

ตารางที่ 1 ค่าคุณสมบัติ Molar mass, gas constant และ critical-point ของสารต่างๆ

Molar mass, gas constant, and critical-point properties

Substance	Formula	Molar mass, M kg/kmol	Gas constant, R kJ/kg · K*	Critical-point properties		
				Temperature, K	Pressure, MPa	Volume, m ³ /kmol
Air	—	28.97	0.2870	132.5	3.77	0.0883
Ammonia	NH ₃	17.03	0.4882	405.5	11.28	0.0724
Argon	Ar	39.948	0.2081	151	4.86	0.0749
Benzene	C ₆ H ₆	78.115	0.1064	562	4.92	0.2603
Bromine	Br ₂	159.808	0.0520	584	10.34	0.1355
<i>n</i> -Butane	C ₄ H ₁₀	58.124	0.1430	425.2	3.80	0.2547
Carbon dioxide	CO ₂	44.01	0.1889	304.2	7.39	0.0943
Carbon monoxide	CO	28.011	0.2968	133	3.50	0.0930
Carbon tetrachloride	CCl ₄	153.82	0.05405	556.4	4.56	0.2759
Chlorine	Cl ₂	70.906	0.1173	417	7.71	0.1242
Chloroform	CHCl ₃	119.38	0.06964	536.6	5.47	0.2403
Dichlorodifluoromethane (R-12)	CCl ₂ F ₂	120.91	0.06876	384.7	4.01	0.2179
Dichlorofluoromethane (R-21)	CHCl ₂ F	102.92	0.08078	451.7	5.17	0.1973
Ethane	C ₂ H ₆	30.070	0.2765	305.5	4.48	0.1480
Ethyl alcohol	C ₂ H ₅ OH	46.07	0.1805	516	6.38	0.1673
Ethylene	C ₂ H ₄	28.054	0.2964	282.4	5.12	0.1242
Helium	He	4.003	2.0769	5.3	0.23	0.0578
<i>n</i> -Hexane	C ₆ H ₁₄	86.179	0.09647	507.9	3.03	0.3677
Hydrogen (normal)	H ₂	2.016	4.1240	33.3	1.30	0.0649
Krypton	Kr	83.80	0.09921	209.4	5.50	0.0924
Methane	CH ₄	16.043	0.5182	191.1	4.64	0.0993
Methyl alcohol	CH ₃ OH	32.042	0.2595	513.2	7.95	0.1180
Methyl chloride	CH ₃ Cl	50.488	0.1647	416.3	6.68	0.1430
Neon	Ne	20.183	0.4119	44.5	2.73	0.0417
Nitrogen	N ₂	28.013	0.2968	126.2	3.39	0.0899
Nitrous oxide	N ₂ O	44.013	0.1889	309.7	7.27	0.0961
Oxygen	O ₂	31.999	0.2598	154.8	5.08	0.0780
Propane	C ₃ H ₈	44.097	0.1885	370	4.26	0.1998
Propylene	C ₃ H ₆	42.081	0.1976	365	4.62	0.1810
Sulfur dioxide	SO ₂	64.063	0.1298	430.7	7.88	0.1217
Tetrafluoroethane (R-134a)	CF ₃ CH ₂ F	102.03	0.08149	374.2	4.059	0.1993
Trichlorofluoromethane (R-11)	CCl ₃ F	137.37	0.06052	471.2	4.38	0.2478
Water	H ₂ O	18.015	0.4615	647.1	22.06	0.0560
Xenon	Xe	131.30	0.06332	289.8	5.88	0.1186

*The unit kJ/kg · K is equivalent to kPa · m³/kg · K. The gas constant is calculated from $R = R_u/M$, where $R_u = 8.31447$ kJ/kmol · K and M is the molar mass.

Source: K. A. Kobe and R. E. Lynn, Jr., *Chemical Review* 52 (1953), pp. 117–236; and ASHRAE, *Handbook of Fundamentals* (Atlanta, GA: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 1993), pp. 16.4 and 36.1.

ตารางที่ 2-A ความร้อนจำเพาะของแก๊สในอุดมคติแต่ละชนิด ณ อุณหภูมิ 300 K

Ideal-gas specific heats of various common gases

(a) At 300 K

Gas	Formula	Gas constant, R kJ/kg · K	c_p kJ/kg · K	c_v kJ/kg · K	k
Air	—	0.2870	1.005	0.718	1.400
Argon	Ar	0.2081	0.5203	0.3122	1.667
Butane	C ₄ H ₁₀	0.1433	1.7164	1.5734	1.091
Carbon dioxide	CO ₂	0.1889	0.846	0.657	1.289
Carbon monoxide	CO	0.2968	1.040	0.744	1.400
Ethane	C ₂ H ₆	0.2765	1.7662	1.4897	1.186
Ethylene	C ₂ H ₄	0.2964	1.5482	1.2518	1.237
Helium	He	2.0769	5.1926	3.1156	1.667
Hydrogen	H ₂	4.1240	14.307	10.183	1.405
Methane	CH ₄	0.5182	2.2537	1.7354	1.299
Neon	Ne	0.4119	1.0299	0.6179	1.667
Nitrogen	N ₂	0.2968	1.039	0.743	1.400
Octane	C ₈ H ₁₈	0.0729	1.7113	1.6385	1.044
Oxygen	O ₂	0.2598	0.918	0.658	1.395
Propane	C ₃ H ₈	0.1885	1.6794	1.4909	1.126
Steam	H ₂ O	0.4615	1.8723	1.4108	1.327

Note: The unit kJ/kg · K is equivalent to kJ/kg · °C.

Source: *Chemical and Process Thermodynamics* 3/E by Kyle, B. G., © 2000. Adapted by permission of Pearson Education, Inc., Upper Saddle River, NJ.

