-46.68	0.0426	338.4	1.6457	0.8812	1.4094	167.9		0.0407	338.7	1.6422	0.8910	1.4143	167.9	-45.55
-45	0.0431	339.9	1.6521	0.8726	1.3994	168.9		0.0409	339.2	1.6444	0.8879	1.4108	168.2	-45
-40	0.0446	344.2	1.6708	0.8506	1.3731	171.8		0.0424	343.6	1.6633	0.8636	1.3825	171.1	-40
-35	0.0461	348.4	1.6887	0.8334	1.3513	174.5		0.0439	347.8	1.6815	0.8445	1.3591	173.8	-35
-30	0.0476	352.6	1.7058	0.8199	1.3328	177.0		0.0453	352.0	1.6988	0.8295	1.3394	176.5	-30
-25	0.0490	356.6	1.7224	0.8093	1.3169	179.5		0.0466	356.1	1.7156	0.8177	1.3226	178.9	-25
-20	0.0503	360.7	1.7385	0.8012	1.3031	181.8		0.0480	360.2	1.7318	0.8086	1.3080	181.3	-20
-15	0.0517	364.6	1.7541	0.7951	1.2909	184.1		0.0493	364.2	1.7476	0.8016	1.2953	183.6	-15
-10	0.0530	368.6	1.7693	0.7907	1.2802	186.2		0.0505	368.2	1.7629	0.7965	1.2840	185.8	-10
-5	0.0543	372.6	1.7842	0.7877	1.2707	188.4		0.0518	372.2	1.7778	0.7928	1.2740	188.0	-5
0	0.0556	376.5	1.7987	0.7859	1.2621	190.4		0.0530	376.1	1.7925	0.7905	1.2651	190.1	0
5	0.0568	380.4	1.8129	0.7852	1.2543	192.4		0.0542	380.1	1.8068	0.7893	1.2570	192.1	5
10	0.0581	384.3	1.8269	0.7853	1.2472	194.4		0.0554	384.0	1.8209	0.7891	1.2497	194.0	10
15	0.0593	388.3	1.8407	0.7863	1.2408	196.3		0.0566	388.0	1.8347	0.7897	1.2430	196.0	15
20	0.0605	392.2	1.8542	0.7880	1.2348	198.1		0.0578	391.9	1.8483	0.7911	1.2368	197.9	20
25	0.0617	396.1	1.8676	0.7902	1.2293	200.0		0.0589	395.9	1.8617	0.7931	1.2312	199.7	25
30	0.0629	400.1	1.8807	0.7930	1.2242	201.8		0.0601	399.9	1.8749	0.7956	1.2259	201.5	30
35	0.0641	404.1	1.8937	0.7962	1.2195	203.5		0.0612	403.9	1.8879	0.7986	1.2211	203.3	35
40	0.0653	408.1	1.9066	0.7999	1.2151	205.2		0.0624	407.9	1.9008	0.8020	1.2165	205.0	40
45	0.0665	412.1	1.9193	0.8039	1.2110	207.0		0.0635	411.9	1.9135	0.8059	1.2123	206.7	45
50	0.0677	416.1	1.9318	0.8082	1.2071	208.6		0.0646	415.9	1.9261	0.8100	1.2083	208.4	50
55	0.0688	420.2	1.9443	0.8128	1.2034	210.3		0.0657	420.0	1.9386	0.8144	1.2046	210.1	55
60	0.0700	424.2	1.9566	0.8176	1.2000	211.9		0.0668	424.1	1.9509	0.8191	1.2010	211.7	60
65	0.0711	428.3	1.9688	0.8226	1.1967	213.5		0.0680	428.2	1.9632	0.8240	1.1977	213.4	65
70	0.0723	432.5	1.9809	0.8278	1.1936	215.1		0.0691	432.3	1.9753	0.8291	1.1946	215.0	70
75	0.0734	436.6	1.9930	0.8331	1.1907	216.7		0.0702	436.5	1.9873	0.8343	1.1916	216.5	75
80	0.0746	440.8	2.0049	0.8386	1.1879	218.3		0.0713	440.6	1.9993	0.8397	1.1887	218.1	80
85	0.0757	445.0	2.0167	0.8441	1.1852	219.8		0.0723	444.9	2.0111	0.8452	1.1860	219.7	85
90	0.0768	449.2	2.0284	0.8498	1.1827	221.3		0.0734	449.1	2.0229	0.8508	1.1834	221.2	90
95	0.0780	453.5	2.0401	0.8555	1.1803	222.8		0.0745	453.4	2.0346	0.8564	1.1810	222.7	95
100	0.0791	457.8	2.0517	0.8612	1.1779	224.3		0.0756	457.7	2.0461	0.8621	1.1786	224.2	100
105	0.0802	462.1	2.0632	0.8670	1.1757	225.8		0.0767	462.0	2.0577	0.8678	1.1764	225.7	105

TABLE 2 (continued)
HFC-23 Superheated Vapor—Constant Pressure Tables

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec
Cp = Heat Capacity at Constant Pressure in kJ/(kg)(°C) Cp/Cv = Heat Capacity Ratio (Dimensionless)

TEMP °C	PRESSURE = 600.00 kPa (abs)						SAT VAP	PRESSURE = 625.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-44.46	0.0391	338.9	1.6389	0.9007	1.4192	167.8		0.0375	339.2	1.6357	0.9102	1.4241	167.7	-43.4
-40	0.0404	342.9	1.6561	0.8770	1.3923	170.4		0.0385	342.2	1.6489	0.8909	1.4025	169.7	-40
-35	0.0418	347.2	1.6744	0.8559	1.3673	173.2		0.0399	346.6	1.6676	0.8677	1.3757	172.6	-35
-30	0.0432	351.5	1.6920	0.8393	1.3463	175.9		0.0412	350.9	1.6854	0.8494	1.3534	175.3	-30
-25	0.0445	355.6	1.7090	0.8263	1.3284	178.4		0.0425	355.1	1.7026	0.8350	1.3345	177.9	-25
-20	0.0458	359.7	1.7254	0.8161	1.3131	180.8		0.0437	359.3	1.7191	0.8237	1.3183	180.4	-20
-15	0.0470	363.8	1.7412	0.8082	1.2997	183.2		0.0450	363.4	1.7351	0.8150	1.3042	182.7	-15
-10	0.0482	367.8	1.7567	0.8023	1.2879	185.4		0.0462	367.4	1.7507	0.8083	1.2919	185.0	-10
-5	0.0495	371.8	1.7718	0.7981	1.2775	187.6		0.0473	371.4	1.7659	0.8034	1.2810	187.2	-5
0	0.0506	375.8	1.7865	0.7952	1.2681	189.7		0.0485	375.5	1.7807	0.8000	1.2713	189.3	0
5	0.0518	379.8	1.8009	0.7936	1.2597	191.7		0.0496	379.4	1.7952	0.7978	1.2625	191.4	5
10	0.0530	383.7	1.8150	0.7929	1.2521	193.7		0.0507	383.4	1.8094	0.7968	1.2546	193.4	10
15	0.0541	387.7	1.8289	0.7932	1.2452	195.7		0.0518	387.4	1.8233	0.7967	1.2475	195.4	15
20	0.0552	391.7	1.8425	0.7942	1.2389	197.6		0.0529	391.4	1.8370	0.7974	1.2409	197.3	20
25	0.0564	395.6	1.8560	0.7959	1.2330	199.4		0.0540	395.4	1.8505	0.7988	1.2349	199.2	25
30	0.0575	399.6	1.8692	0.7982	1.2276	201.3		0.0551	399.4	1.8638	0.8008	1.2294	201.0	30
35	0.0586	403.6	1.8823	0.8010	1.2226	203.0		0.0561	403.4	1.8769	0.8034	1.2242	202.8	35
40	0.0597	407.6	1.8952	0.8042	1.2180	204.8		0.0572	407.4	1.8899	0.8064	1.2194	204.6	40
45	0.0608	411.7	1.9080	0.8079	1.2136	206.5		0.0582	411.5	1.9027	0.8099	1.2150	206.3	45
50	0.0618	415.7	1.9206	0.8118	1.2096	208.2		0.0593	415.5	1.9153	0.8137	1.2108	208.0	50
55	0.0629	419.8	1.9331	0.8161	1.2057	209.9		0.0603	419.6	1.9279	0.8178	1.2069	209.7	55
60	0.0640	423.9	1.9455	0.8207	1.2021	211.6		0.0613	423.7	1.9403	0.8223	1.2032	211.4	60
65	0.0650	428.0	1.9578	0.8255	1.1987	213.2		0.0624	427.8	1.9526	0.8269	1.1997	213.0	65
70	0.0661	432.1	1.9699	0.8304	1.1955	214.8		0.0634	432.0	1.9647	0.8318	1.1965	214.6	70
75	0.0672	436.3	1.9820	0.8356	1.1925	216.4		0.0644	436.1	1.9768	0.8368	1.1933	216.2	75
80	0.0682	440.5	1.9939	0.8409	1.1896	218.0		0.0654	440.3	1.9888	0.8420	1.1904	217.8	80
85	0.0693	444.7	2.0058	0.8463	1.1868	219.5		0.0664	444.6	2.0006	0.8473	1.1876	219.4	85
90	0.0703	449.0	2.0176	0.8518	1.1842	221.1		0.0674	448.8	2.0124	0.8528	1.1849	220.9	90
95	0.0714	453.2	2.0292	0.8573	1.1817	222.6		0.0684	453.1	2.0241	0.8583	1.1824	222.4	95
100	0.0724	457.5	2.0408	0.8630	1.1793	224.1		0.0694	457.4	2.0357	0.8638	1.1800	224.0	100
105	0.0734	461.9	2.0524	0.8686	1.1770	225.6		0.0704	461.7	2.0473	0.8695	1.1776	225.5	105
110	0.0745	466.2	2.0638	0.8744	1.1748	227.1		0.0714	466.1	2.0587	0.8751	1.1754	226.9	110