ตารางที่ 2-B ค่าความร้อนจำเพาะของแก๊สในอุดมคติแต่ละชนิด ณ อุณหภูมิต่างๆ

Ideal-gas specific heats of various common gases (Continued)

(b) At various temperatures

Temperature, K	c_p kJ/kg · K	c_v kJ/kg · K	k	c_p kJ/kg · K	c_v kJ/kg · K	k	c_p kJ/kg · K	c_v kJ/kg · K	k
	<i>Air</i>			<i>Carbon dioxide, CO₂</i>			<i>Carbon monoxide, CO</i>		
250	1.003	0.716	1.401	0.791	0.602	1.314	1.039	0.743	1.400
300	1.005	0.718	1.400	0.846	0.657	1.288	1.040	0.744	1.399
350	1.008	0.721	1.398	0.895	0.706	1.268	1.043	0.746	1.398
400	1.013	0.726	1.395	0.939	0.750	1.252	1.047	0.751	1.395
450	1.020	0.733	1.391	0.978	0.790	1.239	1.054	0.757	1.392
500	1.029	0.742	1.387	1.014	0.825	1.229	1.063	0.767	1.387
550	1.040	0.753	1.381	1.046	0.857	1.220	1.075	0.778	1.382
600	1.051	0.764	1.376	1.075	0.886	1.213	1.087	0.790	1.376
650	1.063	0.776	1.370	1.102	0.913	1.207	1.100	0.803	1.370
700	1.075	0.788	1.364	1.126	0.937	1.202	1.113	0.816	1.364
750	1.087	0.800	1.359	1.148	0.959	1.197	1.126	0.829	1.358
800	1.099	0.812	1.354	1.169	0.980	1.193	1.139	0.842	1.353
900	1.121	0.834	1.344	1.204	1.015	1.186	1.163	0.866	1.343
1000	1.142	0.855	1.336	1.234	1.045	1.181	1.185	0.888	1.335
Temperature, K	<i>Hydrogen, H₂</i>			<i>Nitrogen, N₂</i>			<i>Oxygen, O₂</i>		
	c_p kJ/kg · K	c_v kJ/kg · K	k	c_p kJ/kg · K	c_v kJ/kg · K	k	c_p kJ/kg · K	c_v kJ/kg · K	k
250	14.051	9.927	1.416	1.039	0.742	1.400	0.913	0.653	1.398
300	14.307	10.183	1.405	1.039	0.743	1.400	0.918	0.658	1.395
350	14.427	10.302	1.400	1.041	0.744	1.399	0.928	0.668	1.389
400	14.476	10.352	1.398	1.044	0.747	1.397	0.941	0.681	1.382
450	14.501	10.377	1.398	1.049	0.752	1.395	0.956	0.696	1.373
500	14.513	10.389	1.397	1.056	0.759	1.391	0.972	0.712	1.365
550	14.530	10.405	1.396	1.065	0.768	1.387	0.988	0.728	1.358
600	14.546	10.422	1.396	1.075	0.778	1.382	1.003	0.743	1.350
650	14.571	10.447	1.395	1.086	0.789	1.376	1.017	0.758	1.343
700	14.604	10.480	1.394	1.098	0.801	1.371	1.031	0.771	1.337
750	14.645	10.521	1.392	1.110	0.813	1.365	1.043	0.783	1.332
800	14.695	10.570	1.390	1.121	0.825	1.360	1.054	0.794	1.327
900	14.822	10.698	1.385	1.145	0.849	1.349	1.074	0.814	1.319
1000	14.983	10.859	1.380	1.167	0.870	1.341	1.090	0.830	1.313

Source: Kenneth Wark, *Thermodynamics*, 4th ed. (New York: McGraw-Hill, 1983), p. 783, Table A-4M. Originally published in *Tables of Thermal Properties of Gases*, NBS Circular 564, 1955.

ตารางที่ 2-C ประมวลค่าความร้อนจำเพาะของแก๊สในอุดมคติแต่ละชนิด

Ideal-gas specific heats of various common gases (Concluded)

(c) As a function of temperature

$$\bar{c}_p = a + bT + cT^2 + dT^3$$

(T in K, c_p in kJ/kmol · K)

Substance	Formula	a	b	c	d	Temperature range, K	% error	
							Max.	Avg.
Nitrogen	N ₂	28.90	-0.1571×10^{-2}	0.8081×10^{-5}	-2.873×10^{-9}	273–1800	0.59	0.34
Oxygen	O ₂	25.48	1.520×10^{-2}	-0.7155×10^{-5}	1.312×10^{-9}	273–1800	1.19	0.28
Air	—	28.11	0.1967×10^{-2}	0.4802×10^{-5}	-1.966×10^{-9}	273–1800	0.72	0.33
Hydrogen	H ₂	29.11	-0.1916×10^{-2}	0.4003×10^{-5}	-0.8704×10^{-9}	273–1800	1.01	0.26
Carbon monoxide	CO	28.16	0.1675×10^{-2}	0.5372×10^{-5}	-2.222×10^{-9}	273–1800	0.89	0.37
Carbon dioxide	CO ₂	22.26	5.981×10^{-2}	-3.501×10^{-5}	7.469×10^{-9}	273–1800	0.67	0.22
Water vapor	H ₂ O	32.24	0.1923×10^{-2}	1.055×10^{-5}	-3.595×10^{-9}	273–1800	0.53	0.24
Nitric oxide	NO	29.34	-0.09395×10^{-2}	0.9747×10^{-5}	-4.187×10^{-9}	273–1500	0.97	0.36
Nitrous oxide	N ₂ O	24.11	5.8632×10^{-2}	-3.562×10^{-5}	10.58×10^{-9}	273–1500	0.59	0.26
Nitrogen dioxide	NO ₂	22.9	5.715×10^{-2}	-3.52×10^{-5}	7.87×10^{-9}	273–1500	0.46	0.18
Ammonia	NH ₃	27.568	2.5630×10^{-2}	0.99072×10^{-5}	-6.6909×10^{-9}	273–1500	0.91	0.36
Sulfur	S ₂	27.21	2.218×10^{-2}	-1.628×10^{-5}	3.986×10^{-9}	273–1800	0.99	0.38
Sulfur dioxide	SO ₂	25.78	5.795×10^{-2}	-3.812×10^{-5}	8.612×10^{-9}	273–1800	0.45	0.24
Sulfur trioxide	SO ₃	16.40	14.58×10^{-2}	-11.20×10^{-5}	32.42×10^{-9}	273–1300	0.29	0.13
Acetylene	C ₂ H ₂	21.8	9.2143×10^{-2}	-6.527×10^{-5}	18.21×10^{-9}	273–1500	1.46	0.59
Benzene	C ₆ H ₆	-36.22	48.475×10^{-2}	-31.57×10^{-5}	77.62×10^{-9}	273–1500	0.34	0.20
Methanol	CH ₄ O	19.0	9.152×10^{-2}	-1.22×10^{-5}	-8.039×10^{-9}	273–1000	0.18	0.08
Ethanol	C ₂ H ₆ O	19.9	20.96×10^{-2}	-10.38×10^{-5}	20.05×10^{-9}	273–1500	0.40	0.22
Hydrogen chloride	HCl	30.33	-0.7620×10^{-2}	1.327×10^{-5}	-4.338×10^{-9}	273–1500	0.22	0.08
Methane	CH ₄	19.89	5.024×10^{-2}	1.269×10^{-5}	-11.01×10^{-9}	273–1500	1.33	0.57
Ethane	C ₂ H ₆	6.900	17.27×10^{-2}	-6.406×10^{-5}	7.285×10^{-9}	273–1500	0.83	0.28
Propane	C ₃ H ₈	-4.04	30.48×10^{-2}	-15.72×10^{-5}	31.74×10^{-9}	273–1500	0.40	0.12
<i>n</i> -Butane	C ₄ H ₁₀	3.96	37.15×10^{-2}	-18.34×10^{-5}	35.00×10^{-9}	273–1500	0.54	0.24
<i>i</i> -Butane	C ₄ H ₁₀	-7.913	41.60×10^{-2}	-23.01×10^{-5}	49.91×10^{-9}	273–1500	0.25	0.13
<i>n</i> -Pentane	C ₅ H ₁₂	6.774	45.43×10^{-2}	-22.46×10^{-5}	42.29×10^{-9}	273–1500	0.56	0.21
<i>n</i> -Hexane	C ₆ H ₁₄	6.938	55.22×10^{-2}	-28.65×10^{-5}	57.69×10^{-9}	273–1500	0.72	0.20
Ethylene	C ₂ H ₄	3.95	15.64×10^{-2}	-8.344×10^{-5}	17.67×10^{-9}	273–1500	0.54	0.13
Propylene	C ₃ H ₆	3.15	23.83×10^{-2}	-12.18×10^{-5}	24.62×10^{-9}	273–1500	0.73	0.17