TEMP °C	PRESSURE = 650.00 kPa (abs)						SAT VAP	PRESSURE = 675.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-42.37	0.0361	339.4	1.6327	0.9197	1.4290	167.6		0.0348	339.6	1.6297	0.9290	1.4339	167.5	-41.37
-40	0.0368	341.5	1.6420	0.9052	1.4131	169.0		0.0352	340.9	1.6352	0.9201	1.4242	168.3	-40
-35	0.0381	346.0	1.6609	0.8798	1.3844	172.0		0.0365	345.4	1.6544	0.8922	1.3935	171.3	-35
-30	0.0394	350.3	1.6790	0.8597	1.3607	174.8		0.0377	349.8	1.6727	0.8704	1.3682	174.2	-30
-25	0.0407	354.6	1.6963	0.8440	1.3407	177.4		0.0390	354.1	1.6902	0.8531	1.3470	176.8	-25
-20	0.0419	358.8	1.7130	0.8315	1.3236	179.9		0.0402	358.3	1.7071	0.8395	1.3291	179.4	-20
-15	0.0431	362.9	1.7292	0.8218	1.3088	182.3		0.0413	362.5	1.7234	0.8288	1.3135	181.8	-15
-10	0.0442	367.0	1.7449	0.8144	1.2959	184.6		0.0424	366.6	1.7392	0.8205	1.3000	184.2	-10
-5	0.0454	371.1	1.7601	0.8088	1.2845	186.8		0.0435	370.7	1.7546	0.8143	1.2882	186.4	-5
0	0.0465	375.1	1.7751	0.8048	1.2744	189.0		0.0446	374.8	1.7696	0.8097	1.2776	188.6	0
5	0.0476	379.1	1.7896	0.8022	1.2654	191.1		0.0457	378.8	1.7843	0.8065	1.2682	190.7	5
10	0.0487	383.1	1.8039	0.8007	1.2572	193.1		0.0467	382.8	1.7986	0.8046	1.2598	192.8	10
15	0.0497	387.1	1.8179	0.8002	1.2498	195.1		0.0478	386.8	1.8127	0.8037	1.2521	194.8	15
20	0.0508	391.1	1.8317	0.8006	1.2430	197.0		0.0488	390.9	1.8265	0.8038	1.2451	196.7	20
25	0.0518	395.1	1.8452	0.8017	1.2368	198.9		0.0498	394.9	1.8401	0.8046	1.2387	198.6	25
30	0.0529	399.2	1.8586	0.8034	1.2311	200.8		0.0508	398.9	1.8535	0.8061	1.2329	200.5	30
35	0.0539	403.2	1.8717	0.8058	1.2258	202.6		0.0518	402.9	1.8667	0.8082	1.2274	202.3	35
40	0.0549	407.2	1.8847	0.8086	1.2209	204.4		0.0528	407.0	1.8797	0.8108	1.2224	204.1	40
45	0.0559	411.3	1.8976	0.8119	1.2163	206.1		0.0538	411.1	1.8926	0.8139	1.2177	205.9	45
50	0.0569	415.3	1.9102	0.8155	1.2121	207.8		0.0547	415.1	1.9053	0.8174	1.2133	207.6	50
55	0.0579	419.4	1.9228	0.8195	1.2081	209.5		0.0557	419.2	1.9179	0.8213	1.2093	209.3	55
60	0.0589	423.5	1.9352	0.8238	1.2043	211.2		0.0567	423.3	1.9304	0.8254	1.2054	211.0	60
65	0.0599	427.7	1.9475	0.8284	1.2008	212.8		0.0576	427.5	1.9427	0.8298	1.2018	212.7	65
70	0.0609	431.8	1.9597	0.8331	1.1974	214.5		0.0586	431.6	1.9549	0.8345	1.1984	214.3	70
75	0.0619	436.0	1.9718	0.8381	1.1943	216.1		0.0595	435.8	1.9670	0.8393	1.1952	215.9	75
80	0.0628	440.2	1.9838	0.8432	1.1912	217.7		0.0604	440.0	1.9790	0.8443	1.1921	217.5	80
85	0.0638	444.4	1.9957	0.8484	1.1884	219.2		0.0614	444.3	1.9909	0.8495	1.1892	219.1	85
90	0.0648	448.7	2.0075	0.8538	1.1857	220.8		0.0623	448.5	2.0027	0.8548	1.1864	220.6	90
95	0.0657	453.0	2.0192	0.8592	1.1831	222.3		0.0633	452.8	2.0145	0.8601	1.1838	222.2	95
100	0.0667	457.3	2.0308	0.8647	1.1806	223.8		0.0642	457.1	2.0261	0.8656	1.1813	223.7	100
105	0.0677	461.6	2.0424	0.8703	1.1783	225.3		0.0651	461.5	2.0377	0.8711	1.1789	225.2	105
110	0.0686	466.0	2.0538	0.8759	1.1760	226.8		0.0660	465.8	2.0491	0.8767	1.1767	226.7	110

TABLE 2 (continued)
HFC-23 Superheated Vapor—Constant Pressure Tables

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec
Cp = Heat Capacity at Constant Pressure in kJ/(kg)(°C) Cp/Cv = Heat Capacity Ratio (Dimensionless)

TEMP °C	PRESSURE = 700.00 kPa (abs)						SAT VAP	PRESSURE = 725.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-40.4	0.0335	339.8	1.6269	0.9383	1.4388	167.4		0.0324	340.0	1.6241	0.9475	1.4437	167.2	-39.45
-40	0.0337	340.2	1.6285	0.9355	1.4358	167.6		—	—	—	—	—	—	-40
-35	0.0350	344.7	1.6480	0.9051	1.4029	170.7		0.0335	344.1	1.6417	0.9183	1.4127	170.0	-35
-30	0.0362	349.2	1.6665	0.8812	1.3760	173.6		0.0347	348.6	1.6605	0.8924	1.3841	173.0	-30
-25	0.0374	353.6	1.6843	0.8624	1.3536	176.3		0.0359	353.0	1.6785	0.8720	1.3604	175.8	-25
-20	0.0385	357.8	1.7013	0.8476	1.3346	178.9		0.0370	357.4	1.6957	0.8559	1.3404	178.4	-20
-15	0.0397	362.1	1.7178	0.8359	1.3184	181.4		0.0381	361.6	1.7123	0.8431	1.3233	180.9	-15
-10	0.0408	366.2	1.7337	0.8268	1.3043	183.8		0.0392	365.8	1.7284	0.8331	1.3086	183.3	-10
-5	0.0418	370.3	1.7492	0.8198	1.2919	186.0		0.0403	369.9	1.7440	0.8254	1.2956	185.6	-5
0	0.0429	374.4	1.7643	0.8146	1.2809	188.2		0.0413	374.1	1.7592	0.8196	1.2843	187.9	0
5	0.0439	378.5	1.7791	0.8110	1.2712	190.4		0.0423	378.1	1.7740	0.8154	1.2741	190.0	5
10	0.0449	382.5	1.7935	0.8086	1.2624	192.5		0.0433	382.2	1.7885	0.8126	1.2650	192.1	10
15	0.0459	386.6	1.8076	0.8073	1.2545	194.5		0.0443	386.3	1.8027	0.8109	1.2569	194.2	15
20	0.0469	390.6	1.8215	0.8070	1.2473	196.4		0.0452	390.3	1.8167	0.8103	1.2494	196.2	20
25	0.0479	394.6	1.8352	0.8075	1.2407	198.4		0.0462	394.4	1.8304	0.8105	1.2426	198.1	25
30	0.0489	398.7	1.8486	0.8088	1.2346	200.3		0.0471	398.4	1.8438	0.8115	1.2364	200.0	30
35	0.0499	402.7	1.8618	0.8106	1.2291	202.1		0.0480	402.5	1.8571	0.8131	1.2307	201.9	35
40	0.0508	406.8	1.8749	0.8131	1.2239	203.9		0.0490	406.6	1.8702	0.8153	1.2254	203.7	40
45	0.0518	410.8	1.8878	0.8160	1.2191	205.7		0.0499	410.6	1.8832	0.8180	1.2205	205.5	45
50	0.0527	414.9	1.9006	0.8193	1.2146	207.4		0.0508	414.7	1.8960	0.8212	1.2159	207.2	50
55	0.0536	419.0	1.9132	0.8230	1.2105	209.1		0.0517	418.9	1.9086	0.8247	1.2117	208.9	55
60	0.0546	423.2	1.9256	0.8270	1.2065	210.8		0.0526	423.0	1.9211	0.8286	1.2076	210.6	60
65	0.0555	427.3	1.9380	0.8313	1.2028	212.5		0.0535	427.1	1.9338	0.8328	1.2039	212.3	65
70	0.0564	431.5	1.9502	0.8358	1.1994	214.1		0.0544	431.3	1.9457	0.8372	1.2003	214.0	70
75	0.0573	435.7	1.9624	0.8406	1.1961	215.8		0.0553	435.5	1.9579	0.8418	1.1970	215.6	75
80	0.0582	439.9	1.9744	0.8455	1.1930	217.4		0.0562	439.7	1.9699	0.8467	1.1938	217.2	80
85	0.0591	444.1	1.9863	0.8506	1.1900	218.9		0.0570	444.0	1.9818	0.8517	1.1908	218.8	85
90	0.0600	448.4	1.9981	0.8558	1.1872	220.5		0.0579	448.3	1.9937	0.8568	1.1880	220.4	90
95	0.0609	452.7	2.0099	0.8611	1.1845	222.0		0.0588	452.5	2.0054	0.8620	1.1853	221.9	95
100	0.0618	457.0	2.0215	0.8665	1.1820	223.6		0.0597	456.9	2.0171	0.8674	1.1827	223.5	100
105	0.0627	461.4	2.0331	0.8719	1.1796	225.1		0.0605	461.2	2.0287	0.8728	1.1802	225.0	105
110	0.0636	465.7	2.0446	0.8775	1.1773	226.6		0.0614	465.6	2.0402	0.8782	1.1779	226.5	110
115	—	—	—	—	—	—		0.0623	470.0	2.0516	0.8837	1.1757	228.0	115

TEMP °C	PRESSURE = 750.00 kPa (abs)						SAT VAP	PRESSURE = 800.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-38.53	0.0313	340.1	1.6214	0.9566	1.4487	167.1		0.0294	340.4	1.6163	0.9746	1.4586	166.8	-36.75
-35	0.0322	343.5	1.6355	0.9320	1.4229	169.4		0.0298	342.1	1.6235	0.9609	1.4445	168.0	-35
-30	0.0334	348.0	1.6546	0.9039	1.3924	172.4		0.0309	346.9	1.6431	0.9279	1.4100	171.1	-30
-25	0.0345	352.5	1.6728	0.8818	1.3673	175.2		0.0320	351.4	1.6617	0.9021	1.3819	174.1	-25
-20	0.0357	356.9	1.6902	0.8643	1.3463	177.9		0.0331	355.9	1.6795	0.8817	1.3586	176.9	-20
-15	0.0367	361.2	1.7069	0.8505	1.3284	180.5		0.0341	360.3	1.6966	0.8656	1.3389	179.5	-15
-10	0.0378	365.4	1.7232	0.8396	1.3129	182.9		0.0351	364.6	1.7131	0.8528	1.3220	182.0	-10
-5	0.0388	369.6	1.7389	0.8311	1.2995	185.2		0.0361	368.8	1.7290	0.8428	1.3074	184.4	-5
0	0.0398	373.7	1.7542	0.8247	1.2876	187.5		0.0371	373.0	1.7445	0.8350	1.2946	186.8	0
5	0.0408	377.8	1.7691	0.8199	1.2771	189.7		0.0380	377.1	1.7596	0.8292	1.2833	189.0	5
10	0.0417	381.9	1.7837	0.8166	1.2677	191.8		0.0389	381.3	1.7743	0.8249	1.2732	191.2	10
15	0.0427	386.0	1.7979	0.8146	1.2593	193.9		0.0398	385.4	1.7888	0.8220	1.2642	193.3	15
20	0.0436	390.0	1.8119	0.8136	1.2516	195.9		0.0407	389.5	1.8029	0.8203	1.2561	195.3	20
25	0.0445	394.1	1.8257	0.8135	1.2446	197.8		0.0416	393.6	1.8167	0.8195	1.2487	197.3	25
30	0.0455	398.2	1.8392	0.8142	1.2382	199.7		0.0424	397.7	1.8304	0.8197	1.2419	199.2	30
35	0.0464	402.3	1.8526	0.8156	1.2324	201.6		0.0433	401.8	1.8438	0.8206	1.2357	201.1	35
40	0.0473	406.3	1.8657	0.8176	1.2269	203.4		0.0442	405.9	1.8570	0.8221	1.2300	203.0	40
45	0.0482	410.4	1.8787	0.8201	1.2219	205.2		0.0450	410.0	1.8700	0.8243	1.2248	204.8	45
50	0.0490	414.5	1.8915	0.8231	1.2172	207.0		0.0458	414.1	1.8829	0.8269	1.2199	206.6	50
55	0.0499	418.7	1.9041	0.8265	1.2129	208.7		0.0467	418.3	1.8956	0.8300	1.2153	208.4	55
60	0.0508	422.8	1.9167	0.8302	1.2088	210.5		0.0475	422.4	1.9082	0.8334	1.2111	210.1	60
65	0.0517	427.0	1.9291	0.8343	1.2049	212.1		0.0483	426.6	1.9207	0.8372	1.2071	211.8	65
70	0.0525	431.2	1.9413	0.8386	1.2013	213.8		0.0491	430.8	1.9330	0.8413	1.2033	213.5	70
75	0.0534	435.4	1.9535	0.8431	1.1979	215.4		0.0499	435.0	1.9452	0.8457	1.1998	215.1	75
80	0.0542	439.6	1.9656	0.8479	1.1947	217.1		0.0507	439.3	1.9573	0.8502	1.1965	216.8	80
85	0.0551	443.8	1.9775	0.8528	1.1916	218.6		0.0515	443.5	1.9693	0.8550	1.1933	218.4	85
90	0.0559	448.1	1.9894	0.8578	1.1888	220.2		0.0523	447.8	1.9811	0.8599	1.1903	220.0	90
95	0.0568	452.4	2.0011	0.8630	1.1860	221.8		0.0531	452.1	1.9929	0.8649	1.1875	221.5	95
100	0.0576	456.7	2.0128	0.8683	1.1834	223.3		0.0539	456.5	2.0046	0.8701	1.1848	223.1	100
105	0.0585	461.1	2.0244	0.8736	1.1809	224.9		0.0547	460.8	2.0163	0.8753	1.1822	224.6	105
110	0.0593	465.5	2.0359	0.8790	1.1785	226.4		0.0555	465.2	2.0278	0.8806	1.1798	226.1	110
115	0.0601	469.9	2.0474	0.8845	1.1763	227.9		0.0563	469.6	2.0392	0.8859	1.1775	227.6	115

TABLE 2 (continued)
HFC-23 Superheated Vapor—Constant Pressure Tables

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec
Cp = Heat Capacity at Constant Pressure in kJ/(kg)(°C) Cp/Cv = Heat Capacity Ratio (Dimensionless)

TEMP °C	PRESSURE = 850.00 kPa (abs)						SAT VAP	PRESSURE = 900.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-35.06	0.0276	340.7	1.6115	0.9924	1.4686	166.5		0.0261	341.0	1.6070	1.0100	1.4788	166.2	-33.43
-35	0.0276	340.8	1.6118	0.9919	1.4681	166.6		—	—	—	—	—	—	-35
-30	0.0288	345.6	1.6320	0.9534	1.4289	169.9		0.0268	344.4	1.6211	0.9806	1.4493	168.6	-30
-25	0.0298	350.3	1.6511	0.9235	1.3974	173.0		0.0279	349.2	1.6407	0.9461	1.4140	171.8	-25
-20	0.0309	354.9	1.6692	0.9000	1.3715	175.8		0.0289	353.9	1.6593	0.9190	1.3853	174.8	-20
-15	0.0319	359.3	1.6867	0.8813	1.3499	178.6		0.0298	358.4	1.6771	0.8976	1.3614	177.6	-15
-10	0.0328	363.7	1.7034	0.8665	1.3314	181.2		0.0308	362.9	1.6941	0.8806	1.3413	180.3	-10
-5	0.0338	368.0	1.7196	0.8548	1.3156	183.6		0.0317	367.2	1.7106	0.8672	1.3241	182.8	-5
0	0.0347	372.3	1.7353	0.8456	1.3018	186.0		0.0325	371.5	1.7265	0.8565	1.3092	185.2	0
5	0.0356	376.5	1.7506	0.8386	1.2896	188.3		0.0334	375.8	1.7419	0.8482	1.2962	187.6	5
10	0.0364	380.7	1.7655	0.8333	1.2789	190.5		0.0342	380.0	1.7570	0.8419	1.2847	189.8	10
15	0.0373	384.8	1.7800	0.8295	1.2693	192.6		0.0350	384.2	1.7717	0.8372	1.2745	192.0	15
20	0.0381	388.9	1.7943	0.8271	1.2606	194.7		0.0359	388.4	1.7861	0.8340	1.2653	194.1	20
25	0.0390	393.1	1.8082	0.8257	1.2528	196.8		0.0367	392.6	1.8002	0.8319	1.2570	196.2	25
30	0.0398	397.2	1.8220	0.8252	1.2457	198.7		0.0374	396.7	1.8140	0.8309	1.2495	198.2	30
35	0.0406	401.3	1.8355	0.8256	1.2392	200.7		0.0382	400.9	1.8276	0.8308	1.2427	200.2	35
40	0.0414	405.5	1.8488	0.8268	1.2332	202.5		0.0390	405.0	1.8409	0.8314	1.2364	202.1	40
45	0.0422	409.6	1.8619	0.8285	1.2277	204.4		0.0397	409.2	1.8541	0.8328	1.2306	203.9	45
50	0.0430	413.7	1.8748	0.8308	1.2226	206.2		0.0405	413.3	1.8671	0.8347	1.2253	205.8	50
55	0.0438	417.9	1.8876	0.8335	1.2178	208.0		0.0412	417.5	1.8800	0.8371	1.2203	207.6	55
60	0.0446	422.1	1.9002	0.8367	1.2134	209.7		0.0420	421.7	1.8926	0.8400	1.2157	209.4	60
65	0.0453	426.3	1.9127	0.8403	1.2092	211.4		0.0427	425.9	1.9052	0.8433	1.2114	211.1	65
70	0.0461	430.5	1.9251	0.8441	1.2053	213.1		0.0435	430.2	1.9176	0.8469	1.2074	212.8	70
75	0.0469	434.7	1.9373	0.8483	1.2017	214.8		0.0442	434.4	1.9299	0.8509	1.2036	214.5	75
80	0.0477	439.0	1.9494	0.8526	1.1982	216.4		0.0449	438.7	1.9420	0.8550	1.2000	216.1	80
85	0.0484	443.2	1.9615	0.8572	1.1950	218.1		0.0456	443.0	1.9541	0.8594	1.1967	217.8	85
90	0.0492	447.5	1.9734	0.8620	1.1919	219.7		0.0463	447.3	1.9660	0.8640	1.1935	219.4	90
95	0.0499	451.9	1.9852	0.8668	1.1890	221.3		0.0471	451.6	1.9779	0.8688	1.1905	221.0	95
100	0.0507	456.2	1.9969	0.8719	1.1862	222.8		0.0478	455.9	1.9896	0.8737	1.1876	222.6	100
105	0.0514	460.6	2.0086	0.8770	1.1836	224.4		0.0485	460.3	2.0013	0.8787	1.1849	224.1	105
110	0.0522	465.0	2.0201	0.8822	1.1811	225.9		0.0492	464.7	2.0129	0.8838	1.1823	225.7	110
115	0.0529	469.4	2.0316	0.8874	1.1787	227.4		0.0499	469.2	2.0244	0.8889	1.1799	227.2	115
120	—	—	—	—	—	—		0.0506	473.6	2.0358	0.8941	1.1776	228.7	120

TEMP °C	PRESSURE = 950.00 kPa (abs)						SAT VAP	PRESSURE = 1000.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-31.87	0.0247	341.2	1.6026	1.0275	1.4890	165.9		0.0234	341.4	1.5985	1.0448	1.4994	165.6	-30.38
-30	0.0251	343.1	1.6105	1.0096	1.4715	167.2		0.0235	341.8	1.6001	1.0409	1.4956	165.9	-30
-25	0.0261	348.1	1.6307	0.9699	1.4317	170.6		0.0245	346.9	1.6208	0.9953	1.4508	169.3	-25
-20	0.0271	352.8	1.6497	0.9390	1.3998	173.7		0.0255	351.8	1.6403	0.9601	1.4153	172.6	-20
-15	0.0280	357.5	1.6678	0.9147	1.3736	176.6		0.0264	356.5	1.6588	0.9324	1.3865	175.6	-15
-10	0.0289	362.0	1.6852	0.8953	1.3517	179.4		0.0272	361.1	1.6765	0.9105	1.3625	178.4	-10
-5	0.0298	366.4	1.7019	0.8799	1.3330	182.0		0.0281	365.6	1.6935	0.8931	1.3423	181.1	-5
0	0.0306	370.8	1.7180	0.8677	1.3170	184.5		0.0289	370.0	1.7098	0.8793	1.3250	183.7	0
5	0.0314	375.1	1.7337	0.8581	1.3030	186.9		0.0297	374.4	1.7257	0.8683	1.3100	186.1	5
10	0.0322	379.4	1.7489	0.8507	1.2907	189.2		0.0305	378.7	1.7411	0.8597	1.2969	188.5	10
15	0.0330	383.6	1.7637	0.8451	1.2798	191.4		0.0312	383.0	1.7560	0.8532	1.2854	190.8	15
20	0.0338	387.8	1.7782	0.8410	1.2701	193.6		0.0320	387.3	1.7707	0.8482	1.2750	193.0	20
25	0.0346	392.0	1.7924	0.8383	1.2614	195.7		0.0327	391.5	1.7850	0.8448	1.2658	195.1	25
30	0.0353	396.2	1.8063	0.8367	1.2535	197.7		0.0334	395.7	1.7990	0.8425	1.2575	197.2	30
35	0.0361	400.4	1.8200	0.8360	1.2463	199.7		0.0341	399.9	1.8128	0.8413	1.2499	199.2	35
40	0.0368	404.6	1.8335	0.8362	1.2397	201.6		0.0348	404.1	1.8263	0.8410	1.2430	201.2	40
45	0.0375	408.8	1.8467	0.8371	1.2336	203.5		0.0355	408.3	1.8397	0.8415	1.2367	203.1	45
50	0.0382	412.9	1.8598	0.8387	1.2281	205.4		0.0362	412.5	1.8528	0.8427	1.2309	205.0	50
55	0.0390	417.1	1.8727	0.8408	1.2229	207.2		0.0369	416.8	1.8657	0.8444	1.2255	206.8	55
60	0.0397	421.4	1.8854	0.8434	1.2181	209.0		0.0376	421.0	1.8785	0.8467	1.2205	208.6	60
65	0.0404	425.6	1.8980	0.8464	1.2136	210.7		0.0383	425.2	1.8912	0.8495	1.2159	210.4	65
70	0.0411	429.8	1.9105	0.8498	1.2094	212.5		0.0389	429.5	1.9037	0.8526	1.2115	212.1	70
75	0.0418	434.1	1.9228	0.8535	1.2055	214.2		0.0396	433.8	1.9160	0.8561	1.2075	213.8	75
80	0.0425	438.4	1.9350	0.8575	1.2018	215.8		0.0402	438.0	1.9282	0.8599	1.2037	215.5	80
85	0.0431	442.7	1.9471	0.8617	1.1984	217.5		0.0409	442.4	1.9404	0.8640	1.2001	217.2	85
90	0.0438	447.0	1.9590	0.8661	1.1951	219.1		0.0416	446.7	1.9524	0.8683	1.1967	218.9	90
95	0.0445	451.3	1.9709	0.8708	1.1920	220.7		0.0422	451.0	1.9643	0.8727	1.1935	220.5	95
100	0.0452	455.7	1.9827	0.8755	1.1891	222.3		0.0429	455.4	1.9761	0.8774	1.1905	222.1	100
105	0.0459	460.1	1.9944	0.8804	1.1863	223.9		0.0435	459.8	1.9878	0.8821	1.1877	223.7	105
110	0.0465	464.5	2.0060	0.8854	1.1836	225.5		0.0441	464.2	1.9994	0.8870	1.1849	225.2	110
115	0.0472	468.9	2.0175	0.8904	1.1811	227.0		0.0448	468.7	2.0109	0.8919	1.1824	226.8	115
120	0.0479	473.4	2.0289	0.8955	1.1787	228.5		0.0454	473.2	2.0224	0.8970	1.1799	228.3	120

TABLE 2 (continued)
HFC-23 Superheated Vapor—Constant Pressure Tables

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec
Cp = Heat Capacity at Constant Pressure in kJ/(kg)(°C) Cp/Cv = Heat Capacity Ratio (Dimensionless)