Source: B. G. Kyle, *Chemical and Process Thermodynamics* (Englewood Cliffs, NJ: Prentice-Hall, 1984). Used with permission.

ตารางที่ 3-A คุณสมบัติทั่วไปของ ของเหลว ของแข็ง และอาหาร

Properties of common liquids, solids, and foods

(a) Liquids

Substance	Boiling data at 1 atm		Freezing data		Liquid properties		
	Normal boiling point, °C	Latent heat of vaporization h_{fg} , kJ/kg	Freezing point, °C	Latent heat of fusion h_{if} , kJ/kg	Temperature, °C	Density ρ , kg/m ³	Specific heat c_p , kJ/kg · K
Ammonia	-33.3	1357	-77.7	322.4	-33.3 -20 0 25	682 665 639 602	4.43 4.52 4.60 4.80
Argon	-185.9	161.6	-189.3	28	-185.6	1394	1.14
Benzene	80.2	394	5.5	126	20	879	1.72
Brine (20% sodium chloride by mass)	103.9	—	-17.4	—	20	1150	3.11
<i>n</i> -Butane	-0.5	385.2	-138.5	80.3	-0.5	601	2.31
Carbon dioxide	-78.4*	230.5 (at 0°C)	-56.6	—	0	298	0.59
Ethanol	78.2	838.3	-114.2	109	25	783	2.46
Ethyl alcohol	78.6	855	-156	108	20	789	2.84
Ethylene glycol	198.1	800.1	-10.8	181.1	20	1109	2.84
Glycerine	179.9	974	18.9	200.6	20	1261	2.32
Helium	-268.9	22.8	—	—	-268.9	146.2	22.8
Hydrogen	-252.8	445.7	-259.2	59.5	-252.8	70.7	10.0
Isobutane	-11.7	367.1	-160	105.7	-11.7	593.8	2.28
Kerosene	204–293	251	-24.9	—	20	820	2.00
Mercury	356.7	294.7	-38.9	11.4	25	13,560	0.139
Methane	-161.5	510.4	-182.2	58.4	-161.5 -100 25	423 301 787	3.49 5.79 2.55
Methanol	64.5	1100	-97.7	99.2	25	787	2.55
Nitrogen	-195.8	198.6	-210	25.3	-195.8 -160 20	809 596 640	2.06 2.97 2.0
Octane	124.8	306.3	-57.5	180.7	20	703	2.10
Oil (light)	—	—	—	—	25	910	1.80
Oxygen	-183	212.7	-218.8	13.7	-183	1141	1.71
Petroleum	—	230–384	—	—	20	640	2.0
Propane	-42.1	427.8	-187.7	80.0	-42.1 0 50	581 529 449	2.25 2.53 3.13
Refrigerant-134a	-26.1	217.0	-96.6	—	-50 -26.1 0 25	1443 1374 1295 1207	1.23 1.27 1.34 1.43
Water	100	2257	0.0	333.7	0 25 50 75 100	1000 997 988 975 958	4.22 4.18 4.18 4.19 4.22

* Sublimation temperature. (At pressures below the triple-point pressure of 518 kPa, carbon dioxide exists as a solid or gas. Also, the freezing-point temperature of carbon dioxide is the triple-point temperature of -56.5°C.)

ตารางที่ 3-A คุณสมบัติทั่วไปของ ของเหลว ของแข็ง และอาหาร (ต่อ)

Properties of common liquids, solids, and foods (*Concluded*)

(b) Solids (values are for room temperature unless indicated otherwise)

Substance	Density, ρ kg/m ³	Specific heat, c_p kJ/kg · K	Substance	Density, ρ kg/m ³	Specific heat, c_p kJ/kg · K
Metals			Nonmetals		
Aluminum			Asphalt	2110	0.920
200 K		0.797	Brick, common	1922	0.79
250 K		0.859	Brick, fireclay (500°C)	2300	0.960
300 K	2,700	0.902	Concrete	2300	0.653
350 K		0.929	Clay	1000	0.920
400 K		0.949	Diamond	2420	0.616
450 K		0.973	Glass, window	2700	0.800
500 K		0.997	Glass, pyrex	2230	0.840
Bronze (76% Cu, 2% Zn, 2% Al)	8,280	0.400	Graphite	2500	0.711
Brass, yellow (65% Cu, 35% Zn)	8,310	0.400	Granite	2700	1.017
Copper			Gypsum or plaster board	800	1.09
−173°C		0.254	Ice		
−100°C		0.342	200 K		1.56
−50°C		0.367	220 K		1.71
0°C		0.381	240 K		1.86
27°C	8,900	0.386	260 K		2.01
100°C		0.393	273 K	921	2.11
200°C		0.403	Limestone	1650	0.909
Iron	7,840	0.45	Marble	2600	0.880
Lead	11,310	0.128	Plywood (Douglas Fir)	545	1.21
Magnesium	1,730	1.000	Rubber (soft)	1100	1.840
Nickel	8,890	0.440	Rubber (hard)	1150	2.009
Silver	10,470	0.235	Sand	1520	0.800
Steel, mild	7,830	0.500	Stone	1500	0.800
Tungsten	19,400	0.130	Woods, hard (maple, oak, etc.)	721	1.26
			Woods, soft (fir, pine, etc.)	513	1.38

(c) Foods

Food	Water content, % (mass)	Freezing point, °C	Specific heat, kJ/kg · K		Latent heat of fusion, kJ/kg	Food	Water content, % (mass)	Freezing point, °C	Specific heat, kJ/kg · K		Latent heat of fusion, kJ/kg
			Above freezing	Below freezing					Above freezing	Below freezing	
Apples	84	−1.1	3.65	1.90	281	Lettuce	95	−0.2	4.02	2.04	317
Bananas	75	−0.8	3.35	1.78	251	Milk, whole	88	−0.6	3.79	1.95	294
Beef round	67	—	3.08	1.68	224	Oranges	87	−0.8	3.75	1.94	291
Broccoli	90	−0.6	3.86	1.97	301	Potatoes	78	−0.6	3.45	1.82	261
Butter	16	—	—	1.04	53	Salmon fish	64	−2.2	2.98	1.65	214
Cheese, swiss	39	−10.0	2.15	1.33	130	Shrimp	83	−2.2	3.62	1.89	277
Cherries	80	−1.8	3.52	1.85	267	Spinach	93	−0.3	3.96	2.01	311
Chicken	74	−2.8	3.32	1.77	247	Strawberries	90	−0.8	3.86	1.97	301
Corn, sweet	74	−0.6	3.32	1.77	247	Tomatoes, ripe	94	−0.5	3.99	2.02	314
Eggs, whole	74	−0.6	3.32	1.77	247	Turkey	64	—	2.98	1.65	214
Ice cream	63	−5.6	2.95	1.63	210	Watermelon	93	−0.4	3.96	2.01	311

Source: Values are obtained from various handbooks and other sources or are calculated. Water content and freezing-point data of foods are from ASHRAE, *Handbook of Fundamentals*, SI version (Atlanta, GA: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 1993), Chapter 30, Table 1. Freezing point is the temperature at which freezing starts for fruits and vegetables, and the average freezing temperature for other foods.