TEMP °C	PRESSURE = 1100.00 kPa (abs)						SAT VAP	PRESSURE = 1200.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-27.54	0.0213	341.7	1.5908	1.0794	1.5207	164.9		0.0194	342.0	1.5836	1.1139	1.5427	164.1	-24.88
-25	0.0217	344.4	1.6017	1.0511	1.4936	166.8		—	—	—	—	—	—	-25
-20	0.0227	349.6	1.6222	1.0057	1.4495	170.3		0.0203	347.3	1.6047	1.0569	1.4887	167.9	-20
-15	0.0235	354.5	1.6415	0.9705	1.4144	173.5		0.0211	352.5	1.6249	1.0125	1.4459	171.3	-15
-10	0.0243	359.3	1.6598	0.9429	1.3858	176.5		0.0219	357.4	1.6440	0.9780	1.4117	174.6	-10
-5	0.0251	364.0	1.6774	0.9209	1.3621	179.4		0.0227	362.3	1.6621	0.9508	1.3838	177.6	-5
0	0.0259	368.5	1.6942	0.9034	1.3420	182.1		0.0234	367.0	1.6795	0.9291	1.3605	180.4	0
5	0.0267	373.0	1.7105	0.8895	1.3248	184.7		0.0241	371.6	1.6962	0.9118	1.3407	183.1	5
10	0.0274	377.4	1.7262	0.8784	1.3099	187.1		0.0248	376.1	1.7123	0.8981	1.3238	185.7	10
15	0.0281	381.8	1.7415	0.8697	1.2968	189.5		0.0255	380.5	1.7279	0.8871	1.3090	188.2	15
20	0.0288	386.1	1.7564	0.8631	1.2853	191.8		0.0261	385.0	1.7431	0.8785	1.2961	190.6	20
25	0.0295	390.4	1.7710	0.8581	1.2750	194.0		0.0268	389.3	1.7579	0.8719	1.2847	192.8	25
30	0.0301	394.7	1.7852	0.8545	1.2658	196.1		0.0274	393.7	1.7724	0.8669	1.2745	195.1	30
35	0.0308	399.0	1.7992	0.8521	1.2575	198.2		0.0280	398.0	1.7865	0.8633	1.2653	197.2	35
40	0.0314	403.2	1.8129	0.8508	1.2499	200.2		0.0286	402.3	1.8004	0.8610	1.2571	199.3	40
45	0.0321	407.5	1.8264	0.8504	1.2430	202.2		0.0292	406.6	1.8140	0.8596	1.2495	201.3	45
50	0.0327	411.7	1.8396	0.8508	1.2367	204.1		0.0298	410.9	1.8274	0.8592	1.2427	203.3	50
55	0.0334	416.0	1.8527	0.8519	1.2309	206.0		0.0304	415.2	1.8406	0.8596	1.2364	205.2	55
60	0.0340	420.3	1.8656	0.8536	1.2255	207.9		0.0310	419.5	1.8536	0.8606	1.2306	207.1	60
65	0.0346	424.5	1.8783	0.8558	1.2205	209.7		0.0316	423.8	1.8664	0.8622	1.2252	209.0	65
70	0.0352	428.8	1.8909	0.8585	1.2158	211.5		0.0321	428.1	1.8791	0.8644	1.2202	210.8	70
75	0.0358	433.1	1.9033	0.8615	1.2115	213.2		0.0327	432.5	1.8916	0.8670	1.2156	212.6	75
80	0.0364	437.4	1.9156	0.8649	1.2074	214.9		0.0333	436.8	1.9040	0.8700	1.2113	214.3	80
85	0.0370	441.8	1.9278	0.8686	1.2036	216.6		0.0338	441.2	1.9163	0.8733	1.2072	216.1	85
90	0.0376	446.1	1.9399	0.8726	1.2000	218.3		0.0344	445.5	1.9284	0.8769	1.2034	217.8	90
95	0.0382	450.5	1.9519	0.8767	1.1967	220.0		0.0349	449.9	1.9404	0.8808	1.1998	219.4	95
100	0.0388	454.9	1.9637	0.8811	1.1935	221.6		0.0355	454.3	1.9523	0.8849	1.1965	221.1	100
105	0.0394	459.3	1.9755	0.8856	1.1904	223.2		0.0360	458.8	1.9641	0.8891	1.1933	222.7	105
110	0.0400	463.7	1.9871	0.8902	1.1876	224.8		0.0366	463.2	1.9758	0.8935	1.1903	224.3	110
115	0.0406	468.2	1.9987	0.8950	1.1849	226.3		0.0371	467.7	1.9875	0.8981	1.1874	225.9	115
120	0.0412	472.7	2.0102	0.8998	1.1823	227.9		0.0376	472.2	1.9990	0.9027	1.1847	227.5	120
125	0.0418	477.2	2.0216	0.9047	1.1799	229.4		0.0382	476.7	2.0104	0.9075	1.1822	229.1	125
130	—	—	—	—	—	—		0.0387	481.3	2.0218	0.9123	1.1797	230.6	130

TEMP °C	PRESSURE = 1300.00 kPa (abs)						SAT VAP	PRESSURE = 1400.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-22.39	0.0179	342.2	1.5769	1.1485	1.5655	163.3		0.0165	342.3	1.5706	1.1835	1.5893	162.5	-20.03
-20	0.0183	344.9	1.5876	1.1153	1.5345	165.3		0.0165	342.4	1.5707	1.1830	1.5888	162.6	-20
-15	0.0191	350.3	1.6088	1.0593	1.4817	169.1		0.0173	348.1	1.5931	1.1119	1.5229	166.7	-15
-10	0.0199	355.5	1.6287	1.0164	1.4406	172.5		0.0181	353.5	1.6139	1.0589	1.4731	170.4	-10
-5	0.0206	360.5	1.6475	0.9831	1.4076	175.7		0.0188	358.7	1.6334	1.0181	1.4340	173.8	-5
0	0.0213	365.4	1.6654	0.9566	1.3805	178.8		0.0195	363.7	1.6519	0.9862	1.4024	177.0	0
5	0.0220	370.1	1.6826	0.9356	1.3578	181.6		0.0201	368.6	1.6696	0.9609	1.3764	180.0	5
10	0.0226	374.7	1.6991	0.9187	1.3386	184.3		0.0207	373.3	1.6865	0.9406	1.3545	182.8	10
15	0.0233	379.3	1.7151	0.9053	1.3220	186.9		0.0214	378.0	1.7028	0.9244	1.3358	185.5	15
20	0.0239	383.8	1.7305	0.8946	1.3075	189.3		0.0219	382.6	1.7186	0.9114	1.3196	188.1	20
25	0.0245	388.2	1.7456	0.8862	1.2948	191.7		0.0225	387.1	1.7340	0.9011	1.3056	190.5	25
30	0.0251	392.6	1.7603	0.8797	1.2836	194.0		0.0231	391.6	1.7489	0.8930	1.2931	192.9	30
35	0.0257	397.0	1.7746	0.8749	1.2735	196.2		0.0236	396.0	1.7634	0.8868	1.2821	195.2	35
40	0.0262	401.4	1.7887	0.8714	1.2645	198.3		0.0242	400.5	1.7777	0.8821	1.2722	197.4	40
45	0.0268	405.7	1.8025	0.8691	1.2563	200.4		0.0247	404.9	1.7916	0.8788	1.2633	199.5	45
50	0.0273	410.1	1.8160	0.8678	1.2489	202.4		0.0252	409.2	1.8053	0.8766	1.2553	201.6	50
55	0.0279	414.4	1.8293	0.8674	1.2421	204.4		0.0257	413.6	1.8187	0.8754	1.2480	203.6	55
60	0.0284	418.8	1.8425	0.8678	1.2358	206.4		0.0263	418.0	1.8320	0.8751	1.2413	205.6	60
65	0.0290	423.1	1.8554	0.8688	1.2301	208.3		0.0268	422.4	1.8450	0.8755	1.2351	207.5	65
70	0.0295	427.4	1.8681	0.8704	1.2248	210.1		0.0273	426.8	1.8579	0.8766	1.2294	209.4	70
75	0.0300	431.8	1.8808	0.8726	1.2198	211.9		0.0278	431.1	1.8706	0.8782	1.2241	211.3	75
80	0.0306	436.2	1.8932	0.8751	1.2152	213.7		0.0283	435.5	1.8831	0.8804	1.2192	213.1	80
85	0.0311	440.6	1.9055	0.8781	1.2109	215.5		0.0287	439.9	1.8955	0.8829	1.2147	214.9	85
90	0.0316	445.0	1.9177	0.8813	1.2069	217.2		0.0292	444.4	1.9078	0.8858	1.2104	216.7	90
95	0.0321	449.4	1.9298	0.8849	1.2031	218.9		0.0297	448.8	1.9199	0.8891	1.2064	218.4	95
100	0.0326	453.8	1.9418	0.8887	1.1995	220.6		0.0302	453.3	1.9319	0.8926	1.2027	220.1	100
105	0.0331	458.3	1.9536	0.8927	1.1962	222.2		0.0307	457.7	1.9438	0.8963	1.1991	221.8	105
110	0.0336	462.7	1.9654	0.8969	1.1930	223.9		0.0311	462.2	1.9556	0.9003	1.1958	223.4	110
115	0.0341	467.2	1.9770	0.9012	1.1900	225.5		0.0316	466.7	1.9673	0.9044	1.1927	225.1	115
120	0.0346	471.7	1.9886	0.9057	1.1872	227.1		0.0321	471.3	1.9789	0.9087	1.1897	226.7	120
125	0.0351	476.3	2.0001	0.9102	1.1845	228.7		0.0325	475.8	1.9904	0.9130	1.1869	228.3	125
130	0.0356	480.8	2.0115	0.9149	1.1820	230.2		0.0330	480.4	2.0018	0.9175	1.1842	229.9	130

TABLE 2 (continued)
HFC-23 Superheated Vapor—Constant Pressure Tables

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec
Cp = Heat Capacity at Constant Pressure in kJ/(kg)(°C) Cp/Cv = Heat Capacity Ratio (Dimensionless)

TEMP °C	PRESSURE = 1500.00 kPa (abs)						SAT VAP	PRESSURE = 1600.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-17.8	0.0153	342.4	1.5646	1.2190	1.6141	161.7		0.0143	342.4	1.5589	1.2552	1.6402	160.8	-15.67
-15	0.0158	345.7	1.5776	1.1721	1.5710	164.1		0.0144	343.2	1.5621	1.2419	1.6281	161.5	-15
-10	0.0165	351.4	1.5994	1.1062	1.5100	168.2		0.0152	349.2	1.5851	1.1595	1.5525	165.8	-10
-5	0.0172	356.8	1.6197	1.0565	1.4634	171.8		0.0158	354.9	1.6063	1.0989	1.4965	169.8	-5
0	0.0179	362.0	1.6389	1.0181	1.4265	175.2		0.0165	360.2	1.6262	1.0528	1.4531	173.4	0
5	0.0185	367.0	1.6571	0.9879	1.3965	178.4		0.0171	365.4	1.6449	1.0168	1.4184	176.7	5
10	0.0191	371.9	1.6744	0.9638	1.3716	181.3		0.0177	370.4	1.6628	0.9884	1.3900	179.8	10
15	0.0197	376.7	1.6911	0.9445	1.3505	184.1		0.0182	375.3	1.6799	0.9657	1.3662	182.7	15
20	0.0203	381.3	1.7073	0.9290	1.3325	186.8		0.0188	380.1	1.6963	0.9475	1.3461	185.5	20
25	0.0208	386.0	1.7229	0.9166	1.3168	189.3		0.0193	384.8	1.7122	0.9329	1.3288	188.1	25
30	0.0214	390.5	1.7380	0.9068	1.3032	191.8		0.0198	389.4	1.7276	0.9212	1.3137	190.7	30
35	0.0219	395.0	1.7528	0.8991	1.2911	194.1		0.0203	394.0	1.7426	0.9119	1.3005	193.1	35
40	0.0224	399.5	1.7672	0.8932	1.2803	196.4		0.0208	398.5	1.7572	0.9046	1.2887	195.4	40
45	0.0229	404.0	1.7813	0.8888	1.2707	198.6		0.0213	403.1	1.7715	0.8991	1.2783	197.7	45
50	0.0234	408.4	1.7952	0.8857	1.2620	200.7		0.0218	407.5	1.7855	0.8950	1.2689	199.9	50
55	0.0239	412.8	1.8087	0.8837	1.2541	202.8		0.0223	412.0	1.7992	0.8921	1.2603	202.0	55
60	0.0244	417.2	1.8221	0.8826	1.2468	204.8		0.0227	416.5	1.8127	0.8903	1.2526	204.1	60
65	0.0248	421.6	1.8352	0.8824	1.2402	206.8		0.0232	420.9	1.8260	0.8894	1.2456	206.1	65
70	0.0253	426.1	1.8482	0.8829	1.2342	208.8		0.0236	425.4	1.8390	0.8893	1.2391	208.1	70
75	0.0258	430.5	1.8610	0.8840	1.2286	210.6		0.0241	429.8	1.8519	0.8899	1.2331	210.0	75
80	0.0263	434.9	1.8736	0.8857	1.2234	212.5		0.0245	434.3	1.8646	0.8911	1.2276	211.9	80
85	0.0267	439.3	1.8861	0.8878	1.2185	214.3		0.0249	438.7	1.8771	0.8929	1.2225	213.7	85
90	0.0272	443.8	1.8984	0.8904	1.2140	216.1		0.0254	443.2	1.8895	0.8950	1.2177	215.6	90
95	0.0276	448.2	1.9106	0.8933	1.2098	217.9		0.0258	447.7	1.9018	0.8976	1.2133	217.4	95
100	0.0281	452.7	1.9226	0.8965	1.2059	219.6		0.0262	452.2	1.9139	0.9005	1.2091	219.1	100
105	0.0285	457.2	1.9346	0.9000	1.2022	221.3		0.0267	456.7	1.9259	0.9037	1.2052	220.8	105
110	0.0290	461.7	1.9464	0.9037	1.1987	223.0		0.0271	461.2	1.9378	0.9072	1.2016	222.5	110
115	0.0294	466.2	1.9582	0.9076	1.1954	224.6		0.0275	465.7	1.9496	0.9109	1.1981	224.2	115
120	0.0299	470.8	1.9698	0.9117	1.1923	226.3		0.0279	470.3	1.9613	0.9147	1.1949	225.9	120
125	0.0303	475.4	1.9814	0.9159	1.1893	227.9		0.0283	474.9	1.9729	0.9187	1.1918	227.5	125
130	0.0307	479.9	1.9928	0.9202	1.1866	229.5		0.0287	479.5	1.9844	0.9229	1.1889	229.1	130
135	0.0312	484.6	2.0042	0.9245	1.1839	231.1		0.0291	484.1	1.9958	0.9271	1.1861	230.7	135

TEMP °C	PRESSURE = 1700.00 kPa (abs)						SAT VAP	PRESSURE = 1800.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-13.64	0.0134	342.4	1.5534	1.2924	1.6677	159.9		0.0126	342.3	1.5481	1.3306	1.6966	159.0	-11.7
-10	0.0139	346.9	1.5708	1.2204	1.6020	163.4		0.0128	344.5	1.5566	1.2910	1.6606	160.7	-10
-5	0.0146	352.8	1.5931	1.1461	1.5340	167.6		0.0135	350.7	1.5799	1.1991	1.5769	165.3	-5
0	0.0152	358.4	1.6137	1.0907	1.4827	171.4		0.0141	356.5	1.6015	1.1324	1.5158	169.4	0
5	0.0158	363.8	1.6331	1.0481	1.4424	174.9		0.0147	362.1	1.6215	1.0819	1.4689	173.1	5
10	0.0164	368.9	1.6515	1.0147	1.4099	178.2		0.0153	367.4	1.6404	1.0428	1.4316	176.6	10
15	0.0170	373.9	1.6690	0.9881	1.3831	181.3		0.0158	372.5	1.6584	1.0120	1.4013	179.8	15
20	0.0175	378.8	1.6858	0.9669	1.3606	184.2		0.0163	377.5	1.6756	0.9873	1.3761	182.8	20
25	0.0180	383.6	1.7020	0.9498	1.3414	186.9		0.0168	382.4	1.6921	0.9675	1.3548	185.7	25
30	0.0185	388.3	1.7177	0.9361	1.3248	189.5		0.0173	387.2	1.7081	0.9516	1.3365	188.4	30
35	0.0190	393.0	1.7329	0.9251	1.3103	192.0		0.0178	391.9	1.7235	0.9389	1.3206	191.0	35
40	0.0195	397.6	1.7477	0.9164	1.2975	194.4		0.0182	396.6	1.7386	0.9286	1.3067	193.4	40
45	0.0199	402.1	1.7622	0.9097	1.2862	196.8		0.0187	401.2	1.7532	0.9206	1.2944	195.8	45
50	0.0204	406.7	1.7763	0.9045	1.2760	199.0		0.0191	405.8	1.7675	0.9143	1.2834	198.1	50
55	0.0208	411.2	1.7902	0.9007	1.2669	201.2		0.0195	410.4	1.7815	0.9096	1.2736	200.4	55
60	0.0213	415.7	1.8038	0.8981	1.2586	203.3		0.0200	414.9	1.7952	0.9062	1.2647	202.5	60
65	0.0217	420.2	1.8171	0.8966	1.2510	205.4		0.0204	419.4	1.8087	0.9039	1.2567	204.7	65
70	0.0221	424.6	1.8303	0.8959	1.2441	207.4		0.0208	423.9	1.8220	0.9026	1.2493	206.7	70
75	0.0225	429.1	1.8433	0.8959	1.2378	209.4		0.0212	428.4	1.8350	0.9021	1.2426	208.7	75
80	0.0230	433.6	1.8560	0.8967	1.2319	211.3		0.0216	433.0	1.8479	0.9023	1.2364	210.7	80
85	0.0234	438.1	1.8687	0.8980	1.2265	213.2		0.0220	437.5	1.8606	0.9032	1.2307	212.6	85
90	0.0238	442.6	1.8811	0.8998	1.2215	215.0		0.0224	442.0	1.8731	0.9046	1.2254	214.5	90
95	0.0242	447.1	1.8934	0.9020	1.2168	216.8		0.0228	446.5	1.8855	0.9064	1.2204	216.3	95
100	0.0246	451.6	1.9056	0.9046	1.2125	218.6		0.0231	451.1	1.8977	0.9087	1.2158	218.1	100
105	0.0250	456.1	1.9177	0.9075	1.2084	220.4		0.0235	455.6	1.9098	0.9114	1.2115	219.9	105
110	0.0254	460.7	1.9296	0.9107	1.2045	222.1		0.0239	460.2	1.9218	0.9143	1.2075	221.7	110
115	0.0258	465.2	1.9415	0.9142	1.2009	223.8		0.0243	464.8	1.9337	0.9175	1.2038	223.4	115
120	0.0262	469.8	1.9532	0.9178	1.1975	225.5		0.0247	469.3	1.9455	0.9210	1.2002	225.1	120
125	0.0266	474.4	1.9648	0.9216	1.1943	227.1		0.0250	474.0	1.9571	0.9246	1.1969	226.8	125
130	0.0270	479.0	1.9763	0.9256	1.1913	228.8		0.0254	478.6	1.9687	0.9283	1.1937	228.4	130
135	0.0274	483.7	1.9878	0.9296	1.1884	230.4		0.0258	483.2	1.9802	0.9322	1.1907	230.1	135
140	0.0278	488.3	1.9991	0.9338	1.1857	232.0		0.0262	487.9	1.9915	0.9362	1.1879	231.7	140

TABLE 2 (continued)
HFC-23 Superheated Vapor—Constant Pressure Tables

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec
Cp = Heat Capacity at Constant Pressure in kJ/(kg)(°C) Cp/Cv = Heat Capacity Ratio (Dimensionless)

TEMP °C	PRESSURE = 1900.00 kPa (abs)						SAT VAP	PRESSURE = 2000.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-9.83	0.0118	342.2	1.5430	1.3703	1.7273	158.1		0.0112	342.0	1.5380	1.4114	1.7599	157.2	-8.04
-5	0.0125	348.5	1.5668	1.2596	1.6268	162.9		0.0116	346.2	1.5536	1.3297	1.6857	160.4	-5
0	0.0131	354.6	1.5893	1.1787	1.5532	167.3		0.0122	352.5	1.5772	1.2307	1.5959	165.1	0
5	0.0137	360.3	1.6101	1.1189	1.4982	171.3		0.0128	358.5	1.5988	1.1594	1.5308	169.4	5
10	0.0143	365.8	1.6296	1.0731	1.4553	174.9		0.0133	364.2	1.6190	1.1058	1.4813	173.2	10
15	0.0148	371.1	1.6481	1.0373	1.4209	178.3		0.0139	369.6	1.6380	1.0644	1.4422	176.7	15
20	0.0153	376.2	1.6657	1.0089	1.3927	181.4		0.0143	374.8	1.6560	1.0318	1.4104	180.0	20
25	0.0158	381.2	1.6825	0.9862	1.3690	184.4		0.0148	379.9	1.6732	1.0058	1.3841	183.1	25
30	0.0162	386.1	1.6988	0.9679	1.3488	187.2		0.0153	384.9	1.6898	0.9848	1.3619	186.0	30
35	0.0167	390.9	1.7145	0.9531	1.3314	189.9		0.0157	389.8	1.7057	0.9680	1.3428	188.8	35
40	0.0171	395.6	1.7297	0.9413	1.3163	192.4		0.0161	394.6	1.7212	0.9544	1.3263	191.4	40
45	0.0176	400.3	1.7446	0.9319	1.3030	194.9		0.0165	399.3	1.7362	0.9435	1.3119	193.9	45
50	0.0180	404.9	1.7590	0.9244	1.2912	197.3		0.0170	404.0	1.7509	0.9349	1.2992	196.4	50
55	0.0184	409.5	1.7732	0.9187	1.2806	199.6		0.0174	408.7	1.7652	0.9281	1.2878	198.7	55
60	0.0188	414.1	1.7870	0.9144	1.2711	201.8		0.0177	413.3	1.7792	0.9229	1.2777	201.0	60
65	0.0192	418.7	1.8006	0.9114	1.2625	203.9		0.0181	417.9	1.7929	0.9191	1.2685	203.2	65
70	0.0196	423.2	1.8140	0.9094	1.2547	206.0		0.0185	422.5	1.8064	0.9164	1.2602	205.3	70
75	0.0200	427.8	1.8272	0.9083	1.2475	208.1		0.0189	427.1	1.8196	0.9147	1.2526	207.4	75
80	0.0204	432.3	1.8401	0.9080	1.2410	210.1		0.0192	431.6	1.8326	0.9139	1.2456	209.5	80
85	0.0207	436.8	1.8529	0.9084	1.2349	212.0		0.0196	436.2	1.8455	0.9138	1.2393	211.5	85
90	0.0211	441.4	1.8655	0.9094	1.2293	213.9		0.0200	440.8	1.8582	0.9144	1.2334	213.4	90
95	0.0215	445.9	1.8779	0.9109	1.2241	215.8		0.0203	445.4	1.8707	0.9155	1.2279	215.3	95
100	0.0218	450.5	1.8902	0.9129	1.2193	217.6		0.0207	449.9	1.8830	0.9172	1.2228	217.2	100
105	0.0222	455.1	1.9024	0.9153	1.2148	219.5		0.0210	454.5	1.8952	0.9192	1.2181	219.0	105
110	0.0226	459.7	1.9144	0.9179	1.2106	221.2		0.0214	459.1	1.9073	0.9216	1.2137	220.8	110
115	0.0229	464.2	1.9263	0.9209	1.2066	223.0		0.0217	463.7	1.9193	0.9243	1.2096	222.6	115
120	0.0233	468.9	1.9382	0.9241	1.2029	224.7		0.0221	468.4	1.9311	0.9273	1.2057	224.3	120
125	0.0237	473.5	1.9499	0.9275	1.1994	226.4		0.0224	473.0	1.9429	0.9305	1.2021	226.0	125
130	0.0240	478.1	1.9615	0.9311	1.1961	228.1		0.0228	477.7	1.9545	0.9340	1.1986	227.7	130
135	0.0244	482.8	1.9730	0.9349	1.1930	229.7		0.0231	482.4	1.9661	0.9375	1.1954	229.4	135
140	0.0247	487.5	1.9844	0.9387	1.1901	231.4		0.0234	487.1	1.9775	0.9412	1.1924	231.0	140
145	0.0251	492.2	1.9957	0.9427	1.1873	233.0		0.0238	491.8	1.9888	0.9450	1.1895	232.7	145