ตารางที่ 4 ตารางอุณหภูมิของน้ำอิ่มตัว

Temp	Press.	Specific Volume		Specific Internal Energy			Specific Enthalpy			Specific Entropy		
<i>T</i>	<i>P</i>	<i>v_f</i>	<i>v_g</i>	<i>u_f</i>	<i>u_{fg}</i>	<i>u_g</i>	<i>h_f</i>	<i>h_{fg}</i>	<i>h_g</i>	<i>s_f</i>	<i>s_{fg}</i>	<i>s_g</i>
°C	kPa	m ³ /kg		kJ/kg			kJ/kg			kJ/kg K		
0.01	0.6117	0.001000	206.00	(0.00)	2,374.9	2,374.9	0.00	2,500.9	2,500.9	(0.0000)	9.1555	9.1555
4	0.8135	0.001000	157.12	16.81	2,363.6	2,380.4	16.81	2,491.4	2,508.2	0.0611	8.9895	9.0506
5	0.8726	0.001000	147.02	21.02	2,360.8	2,381.8	21.02	2,489.1	2,510.1	0.0763	8.9486	9.0249
10	1.2282	0.001000	106.31	42.02	2,346.6	2,388.7	42.02	2,477.2	2,519.2	0.1511	8.7488	8.8998
11	1.3129	0.001000	99.793	46.21	2,343.8	2,390.0	46.22	2,474.8	2,521.1	0.1659	8.7096	8.8755
12	1.4028	0.001001	93.724	50.41	2,341.0	2,391.4	50.41	2,472.5	2,522.9	0.1806	8.6708	8.8514
13	1.4981	0.001001	88.070	54.60	2,338.2	2,392.8	54.60	2,470.1	2,524.7	0.1953	8.6322	8.8275
14	1.5989	0.001001	82.798	58.79	2,335.4	2,394.1	58.79	2,467.7	2,526.5	0.2099	8.5939	8.8038
15	1.7057	0.001001	77.881	62.98	2,332.5	2,395.5	62.98	2,465.4	2,528.4	0.2245	8.5559	8.7804
20	2.3392	0.001002	57.761	83.92	2,318.4	2,402.4	83.92	2,453.5	2,537.5	0.2965	8.3696	8.6661
25	3.1697	0.001003	43.341	104.84	2,304.3	2,409.2	104.84	2,441.7	2,546.5	0.3673	8.1895	8.5568
30	4.2467	0.001004	32.882	125.74	2,290.2	2,415.9	125.75	2,429.8	2,555.6	0.4368	8.0153	8.4521
35	5.6286	0.001006	25.208	146.64	2,276.1	2,422.7	146.64	2,417.9	2,564.6	0.5052	7.8467	8.3518
40	7.3844	0.001008	19.517	167.53	2,261.9	2,429.4	167.54	2,406.0	2,573.5	0.5724	7.6832	8.2557
45	9.5944	0.001010	15.253	188.43	2,247.7	2,436.1	188.44	2,394.0	2,582.5	0.6386	7.5248	8.1634
50	12.351	0.001012	12.028	209.32	2,233.4	2,442.8	209.34	2,382.0	2,591.3	0.7038	7.3711	8.0749
55	15.761	0.001015	9.565	230.23	2,219.1	2,449.4	230.24	2,369.9	2,600.1	0.7680	7.2219	7.9899
60	19.946	0.001017	7.668	251.13	2,204.8	2,455.9	251.15	2,357.7	2,608.8	0.8312	7.0770	7.9082
65	25.041	0.001020	6.194	272.05	2,190.4	2,462.4	272.08	2,345.4	2,617.5	0.8935	6.9361	7.8296
70	31.201	0.001023	5.040	292.99	2,175.9	2,468.9	293.02	2,333.1	2,626.1	0.9550	6.7990	7.7540
75	38.595	0.001026	4.129	313.93	2,161.3	2,475.2	313.97	2,320.6	2,634.6	1.0156	6.6656	7.6812
80	47.415	0.001029	3.405	334.90	2,146.7	2,481.6	334.95	2,308.1	2,643.0	1.0754	6.5356	7.6110
85	57.867	0.001032	2.826	355.89	2,131.9	2,487.8	355.95	2,295.4	2,651.3	1.1344	6.4090	7.5434
90	70.182	0.001036	2.359	376.90	2,117.1	2,494.0	376.97	2,282.6	2,659.5	1.1927	6.2854	7.4781
95	84.609	0.001040	1.981	397.93	2,102.1	2,500.0	398.02	2,269.6	2,667.6	1.2502	6.1648	7.4150
100	101.42	0.001043	1.672	418.99	2,087.0	2,506.0	419.10	2,256.5	2,675.6	1.3070	6.0471	7.3541
105	120.90	0.001047	1.418	440.09	2,071.8	2,511.9	440.21	2,243.2	2,683.4	1.3632	5.9320	7.2951
110	143.38	0.001052	1.209	461.21	2,056.5	2,517.7	461.36	2,229.7	2,691.1	1.4187	5.8194	7.2380
115	169.18	0.001056	1.036	482.37	2,041.0	2,523.3	482.55	2,216.0	2,698.6	1.4735	5.7092	7.1827
120	198.67	0.001060	0.89130	503.57	2,025.3	2,528.9	503.78	2,202.1	2,705.9	1.5278	5.6013	7.1291
125	232.22	0.001065	0.77011	524.81	2,009.5	2,534.3	525.06	2,188.0	2,713.1	1.5815	5.4955	7.0770
130	270.26	0.001070	0.66808	546.10	1,993.4	2,539.5	546.39	2,173.7	2,720.1	1.6346	5.3918	7.0264
135	313.20	0.001075	0.58180	567.43	1,977.2	2,544.6	567.77	2,159.1	2,726.9	1.6872	5.2900	6.9772
140	361.50	0.001080	0.50852	588.81	1,960.8	2,549.6	589.20	2,144.2	2,733.4	1.7393	5.1900	6.9293
145	415.63	0.001085	0.44602	610.24	1,944.2	2,554.4	610.69	2,129.1	2,739.8	1.7909	5.0917	6.8826
150	476.10	0.001091	0.39250	631.73	1,927.3	2,559.0	632.25	2,113.7	2,745.9	1.8420	4.9951	6.8370
155	543.42	0.001096	0.34650	653.28	1,910.2	2,563.5	653.88	2,097.9	2,751.8	1.8926	4.9000	6.7926
160	618.14	0.001102	0.30682	674.89	1,892.9	2,567.8	675.57	2,081.9	2,757.4	1.9428	4.8063	6.7491
165	700.82	0.001108	0.27246	696.57	1,875.3	2,571.9	697.35	2,065.4	2,762.8	1.9926	4.7140	6.7066
170	792.05	0.001114	0.24262	718.32	1,857.4	2,575.7	719.21	2,048.7	2,767.9	2.0419	4.6230	6.6649
175	892.45	0.001121	0.21660	740.15	1,839.2	2,579.4	741.15	2,031.6	2,772.7	2.0909	4.5332	6.6241
180	1,002.6	0.001127	0.19386	762.06	1,820.8	2,582.8	763.19	2,014.0	2,777.2	2.1395	4.4445	6.5841
185	1,123.3	0.001134	0.17392	784.05	1,802.0	2,586.1	785.32	1,996.1	2,781.4	2.1878	4.3569	6.5447
190	1,255.0	0.001141	0.15638	806.13	1,782.9	2,589.1	807.57	1,977.7	2,785.3	2.2358	4.2702	6.5060
195	1,398.6	0.001149	0.14091	828.31	1,763.5	2,591.8	829.92	1,958.9	2,788.9	2.2834	4.1844	6.4679
200	1,554.7	0.001157	0.12722	850.60	1,743.7	2,594.3	852.39	1,939.7	2,792.1	2.3308	4.0995	6.4303
205	1,724.0	0.001164	0.11509	872.99	1,723.5	2,596.5	874.99	1,919.9	2,794.9	2.3779	4.0153	6.3932
210	1,907.4	0.001173	0.10430	895.49	1,702.9	2,598.4	897.73	1,899.6	2,797.4	2.4248	3.9318	6.3565
215	2,105.5	0.001181	0.09469	918.12	1,681.9	2,600.0	920.61	1,878.8	2,799.4	2.4714	3.8488	6.3202

ตารางคุณสมบัติของไอน้ำ ตารางที่ 4 ถึงตารางที่ 7 ผู้เขียนสร้างขึ้น โดยใช้โปรแกรม X Steam Tables v2.6 ซึ่งอ้างอิงสมการ
คุณสมบัติของไอน้ำจาก IAPWS IF-97 โปรแกรมนี้พัฒนาขึ้นโดย Magnus Holmgren (<http://www.x-eng.com>) และอนุญาตให้ใช้ได้อย่าง

ตารางที่ 4 ตารางอุณหภูมิของน้ำอิ่มตัว (ต่อ)