TEMP °C	PRESSURE = 2200.00 kPa (abs)						SAT VAP	PRESSURE = 2400.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
-4.66	0.0100	341.5	1.5283	1.4996	1.8318	155.2		0.0090	340.9	1.5188	1.5976	1.9146	153.2	-1.5
0	0.0106	348.2	1.5528	1.3578	1.7029	160.4		0.0092	343.2	1.5275	1.5332	1.8557	155.1	0
5	0.0112	354.7	1.5764	1.2545	1.6092	165.3		0.0098	350.5	1.5538	1.3759	1.7125	160.8	5
10	0.0117	360.7	1.5981	1.1804	1.5418	169.6		0.0104	357.1	1.5773	1.2709	1.6173	165.7	10
15	0.0122	366.5	1.6182	1.1248	1.4905	173.5		0.0109	363.2	1.5988	1.1957	1.5488	170.1	15
20	0.0127	372.0	1.6372	1.0820	1.4501	177.1		0.0113	369.1	1.6189	1.1393	1.4967	174.1	20
25	0.0132	377.3	1.6552	1.0482	1.4174	180.4		0.0118	374.6	1.6378	1.0958	1.4557	177.7	25
30	0.0136	382.5	1.6724	1.0213	1.3903	183.6		0.0122	380.0	1.6557	1.0615	1.4225	181.1	30
35	0.0140	387.6	1.6889	0.9996	1.3675	186.5		0.0126	385.3	1.6729	1.0342	1.3949	184.2	35
40	0.0144	392.5	1.7049	0.9821	1.3479	189.3		0.0130	390.4	1.6893	1.0121	1.3717	187.2	40
45	0.0148	397.4	1.7203	0.9680	1.3310	192.0		0.0134	395.4	1.7052	0.9943	1.3518	190.1	45
50	0.0152	402.2	1.7353	0.9567	1.3162	194.6		0.0137	400.3	1.7206	0.9799	1.3346	192.8	50
55	0.0156	407.0	1.7499	0.9476	1.3031	197.1		0.0141	405.2	1.7355	0.9683	1.3196	195.4	55
60	0.0159	411.7	1.7642	0.9405	1.2915	199.4		0.0144	410.0	1.7501	0.9590	1.3063	197.9	60
65	0.0163	416.4	1.7782	0.9350	1.2811	201.7		0.0148	414.8	1.7643	0.9517	1.2945	200.3	65
70	0.0166	421.0	1.7919	0.9308	1.2717	204.0		0.0151	419.5	1.7783	0.9459	1.2838	202.6	70
75	0.0170	425.7	1.8053	0.9279	1.2631	206.1		0.0154	424.3	1.7919	0.9416	1.2743	204.8	75
80	0.0173	430.3	1.8185	0.9259	1.2554	208.2		0.0157	429.0	1.8053	0.9385	1.2656	207.0	80
85	0.0177	434.9	1.8315	0.9249	1.2483	210.3		0.0161	433.6	1.8185	0.9363	1.2577	209.2	85
90	0.0180	439.6	1.8443	0.9246	1.2417	212.3		0.0164	438.3	1.8315	0.9351	1.2505	211.2	90
95	0.0183	444.2	1.8570	0.9249	1.2357	214.3		0.0167	443.0	1.8443	0.9346	1.2438	213.3	95
100	0.0187	448.8	1.8695	0.9259	1.2301	216.2		0.0170	447.7	1.8569	0.9348	1.2377	215.2	100
105	0.0190	453.4	1.8818	0.9273	1.2249	218.1		0.0173	452.3	1.8693	0.9356	1.2320	217.2	105
110	0.0193	458.1	1.8940	0.9291	1.2201	219.9		0.0176	457.0	1.8816	0.9368	1.2268	219.1	110
115	0.0196	462.7	1.9061	0.9313	1.2156	221.8		0.0179	461.7	1.8938	0.9385	1.2218	221.0	115
120	0.0199	467.4	1.9180	0.9339	1.2114	223.5		0.0182	466.4	1.9058	0.9406	1.2173	222.8	120
125	0.0203	472.1	1.9298	0.9367	1.2074	225.3		0.0185	471.1	1.9177	0.9429	1.2130	224.6	125
130	0.0206	476.8	1.9415	0.9397	1.2037	227.0		0.0188	475.8	1.9295	0.9456	1.2090	226.4	130
135	0.0209	481.5	1.9531	0.9429	1.2002	228.7		0.0191	480.6	1.9412	0.9484	1.2052	228.1	135
140	0.0212	486.2	1.9646	0.9463	1.1969	230.4		0.0193	485.3	1.9527	0.9515	1.2017	229.8	140
145	0.0215	490.9	1.9760	0.9498	1.1938	232.1		0.0196	490.1	1.9642	0.9547	1.1983	231.5	145
150	0.0218	495.7	1.9873	0.9534	1.1909	233.7		0.0199	494.9	1.9756	0.9581	1.1952	233.2	150

TABLE 2 (continued)
HFC-23 Superheated Vapor—Constant Pressure Tables

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec
Cp = Heat Capacity at Constant Pressure in kJ/(kg)(°C) Cp/Cv = Heat Capacity Ratio (Dimensionless)

TEMP °C	PRESSURE = 2600.00 kPa (abs)						SAT VAP	PRESSURE = 2800.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
1.46	0.0082	340.1	1.5096	1.7086	2.0112	151.1		0.0074	339.0	1.5003	1.8369	2.1259	149.0	4.24
5	0.0086	345.8	1.5303	1.5402	1.8566	155.8		0.0075	340.4	1.5052	1.7835	2.0764	150.1	5
10	0.0092	353.1	1.5563	1.3849	1.7151	161.5		0.0081	348.7	1.5346	1.5357	1.8481	156.9	10
15	0.0097	359.7	1.5796	1.2809	1.6206	166.5		0.0087	355.9	1.5601	1.3864	1.7118	162.6	15
20	0.0102	365.9	1.6009	1.2061	1.5522	170.8		0.0091	362.6	1.5830	1.2853	1.6196	167.4	20
25	0.0106	371.8	1.6208	1.1499	1.5002	174.8		0.0096	368.8	1.6041	1.2122	1.5525	171.8	25
30	0.0110	377.5	1.6396	1.1064	1.4591	178.5		0.0100	374.8	1.6238	1.1570	1.5012	175.8	30
35	0.0114	382.9	1.6574	1.0721	1.4257	181.9		0.0103	380.4	1.6423	1.1142	1.4605	179.4	35
40	0.0118	388.2	1.6744	1.0447	1.3981	185.1		0.0107	385.9	1.6600	1.0804	1.4274	182.9	40
45	0.0121	393.4	1.6908	1.0227	1.3747	188.1		0.0111	391.2	1.6769	1.0533	1.3999	186.1	45
50	0.0125	398.4	1.7066	1.0048	1.3547	190.9		0.0114	396.5	1.6931	1.0315	1.3766	189.1	50
55	0.0128	403.4	1.7219	0.9903	1.3373	193.7		0.0117	401.6	1.7088	1.0137	1.3566	191.9	55
60	0.0131	408.3	1.7368	0.9786	1.3222	196.3		0.0120	406.6	1.7240	0.9994	1.3392	194.7	60
65	0.0135	413.2	1.7513	0.9692	1.3087	198.8		0.0123	411.6	1.7388	0.9877	1.3240	197.3	65
70	0.0138	418.0	1.7655	0.9618	1.2968	201.2		0.0126	416.5	1.7533	0.9784	1.3105	199.8	70
75	0.0141	422.8	1.7793	0.9559	1.2861	203.6		0.0129	421.3	1.7674	0.9709	1.2985	202.3	75
80	0.0144	427.6	1.7929	0.9515	1.2764	205.8		0.0132	426.2	1.7812	0.9651	1.2878	204.6	80
85	0.0147	432.3	1.8063	0.9483	1.2676	208.0		0.0135	431.0	1.7947	0.9606	1.2780	206.9	85
90	0.0150	437.1	1.8194	0.9460	1.2596	210.2		0.0138	435.8	1.8080	0.9573	1.2692	209.1	90
95	0.0153	441.8	1.8323	0.9447	1.2523	212.3		0.0141	440.6	1.8211	0.9550	1.2612	211.3	95
100	0.0156	446.5	1.8451	0.9441	1.2456	214.3		0.0143	445.3	1.8339	0.9536	1.2538	213.4	100
105	0.0158	451.2	1.8576	0.9441	1.2394	216.3		0.0146	450.1	1.8466	0.9529	1.2470	215.4	105
110	0.0161	456.0	1.8700	0.9448	1.2336	218.2		0.0149	454.9	1.8591	0.9529	1.2408	217.4	110
115	0.0164	460.7	1.8823	0.9459	1.2283	220.2		0.0151	459.6	1.8715	0.9535	1.2350	219.4	115
120	0.0167	465.4	1.8944	0.9474	1.2233	222.0		0.0154	464.4	1.8837	0.9545	1.2296	221.3	120
125	0.0170	470.2	1.9064	0.9494	1.2187	223.9		0.0157	469.2	1.8958	0.9559	1.2246	223.2	125
130	0.0172	474.9	1.9183	0.9516	1.2144	225.7		0.0159	474.0	1.9077	0.9577	1.2199	225.0	130
135	0.0175	479.7	1.9300	0.9541	1.2103	227.5		0.0162	478.8	1.9195	0.9598	1.2156	226.9	135
140	0.0178	484.5	1.9416	0.9568	1.2065	229.2		0.0164	483.6	1.9312	0.9622	1.2115	228.7	140
145	0.0180	489.2	1.9532	0.9597	1.2029	231.0		0.0167	488.4	1.9428	0.9648	1.2076	230.4	145
150	0.0183	494.0	1.9646	0.9628	1.1995	232.7		0.0169	493.2	1.9543	0.9676	1.2040	232.2	150
155	0.0186	498.9	1.9759	0.9660	1.1964	234.4		0.0172	498.1	1.9657	0.9705	1.2006	233.9	155

TEMP °C	PRESSURE = 3000.00 kPa (abs)						SAT VAP	PRESSURE = 3200.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
6.87	0.0068	337.8	1.4909	1.9888	2.2647	146.8		0.0062	336.4	1.4812	2.1732	2.4364	144.5	9.36
10	0.0072	343.7	1.5115	1.7505	2.0426	151.7		0.0063	337.8	1.4860	2.0961	2.3636	145.7	10
15	0.0077	351.8	1.5400	1.5225	1.8325	158.3		0.0069	347.2	1.5189	1.7088	2.0016	153.6	15
20	0.0082	359.0	1.5649	1.3817	1.7037	163.8		0.0074	355.2	1.5463	1.5031	1.8118	159.9	20
25	0.0087	365.7	1.5874	1.2851	1.6152	168.7		0.0079	362.3	1.5706	1.3724	1.6918	165.3	25
30	0.0091	371.9	1.6082	1.2147	1.5502	173.0		0.0083	368.9	1.5926	1.2814	1.6080	170.1	30
35	0.0094	377.9	1.6276	1.1613	1.5002	176.9		0.0086	375.2	1.6130	1.2144	1.5457	174.4	35
40	0.0098	383.6	1.6459	1.1197	1.4603	180.6		0.0090	381.1	1.6321	1.1632	1.4974	178.3	40
45	0.0101	389.1	1.6634	1.0867	1.4277	184.0		0.0093	386.8	1.6502	1.1231	1.4586	181.9	45
50	0.0105	394.4	1.6801	1.0602	1.4005	187.2		0.0096	392.4	1.6675	1.0913	1.4268	185.3	50
55	0.0108	399.7	1.6962	1.0388	1.3774	190.2		0.0099	397.7	1.6840	1.0656	1.4001	188.4	55
60	0.0111	404.8	1.7118	1.0214	1.3576	193.1		0.0102	403.0	1.7000	1.0448	1.3774	191.4	60
65	0.0114	409.9	1.7269	1.0073	1.3403	195.8		0.0105	408.2	1.7154	1.0279	1.3578	194.3	65
70	0.0117	414.9	1.7416	0.9958	1.3252	198.4		0.0108	413.3	1.7304	1.0142	1.3408	197.0	70
75	0.0119	419.9	1.7559	0.9866	1.3117	201.0		0.0111	418.3	1.7450	1.0030	1.3257	199.7	75
80	0.0122	424.8	1.7700	0.9793	1.2998	203.4		0.0113	423.3	1.7592	0.9940	1.3124	202.2	80
85	0.0125	429.7	1.7837	0.9735	1.2890	205.8		0.0116	428.3	1.7731	0.9869	1.3005	204.6	85
90	0.0128	434.5	1.7971	0.9690	1.2793	208.0		0.0119	433.2	1.7868	0.9812	1.2898	207.0	90
95	0.0130	439.3	1.8104	0.9658	1.2704	210.3		0.0121	438.1	1.8002	0.9769	1.2801	209.3	95
100	0.0133	444.2	1.8234	0.9635	1.2624	212.4		0.0124	443.0	1.8133	0.9736	1.2713	211.5	100
105	0.0135	449.0	1.8362	0.9620	1.2550	214.5		0.0126	447.8	1.8263	0.9714	1.2632	213.7	105
110	0.0138	453.8	1.8488	0.9613	1.2482	216.6		0.0128	452.7	1.8390	0.9699	1.2559	215.8	110
115	0.0140	458.6	1.8613	0.9612	1.2419	218.6		0.0131	457.5	1.8516	0.9692	1.2491	217.8	115
120	0.0143	463.4	1.8736	0.9617	1.2361	220.6		0.0133	462.4	1.8640	0.9691	1.2428	219.9	120
125	0.0145	468.2	1.8858	0.9627	1.2307	222.5		0.0135	467.2	1.8762	0.9696	1.2370	221.8	125
130	0.0148	473.0	1.8978	0.9640	1.2257	224.4		0.0138	472.1	1.8883	0.9705	1.2316	223.8	130
135	0.0150	477.9	1.9097	0.9657	1.2210	226.3		0.0140	476.9	1.9003	0.9717	1.2265	225.7	135
140	0.0153	482.7	1.9214	0.9677	1.2166	228.1		0.0142	481.8	1.9122	0.9734	1.2218	227.5	140
145	0.0155	487.5	1.9331	0.9700	1.2125	229.9		0.0145	486.7	1.9239	0.9753	1.2174	229.4	145
150	0.0157	492.4	1.9446	0.9724	1.2086	231.7		0.0147	491.6	1.9355	0.9774	1.2133	231.2	150
155	0.0160	497.3	1.9561	0.9751	1.2050	233.4		0.0149	496.4	1.9470	0.9798	1.2094	233.0	155
160	0.0162	502.1	1.9674	0.9779	1.2016	235.1		0.0151	501.4	1.9584	0.9823	1.2058	234.7	160

TABLE 2 (continued)
HFC-23 Superheated Vapor—Constant Pressure Tables

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec
Cp = Heat Capacity at Constant Pressure in kJ/(kg)(°C) Cp/Cv = Heat Capacity Ratio (Dimensionless)

TEMP °C	PRESSURE = 3400.00 kPa (abs)						SAT VAP	PRESSURE = 3600.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
11.73	0.0057	334.7	1.4711	2.4042	2.6548	142.1		0.0052	332.8	1.4604	2.7049	2.9427	139.7	13.99
15	0.0061	341.8	1.4959	1.9879	2.2607	148.3		0.0053	335.4	1.4695	2.4779	2.7253	142.0	15
20	0.0067	350.9	1.5270	1.6630	1.9572	155.7		0.0060	346.1	1.5062	1.8878	2.1660	151.0	20
25	0.0071	358.7	1.5534	1.4797	1.7878	161.8		0.0065	354.8	1.5357	1.6161	1.9121	158.0	25
30	0.0075	365.8	1.5770	1.3599	1.6773	167.0		0.0069	362.4	1.5611	1.4541	1.7620	163.8	30
35	0.0079	372.4	1.5985	1.2750	1.5987	171.7		0.0073	369.4	1.5839	1.3451	1.6610	168.9	35
40	0.0083	378.6	1.6185	1.2118	1.5395	175.9		0.0076	375.9	1.6049	1.2666	1.5878	173.4	40
45	0.0086	384.5	1.6373	1.1632	1.4931	179.7		0.0079	382.1	1.6245	1.2076	1.5320	177.5	45
50	0.0089	390.2	1.6551	1.1250	1.4557	183.3		0.0083	388.0	1.6430	1.1618	1.4878	181.3	50
55	0.0092	395.8	1.6721	1.0945	1.4248	186.7		0.0086	393.7	1.6605	1.1256	1.4518	184.9	55
60	0.0095	401.2	1.6885	1.0698	1.3988	189.8		0.0088	399.3	1.6773	1.0966	1.4220	188.2	60
65	0.0098	406.5	1.7043	1.0498	1.3766	192.8		0.0091	404.7	1.6935	1.0731	1.3968	191.3	65
70	0.0100	411.7	1.7196	1.0335	1.3574	195.7		0.0094	410.0	1.7091	1.0540	1.3751	194.3	70
75	0.0103	416.8	1.7344	1.0203	1.3406	198.4		0.0096	415.2	1.7242	1.0384	1.3564	197.1	75
80	0.0106	421.9	1.7489	1.0095	1.3258	201.0		0.0099	420.4	1.7389	1.0256	1.3399	199.8	80
85	0.0108	426.9	1.7630	1.0008	1.3126	203.5		0.0101	425.5	1.7533	1.0153	1.3253	202.4	85
90	0.0111	431.9	1.7768	0.9938	1.3008	206.0		0.0104	430.6	1.7673	1.0069	1.3124	204.9	90
95	0.0113	436.8	1.7904	0.9884	1.2902	208.3		0.0106	435.6	1.7810	1.0003	1.3007	207.4	95
100	0.0115	441.8	1.8037	0.9841	1.2806	210.6		0.0108	440.6	1.7945	0.9950	1.2903	209.7	100
105	0.0118	446.7	1.8168	0.9810	1.2718	212.8		0.0110	445.5	1.8077	0.9910	1.2807	212.0	105
110	0.0120	451.6	1.8296	0.9788	1.2638	215.0		0.0113	450.5	1.8207	0.9880	1.2721	214.2	110
115	0.0122	456.5	1.8423	0.9774	1.2565	217.1		0.0115	455.4	1.8335	0.9859	1.2641	216.4	115
120	0.0125	461.4	1.8548	0.9767	1.2497	219.2		0.0117	460.3	1.8461	0.9845	1.2568	218.5	120
125	0.0127	466.2	1.8672	0.9766	1.2434	221.2		0.0119	465.3	1.8585	0.9839	1.2501	220.5	125
130	0.0129	471.1	1.8794	0.9770	1.2376	223.2		0.0121	470.2	1.8708	0.9838	1.2439	222.6	130
135	0.0131	476.0	1.8914	0.9779	1.2322	225.1		0.0123	475.1	1.8829	0.9842	1.2381	224.5	135
140	0.0133	480.9	1.9033	0.9791	1.2272	227.0		0.0125	480.0	1.8949	0.9850	1.2327	226.5	140
145	0.0136	485.8	1.9151	0.9807	1.2225	228.9		0.0127	484.9	1.9068	0.9862	1.2277	228.4	145
150	0.0138	490.7	1.9268	0.9825	1.2181	230.7		0.0129	489.9	1.9185	0.9877	1.2230	230.3	150
155	0.0140	495.6	1.9383	0.9846	1.2140	232.5		0.0131	494.8	1.9301	0.9894	1.2187	232.1	155
160	0.0142	500.6	1.9498	0.9868	1.2101	234.3		0.0133	499.8	1.9416	0.9914	1.2145	233.9	160
165	0.0144	505.5	1.9611	0.9893	1.2065	236.0		0.0135	504.7	1.9530	0.9936	1.2107	235.7	165

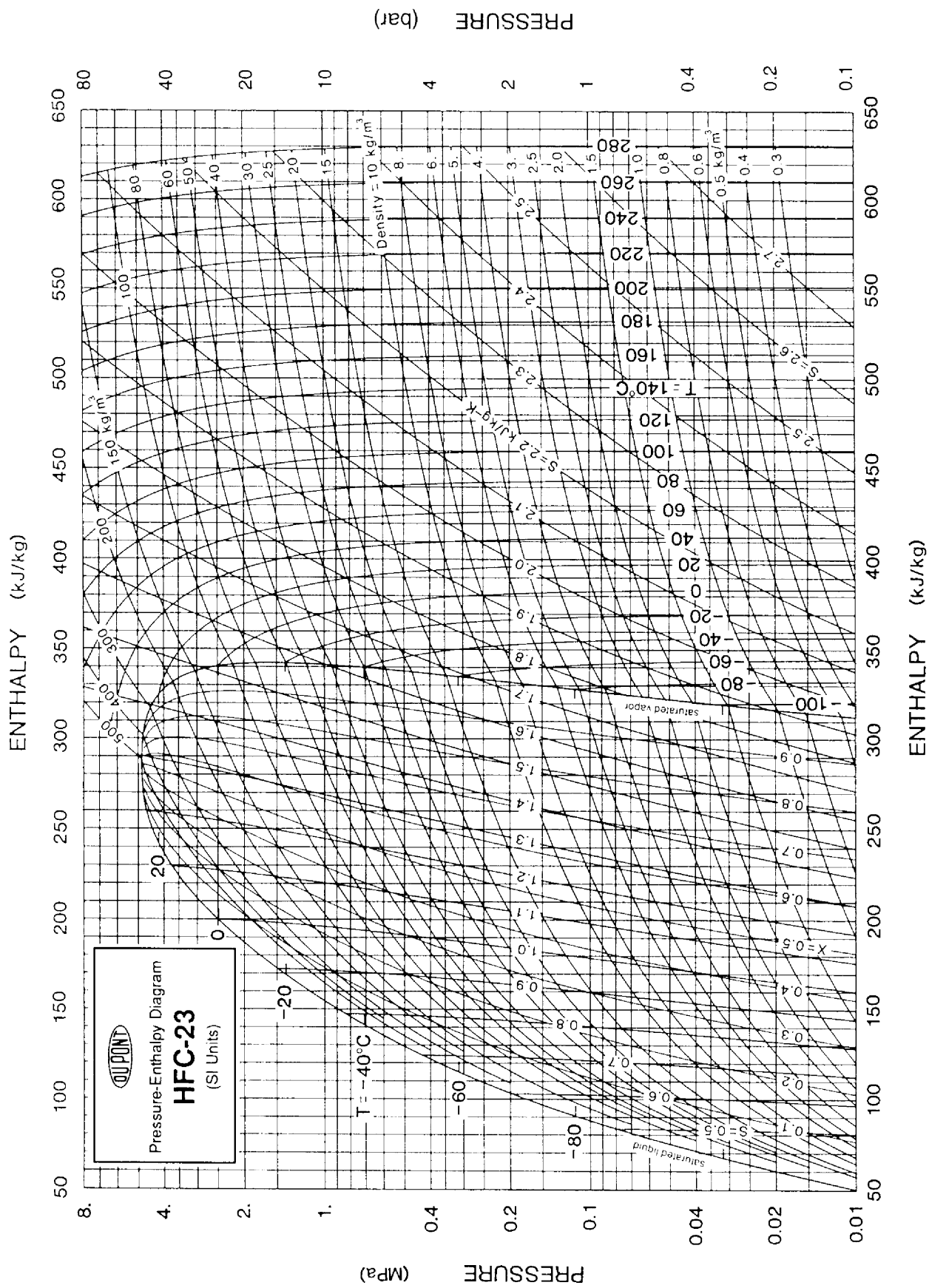
TEMP °C	PRESSURE = 3800.00 kPa (abs)						SAT VAP	PRESSURE = 4000.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
16.14	0.0047	330.4	1.4488	3.1162	3.3405	137.1		0.0043	327.6	1.4360	3.7187	3.9275	134.5	18.2
20	0.0053	340.5	1.4833	2.2383	2.4974	145.8		0.0046	333.5	1.4561	2.8981	3.1318	139.5	20
25	0.0058	350.4	1.5169	1.7978	2.0809	153.9		0.0053	345.5	1.4967	2.0567	2.3253	149.4	25
30	0.0063	358.8	1.5448	1.5701	1.8681	160.5		0.0057	354.8	1.5278	1.7179	2.0054	156.9	30
35	0.0067	366.2	1.5692	1.4276	1.7355	166.0		0.0061	362.9	1.5542	1.5264	1.8261	163.0	35
40	0.0070	373.1	1.5914	1.3291	1.6437	170.9		0.0065	370.2	1.5777	1.4012	1.7091	168.3	40
45	0.0074	379.6	1.6118	1.2570	1.5759	175.3		0.0068	377.0	1.5991	1.3126	1.6259	173.0	45
50	0.0077	385.7	1.6310	1.2022	1.5234	179.3		0.0071	383.4	1.6191	1.2467	1.5633	177.3	50
55	0.0080	391.6	1.6491	1.1593	1.4815	183.0		0.0074	389.5	1.6378	1.1960	1.5142	181.2	55
60	0.0082	397.3	1.6664	1.1253	1.4472	186.5		0.0077	395.3	1.6556	1.1561	1.4746	184.8	60
65	0.0085	402.9	1.6829	1.0978	1.4185	189.8		0.0080	401.0	1.6726	1.1242	1.4419	188.3	65
70	0.0088	408.3	1.6988	1.0756	1.3941	192.9		0.0082	406.6	1.6889	1.0984	1.4144	191.5	70
75	0.0090	413.6	1.7143	1.0574	1.3731	195.8		0.0085	412.0	1.7046	1.0774	1.3909	194.5	75
80	0.0093	418.9	1.7292	1.0425	1.3548	198.6		0.0087	417.4	1.7198	1.0603	1.3706	197.4	80
85	0.0095	424.1	1.7438	1.0304	1.3387	201.3		0.0089	422.6	1.7346	1.0462	1.3529	200.2	85
90	0.0097	429.2	1.7580	1.0206	1.3245	203.9		0.0091	427.8	1.7491	1.0347	1.3372	202.9	90
95	0.0099	434.3	1.7719	1.0126	1.3118	206.4		0.0094	433.0	1.7631	1.0254	1.3233	205.5	95
100	0.0102	439.3	1.7855	1.0062	1.3003	208.8		0.0096	438.1	1.7769	1.0178	1.3108	207.9	100
105	0.0104	444.3	1.7989	1.0012	1.2900	211.2		0.0098	443.2	1.7904	1.0118	1.2996	210.4	105
110	0.0106	449.3	1.8120	0.9974	1.2806	213.4		0.0100	448.2	1.8037	1.0070	1.2894	212.7	110
115	0.0108	454.3	1.8249	0.9945	1.2720	215.7		0.0102	453.2	1.8167	1.0034	1.2802	215.0	115
120	0.0110	459.3	1.8376	0.9925	1.2642	217.8		0.0104	458.2	1.8295	1.0007	1.2718	217.2	120
125	0.0112	464.3	1.8502	0.9913	1.2569	219.9		0.0106	463.2	1.8422	0.9988	1.2640	219.3	125
130	0.0114	469.2	1.8626	0.9906	1.2503	222.0		0.0108	468.2	1.8546	0.9977	1.2569	221.4	130
135	0.0116	474.2	1.8748	0.9906	1.2441	224.0		0.0110	473.2	1.8669	0.9971	1.2503	223.5	135
140	0.0118	479.1	1.8868	0.9910	1.2384	226.0		0.0112	478.2	1.8791	0.9971	1.2442	225.5	140
145	0.0120	484.1	1.8987	0.9918	1.2330	227.9		0.0114	483.2	1.8911	0.9975	1.2385	227.4	145
150	0.0122	489.0	1.9105	0.9929	1.2281	229.8		0.0116	488.2	1.9029	0.9983	1.2332	229.4	150
155	0.0124	494.0	1.9222	0.9944	1.2234	231.7		0.0117	493.2	1.9147	0.9994	1.2283	231.3	155
160	0.0126	499.0	1.9338	0.9961	1.2191	233.5		0.0119	498.2	1.9263	1.0008	1.2237	233.1	160
165	0.0128	504.0	1.9452	0.9980	1.2150	235.3		0.0121	503.2	1.9378	1.0025	1.2193	235.0	165
170	0.0130	509.0	1.9565	1.0001	1.2111	237.1		0.0123	508.2	1.9491	1.0043	1.2153	236.8	170