Temp	Press.	Specific Volume		Specific Internal Energy			Specific Enthalpy			Specific Entropy		
<i>T</i>	<i>P</i>	<i>v_f</i>	<i>v_g</i>	<i>u_f</i>	<i>u_{fg}</i>	<i>u_g</i>	<i>h_f</i>	<i>h_{fg}</i>	<i>h_g</i>	<i>s_f</i>	<i>s_{fg}</i>	<i>s_g</i>
^o C	kPa	m ³ /kg		kJ/kg			kJ/kg			kJ/kg K		
220	2,319.3	0.001190	0.08610	940.9	1,660.5	2,601.4	943.6	1,857.4	2,801.1	2.5178	3.7664	6.2842
225	2,549.4	0.001199	0.07841	963.8	1,638.6	2,602.4	966.8	1,835.4	2,802.3	2.5641	3.6845	6.2485
230	2,796.8	0.001209	0.07151	986.8	1,616.2	2,603.0	990.2	1,812.8	2,803.0	2.6102	3.6029	6.2131
235	3,062.2	0.001219	0.06530	1,010.0	1,593.3	2,603.3	1,013.8	1,789.5	2,803.3	2.6561	3.5216	6.1777
240	3,346.7	0.001229	0.05971	1,033.4	1,569.8	2,603.2	1,037.5	1,765.5	2,803.1	2.7019	3.4406	6.1425
245	3,650.9	0.001240	0.05466	1,057.0	1,545.8	2,602.8	1,061.5	1,740.8	2,802.3	2.7477	3.3597	6.1074
250	3,975.9	0.001252	0.05009	1,080.7	1,521.2	2,601.9	1,085.7	1,715.3	2,801.0	2.7934	3.2788	6.0722
255	4,322.7	0.001264	0.04594	1,104.7	1,495.9	2,600.5	1,110.1	1,689.0	2,799.1	2.8391	3.1980	6.0370
260	4,692.1	0.001276	0.04218	1,128.8	1,469.9	2,598.8	1,134.8	1,661.8	2,796.6	2.8847	3.1170	6.0017
265	5,085.1	0.001289	0.03875	1,153.3	1,443.2	2,596.5	1,159.8	1,633.7	2,793.5	2.9304	3.0358	5.9662
270	5,502.8	0.001303	0.03562	1,177.9	1,415.7	2,593.7	1,185.1	1,604.6	2,789.7	2.9762	2.9542	5.9304
275	5,946.3	0.001318	0.03277	1,202.9	1,387.4	2,590.3	1,210.7	1,574.4	2,785.1	3.0221	2.8723	5.8943
280	6,416.5	0.001333	0.03015	1,228.1	1,358.2	2,586.3	1,236.7	1,543.2	2,779.8	3.0681	2.7898	5.8578
285	6,914.5	0.001349	0.02776	1,253.7	1,328.0	2,581.7	1,263.0	1,510.7	2,773.7	3.1143	2.7065	5.8208
290	7,441.6	0.001366	0.02556	1,279.6	1,296.8	2,576.4	1,289.8	1,476.8	2,766.6	3.1608	2.6225	5.7832
295	7,999.0	0.001385	0.02353	1,306.0	1,264.4	2,570.4	1,317.0	1,441.6	2,758.6	3.2076	2.5374	5.7449
300	8,587.7	0.001404	0.02166	1,332.7	1,230.8	2,563.5	1,344.8	1,404.8	2,749.6	3.2547	2.4510	5.7058
305	9,209.2	0.001425	0.01994	1,359.9	1,195.8	2,555.8	1,373.1	1,366.3	2,739.4	3.3024	2.3632	5.6656
310	9,864.7	0.001448	0.01834	1,387.7	1,159.3	2,547.0	1,402.0	1,325.9	2,727.9	3.3506	2.2737	5.6243
315	10,556	0.001472	0.01686	1,416.1	1,121.1	2,537.2	1,431.6	1,283.4	2,715.1	3.3994	2.1822	5.5816
320	11,284	0.001499	0.01548	1,445.1	1,080.9	2,526.0	1,462.1	1,238.6	2,700.7	3.4491	2.0882	5.5373
325	12,051	0.001528	0.01419	1,475.0	1,038.5	2,513.5	1,493.4	1,191.1	2,684.5	3.4997	1.9913	5.4911
330	12,858	0.001561	0.01298	1,505.7	993.6	2,499.3	1,525.7	1,140.5	2,666.2	3.5516	1.8909	5.4425
335	13,707	0.001597	0.01185	1,537.5	945.7	2,483.1	1,559.3	1,086.3	2,645.6	3.6048	1.7862	5.3910
340	14,600	0.001638	0.01078	1,570.5	894.1	2,464.6	1,594.4	1,027.6	2,622.1	3.6599	1.6760	5.3359
345	15,540	0.001685	0.00977	1,605.3	837.9	2,443.2	1,631.4	963.6	2,595.0	3.7175	1.5588	5.2763
350	16,529	0.001740	0.00880	1,642.1	776.0	2,418.1	1,670.9	892.7	2,563.6	3.7783	1.4326	5.2109
355	17,570	0.001808	0.00787	1,681.9	706.3	2,388.3	1,713.7	812.8	2,526.5	3.8438	1.2939	5.1377
360	18,666	0.001894	0.00695	1,726.1	625.3	2,351.4	1,761.5	719.5	2,481.0	3.9163	1.1364	5.0528
365	19,822	0.002016	0.00600	1,777.6	525.4	2,303.0	1,817.6	604.5	2,422.1	4.0010	0.9472	4.9483
370	21,043	0.002222	0.00495	1,845.9	383.6	2,229.5	1,892.6	440.9	2,333.6	4.1141	0.6856	4.7997
373.95	22,064	0.003106	0.00311	2,015.7	-	2,015.7	2,084.3	-	2,084.3	4.4070	-	4.4070

subscript:

f แสดงค่าคุณสมบัติของ ของเหลวอิ่มตัว (Saturated liquid)

g แสดงค่าคุณสมบัติของ ไออิ่มตัว (Saturated vapor)

fg แสดงปริมาณที่แตกต่างของค่าคุณสมบัติของ ไออิ่มตัว (Saturated vapor) และของเหลวอิ่มตัว (Saturated liquid)
ตัวอย่างเช่น $h_{fg} = h_g - h_f$

ตารางที่ 5 ตารางความดันของน้ำอิมตัว

Temp	Press.	Specific Volume		Specific Internal Energy			Specific Enthalpy			Specific Entropy		
P	T	v_f	v_g	u_f	u_{fg}	u_g	h_f	h_{fg}	h_g	s_f	s_{fg}	s_g
kPa	$^{\circ}C$	m^3/kg		kJ/kg			kJ/kg			kJ/kg K		
0.6117	0.01	0.001000	206.00	(0.00)	2,374.9	2,374.9	0.00	2,500.9	2,500.9	(0.0000)	9.1555	9.1555
1.0	7.0	0.001000	129.18	29.30	2,355.2	2,384.5	29.30	2,484.4	2,513.7	0.1059	8.8690	8.9749
1.5	13.0	0.001001	87.96	54.68	2,338.1	2,392.8	54.69	2,470.1	2,524.7	0.1956	8.6315	8.8270
3.5	26.7	0.001003	39.47	111.83	2,299.6	2,411.4	111.84	2,437.7	2,549.6	0.3907	8.1306	8.5213
6.0	36.2	0.001006	23.73	151.49	2,272.8	2,424.3	151.49	2,415.2	2,566.7	0.5209	7.8083	8.3291
6.5	37.6	0.001007	22.01	157.62	2,268.6	2,426.2	157.63	2,411.7	2,569.3	0.5407	7.7601	8.3008
7.0	39.0	0.001007	20.53	163.36	2,264.7	2,428.1	163.37	2,408.4	2,571.8	0.5591	7.7155	8.2746
7.5	40.3	0.001008	19.23	168.75	2,261.1	2,429.8	168.76	2,405.3	2,574.1	0.5763	7.6739	8.2502
8.0	41.5	0.001008	18.10	173.84	2,257.6	2,431.4	173.85	2,402.4	2,576.2	0.5925	7.6349	8.2274
8.5	42.7	0.001009	17.10	178.67	2,254.3	2,433.0	178.68	2,399.6	2,578.3	0.6078	7.5982	8.2060
9.0	43.8	0.001009	16.20	183.25	2,251.2	2,434.5	183.26	2,397.0	2,580.3	0.6223	7.5636	8.1859
9.5	44.8	0.001010	15.40	187.62	2,248.2	2,435.8	187.63	2,394.5	2,582.1	0.6361	7.5308	8.1669
10	45.8	0.001010	14.67	191.80	2,245.4	2,437.2	191.81	2,392.1	2,583.9	0.6492	7.4997	8.1489
15	54.0	0.001014	10.02	225.92	2,222.1	2,448.0	225.94	2,372.4	2,598.3	0.7548	7.2523	8.0071
20	60.1	0.001017	7.6482	251.38	2,204.6	2,456.0	251.40	2,357.5	2,608.9	0.8320	7.0753	7.9072
25	65.0	0.001020	6.2034	271.90	2,190.5	2,462.4	271.93	2,345.5	2,617.4	0.8931	6.9371	7.8302
30	69.1	0.001022	5.2286	289.20	2,178.5	2,467.7	289.23	2,335.3	2,624.6	0.9439	6.8235	7.7675
35	72.7	0.001024	4.5252	304.21	2,168.1	2,472.3	304.25	2,326.4	2,630.7	0.9876	6.7270	7.7146
40	75.9	0.001026	3.9931	317.53	2,158.8	2,476.3	317.57	2,318.5	2,636.1	1.0259	6.6431	7.6690
45	78.7	0.001028	3.5761	329.51	2,150.4	2,479.9	329.55	2,311.3	2,640.9	1.0601	6.5687	7.6288
50	81.3	0.001030	3.2401	340.42	2,142.8	2,483.2	340.48	2,304.7	2,645.2	1.0910	6.5020	7.5930
55	83.7	0.001032	2.9636	350.47	2,135.7	2,486.2	350.52	2,298.7	2,649.2	1.1192	6.4414	7.5606
60	85.9	0.001033	2.7318	359.77	2,129.2	2,488.9	359.84	2,293.0	2,652.9	1.1452	6.3859	7.5311
65	88.0	0.001035	2.5347	368.46	2,123.0	2,491.5	368.53	2,287.7	2,656.2	1.1694	6.3346	7.5040
70	89.9	0.001036	2.3649	376.61	2,117.3	2,493.9	376.68	2,282.7	2,659.4	1.1919	6.2871	7.4790
75	91.8	0.001037	2.2171	384.29	2,111.8	2,496.1	384.37	2,278.0	2,662.4	1.2130	6.2427	7.4557
80	93.5	0.001038	2.0872	391.56	2,106.6	2,498.2	391.64	2,273.5	2,665.2	1.2328	6.2011	7.4339
85	95.1	0.001040	1.9721	398.46	2,101.7	2,500.2	398.55	2,269.3	2,667.8	1.2516	6.1618	7.4135
90	96.7	0.001041	1.8695	405.03	2,097.0	2,502.1	405.13	2,265.2	2,670.3	1.2694	6.1248	7.3942
95	98.2	0.001042	1.7773	411.32	2,092.5	2,503.8	411.42	2,261.3	2,672.7	1.2864	6.0897	7.3760
100	99.6	0.001043	1.6940	417.33	2,088.2	2,505.5	417.44	2,257.5	2,674.9	1.3026	6.0562	7.3588
101.325	100.0	0.001043	1.6733	418.88	2,087.1	2,506.0	418.99	2,256.5	2,675.5	1.3067	6.0477	7.3544
125	106.0	0.001048	1.3749	444.16	2,068.9	2,513.0	444.30	2,240.6	2,684.9	1.3739	5.9100	7.2840
150	111.4	0.001053	1.1594	466.92	2,052.3	2,519.2	467.08	2,226.0	2,693.1	1.4335	5.7894	7.2229
175	116.0	0.001057	1.0036	486.78	2,037.7	2,524.5	486.97	2,213.2	2,700.1	1.4849	5.6865	7.1714
200	120.2	0.001061	0.88574	504.47	2,024.6	2,529.1	504.68	2,201.6	2,706.2	1.5301	5.5968	7.1269
225	124.0	0.001064	0.79325	520.46	2,012.7	2,533.2	520.70	2,191.0	2,711.7	1.5706	5.5170	7.0876
250	127.4	0.001067	0.71870	535.08	2,001.7	2,536.8	535.35	2,181.2	2,716.5	1.6072	5.4452	7.0524
275	130.6	0.001070	0.65728	548.58	1,991.6	2,540.1	548.87	2,172.0	2,720.9	1.6408	5.3798	7.0206
300	133.5	0.001073	0.60579	561.13	1,982.0	2,543.2	561.46	2,163.4	2,724.9	1.6718	5.3198	6.9916
325	136.3	0.001076	0.56196	572.88	1,973.1	2,545.9	573.23	2,155.3	2,728.6	1.7006	5.2643	6.9648
350	138.9	0.001079	0.52420	583.93	1,964.6	2,548.5	584.31	2,147.7	2,732.0	1.7275	5.2126	6.9401
375	141.3	0.001081	0.49130	594.38	1,956.5	2,550.9	594.78	2,140.3	2,735.1	1.7527	5.1643	6.9170
400	143.6	0.001084	0.46239	604.29	1,948.8	2,553.1	604.72	2,133.3	2,738.1	1.7766	5.1188	6.8954
425	145.8	0.001086	0.43677	613.73	1,941.5	2,555.2	614.19	2,126.6	2,740.8	1.7992	5.0759	6.8751
450	147.9	0.001088	0.41390	622.73	1,934.4	2,557.1	623.22	2,120.2	2,743.4	1.8206	5.0353	6.8560
475	149.9	0.001090	0.39336	631.36	1,927.6	2,559.0	631.88	2,113.9	2,745.8	1.8411	4.9967	6.8378
500	151.8	0.001093	0.37480	639.64	1,921.1	2,560.7	640.19	2,107.9	2,748.1	1.8606	4.9600	6.8206
550	155.5	0.001097	0.34259	655.27	1,908.6	2,563.9	655.88	2,096.5	2,752.3	1.8972	4.8913	6.7885

ตารางที่ 5 ตารางความดันของน้ำอิ่มตัว (ต่อ)