TABLE 2 (continued)
HFC-23 Superheated Vapor—Constant Pressure Tables

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec
Cp = Heat Capacity at Constant Pressure in kJ/(kg)(°C) Cp/Cv = Heat Capacity Ratio (Dimensionless)

TEMP °C	PRESSURE = 4200.00 kPa (abs)						SAT VAP	PRESSURE = 4400.00 kPa (abs)						TEMP °C
	V	H	S	Cp	Cp/Cv	v _s		V	H	S	Cp	Cp/Cv	v _s	
20.16	0.0039	324.2	1.4214	4.6962	4.8846	131.7		0.0035	319.7	1.4036	6.5795	6.7339	128.8	22.05
25	0.0047	339.7	1.4740	2.4663	2.7177	144.4		0.0041	332.5	1.4468	3.2492	3.4772	138.6	25
30	0.0052	350.4	1.5097	1.9145	2.1908	153.0		0.0047	345.5	1.4902	2.1924	2.4563	148.9	30
35	0.0056	359.3	1.5387	1.6475	1.9388	159.9		0.0052	355.4	1.5225	1.8003	2.0828	156.6	35
40	0.0060	367.1	1.5638	1.4855	1.7867	165.6		0.0056	363.8	1.5496	1.5856	1.8800	162.9	40
45	0.0063	374.2	1.5864	1.3756	1.6834	170.7		0.0059	371.4	1.5735	1.4478	1.7500	168.3	45
50	0.0067	380.9	1.6072	1.2961	1.6080	175.2		0.0062	378.3	1.5953	1.3513	1.6586	173.1	50
55	0.0069	387.2	1.6266	1.2361	1.5503	179.4		0.0065	384.9	1.6155	1.2800	1.5904	177.5	55
60	0.0072	393.3	1.6449	1.1894	1.5045	183.2		0.0068	391.2	1.6344	1.2254	1.5372	181.5	60
65	0.0075	399.1	1.6624	1.1524	1.4672	186.7		0.0070	397.2	1.6524	1.1826	1.4946	185.2	65
70	0.0077	404.8	1.6791	1.1227	1.4361	190.1		0.0073	403.0	1.6694	1.1484	1.4595	188.7	70
75	0.0080	410.4	1.6951	1.0985	1.4099	193.3		0.0075	408.7	1.6859	1.1208	1.4300	192.0	75
80	0.0082	415.8	1.7107	1.0788	1.3873	196.3		0.0077	414.2	1.7017	1.0983	1.4050	195.1	80
85	0.0084	421.2	1.7257	1.0627	1.3677	199.1		0.0079	419.7	1.7170	1.0799	1.3834	198.1	85
90	0.0086	426.4	1.7403	1.0494	1.3505	201.9		0.0082	425.0	1.7318	1.0648	1.3645	200.9	90
95	0.0088	431.7	1.7546	1.0386	1.3353	204.5		0.0084	430.3	1.7463	1.0523	1.3479	203.6	95
100	0.0090	436.8	1.7686	1.0298	1.3218	207.1		0.0086	435.6	1.7604	1.0422	1.3331	206.3	100
105	0.0093	442.0	1.7822	1.0227	1.3096	209.6		0.0088	440.8	1.7743	1.0339	1.3200	208.8	105
110	0.0095	447.1	1.7956	1.0170	1.2986	211.9		0.0090	445.9	1.7878	1.0272	1.3081	211.2	110
115	0.0096	452.1	1.8088	1.0125	1.2887	214.3		0.0092	451.0	1.8011	1.0219	1.2974	213.6	115
120	0.0098	457.2	1.8217	1.0091	1.2796	216.5		0.0093	456.1	1.8141	1.0177	1.2876	215.9	120
125	0.0100	462.2	1.8344	1.0066	1.2713	218.7		0.0095	461.2	1.8270	1.0145	1.2787	218.1	125
130	0.0102	467.3	1.8470	1.0049	1.2636	220.9		0.0097	466.3	1.8396	1.0122	1.2706	220.3	130
135	0.0104	472.3	1.8594	1.0038	1.2566	223.0		0.0099	471.3	1.8521	1.0106	1.2631	222.5	135
140	0.0106	477.3	1.8716	1.0033	1.2501	225.0		0.0101	476.4	1.8644	1.0097	1.2562	224.5	140
145	0.0108	482.3	1.8837	1.0033	1.2441	227.0		0.0102	481.4	1.8765	1.0092	1.2498	226.6	145
150	0.0110	487.3	1.8956	1.0037	1.2384	229.0		0.0104	486.5	1.8885	1.0093	1.2438	228.6	150
155	0.0111	492.3	1.9074	1.0045	1.2332	230.9		0.0106	491.5	1.9004	1.0097	1.2383	230.5	155
160	0.0113	497.4	1.9191	1.0056	1.2283	232.8		0.0108	496.6	1.9121	1.0105	1.2331	232.5	160
165	0.0115	502.4	1.9306	1.0070	1.2238	234.7		0.0109	501.6	1.9237	1.0116	1.2283	234.4	165
170	0.0117	507.4	1.9420	1.0086	1.2195	236.5		0.0111	506.7	1.9352	1.0129	1.2238	236.2	170
175	0.0118	512.5	1.9534	1.0103	1.2155	238.3		0.0113	511.8	1.9466	1.0145	1.2196	238.0	175

TEMP °C	PRESSURE = 4600.00 kPa (abs)						SAT VAP
	V	H	S	Cp	Cp/Cv	v _s	
23.87	0.0030	313.1	1.3794	11.8015	11.8636	125.7	
25	0.0034	321.9	1.4088	5.6441	5.8219	131.1	
30	0.0042	339.8	1.4683	2.6224	2.8719	144.4	
35	0.0047	351.1	1.5053	2.0002	2.2735	153.1	
40	0.0051	360.3	1.5349	1.7068	1.9942	160.0	
45	0.0055	368.3	1.5605	1.5312	1.8280	165.9	
50	0.0058	375.7	1.5834	1.4133	1.7161	171.0	
55	0.0061	382.5	1.6044	1.3283	1.6350	175.6	
60	0.0064	389.0	1.6240	1.2645	1.5731	179.8	
65	0.0066	395.2	1.6424	1.2150	1.5242	183.7	
70	0.0069	401.2	1.6600	1.1758	1.4845	187.4	
75	0.0071	407.0	1.6767	1.1443	1.4516	190.8	
80	0.0073	412.6	1.6929	1.1187	1.4237	194.0	
85	0.0075	418.2	1.7084	1.0978	1.3998	197.0	
90	0.0077	423.6	1.7235	1.0807	1.3791	200.0	
95	0.0079	429.0	1.7382	1.0666	1.3610	202.7	
100	0.0081	434.3	1.7525	1.0550	1.3450	205.4	
105	0.0083	439.5	1.7665	1.0455	1.3307	208.0	
110	0.0085	444.7	1.7802	1.0378	1.3179	210.5	
115	0.0087	449.9	1.7936	1.0315	1.3064	212.9	
120	0.0089	455.1	1.8068	1.0266	1.2960	215.3	
125	0.0091	460.2	1.8197	1.0227	1.2864	217.6	
130	0.0092	465.3	1.8325	1.0197	1.2777	219.8	
135	0.0094	470.4	1.8450	1.0176	1.2697	222.0	
140	0.0096	475.5	1.8574	1.0161	1.2624	224.1	
145	0.0098	480.5	1.8696	1.0153	1.2556	226.2	
150	0.0099	485.6	1.8817	1.0149	1.2493	228.2	
155	0.0101	490.7	1.8936	1.0150	1.2434	230.2	
160	0.0103	495.8	1.9054	1.0155	1.2380	232.1	
165	0.0104	500.8	1.9171	1.0163	1.2329	234.1	
170	0.0106	505.9	1.9286	1.0173	1.2282	235.9	
175	0.0107	511.0	1.9400	1.0186	1.2237	237.8	



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