Temp	Press.	Specific Volume		Specific Internal Energy			Specific Enthalpy			Specific Entropy		
<i>P</i>	<i>T</i>	<i>v_f</i>	<i>v_g</i>	<i>u_f</i>	<i>u_{fg}</i>	<i>u_g</i>	<i>h_f</i>	<i>h_{fg}</i>	<i>h_g</i>	<i>s_f</i>	<i>s_{fg}</i>	<i>s_g</i>
<i>kPa</i>	<i>°C</i>	<i>m³/kg</i>		<i>kJ/kg</i>			<i>kJ/kg</i>			<i>kJ/kg K</i>		
600	158.8	0.001101	0.31558	669.8	1,897.0	2,566.8	670.5	2,085.6	2,756.1	1.9311	4.8281	6.7592
650	162.0	0.001104	0.29258	683.5	1,885.9	2,569.4	684.2	2,075.4	2,759.6	1.9626	4.7695	6.7321
700	165.0	0.001108	0.27276	696.4	1,875.4	2,571.8	697.1	2,065.6	2,762.7	1.9921	4.7149	6.7070
750	167.8	0.001111	0.25550	708.6	1,865.5	2,574.0	709.4	2,056.3	2,765.6	2.0198	4.6637	6.6835
800	170.4	0.001115	0.24033	720.1	1,855.9	2,576.0	721.0	2,047.3	2,768.3	2.0460	4.6156	6.6615
850	172.9	0.001118	0.22688	731.2	1,846.8	2,577.9	732.1	2,038.6	2,770.8	2.0708	4.5700	6.6408
900	175.4	0.001121	0.21487	741.7	1,837.9	2,579.7	742.7	2,030.3	2,773.0	2.0944	4.5268	6.6212
950	177.7	0.001124	0.20409	751.8	1,829.4	2,581.3	752.9	2,022.3	2,775.2	2.1169	4.4857	6.6027
1,000	179.9	0.001127	0.19435	761.6	1,821.2	2,582.8	762.7	2,014.4	2,777.1	2.1384	4.4465	6.5850
1,100	184.1	0.001133	0.17744	780.0	1,805.5	2,585.5	781.2	1,999.5	2,780.7	2.1789	4.3731	6.5520
1,200	188.0	0.001139	0.16325	797.1	1,790.7	2,587.9	798.5	1,985.3	2,783.8	2.2163	4.3054	6.5217
1,300	191.6	0.001144	0.15117	813.3	1,776.7	2,590.0	814.8	1,971.7	2,786.5	2.2512	4.2425	6.4936
1,400	195.0	0.001149	0.14077	828.5	1,763.3	2,591.8	830.1	1,958.8	2,788.9	2.2839	4.1836	6.4675
1,500	198.3	0.001154	0.13170	843.0	1,750.5	2,593.5	844.7	1,946.3	2,791.0	2.3147	4.1284	6.4431
1,750	205.7	0.001166	0.11343	876.3	1,720.5	2,596.8	878.3	1,917.0	2,795.3	2.3848	4.0030	6.3878
2,000	212.4	0.001177	0.09958	906.3	1,693.0	2,599.2	908.6	1,889.8	2,798.4	2.4470	3.8921	6.3392
2,250	218.4	0.001187	0.088712	933.7	1,667.3	2,601.0	936.3	1,864.2	2,800.6	2.5032	3.7924	6.2956
2,500	224.0	0.001197	0.079947	959.0	1,643.2	2,602.2	962.0	1,840.1	2,802.0	2.5544	3.7015	6.2560
2,750	229.1	0.001207	0.072724	982.6	1,620.3	2,602.9	985.9	1,817.0	2,802.9	2.6017	3.6179	6.2196
3,000	233.9	0.001217	0.066664	1,004.7	1,598.6	2,603.3	1,008.4	1,794.9	2,803.3	2.6456	3.5402	6.1858
3,250	238.3	0.001226	0.061505	1,025.6	1,577.7	2,603.3	1,029.6	1,773.6	2,803.2	2.6867	3.4675	6.1542
3,500	243	0.001235	0.057058	1,045.5	1,557.6	2,603.0	1,049.8	1,753.0	2,802.7	2.7254	3.3991	6.1245
3,750	247	0.001244	0.053184	1,064.3	1,538.2	2,602.5	1,069.0	1,733.0	2,802.0	2.7619	3.3345	6.0964
4,000	250	0.001253	0.049777	1,082.4	1,519.4	2,601.8	1,087.4	1,713.5	2,800.9	2.7967	3.2731	6.0697
5,000	264	0.001286	0.039446	1,148.1	1,448.9	2,597.0	1,154.5	1,639.7	2,794.2	2.9207	3.0530	5.9737
6,000	276	0.001319	0.032449	1,205.8	1,384.1	2,589.9	1,213.7	1,570.8	2,784.6	3.0274	2.8626	5.8901
7,000	286	0.001352	0.027380	1,258.0	1,322.9	2,580.9	1,267.4	1,505.1	2,772.6	3.1220	2.6926	5.8146
8,000	295	0.001385	0.023528	1,306.0	1,264.4	2,570.4	1,317.1	1,441.5	2,758.6	3.2077	2.5372	5.7448
9,000	303	0.001418	0.020493	1,350.9	1,207.6	2,558.4	1,363.7	1,379.2	2,742.9	3.2866	2.3924	5.6790
10,000	311	0.001453	0.018034	1,393.3	1,151.8	2,545.1	1,407.9	1,317.6	2,725.5	3.3603	2.2556	5.6159
11,000	318	0.001489	0.015994	1,433.9	1,096.6	2,530.5	1,450.3	1,256.1	2,706.4	3.4300	2.1246	5.5545
12,000	325	0.001526	0.014269	1,473.0	1,041.3	2,514.4	1,491.3	1,194.3	2,685.6	3.4965	1.9977	5.4941
13,000	331	0.001566	0.012785	1,511.0	985.6	2,496.7	1,531.4	1,131.5	2,662.9	3.5606	1.8733	5.4339
14,000	337	0.001610	0.011489	1,548.3	928.9	2,477.2	1,570.9	1,067.2	2,638.1	3.6230	1.7500	5.3730
15,000	342	0.001657	0.010340	1,585.3	870.5	2,455.8	1,610.2	1,000.7	2,610.9	3.6844	1.6264	5.3108
16,000	347	0.001710	0.009308	1,622.3	809.6	2,431.9	1,649.7	931.1	2,580.8	3.7457	1.5006	5.2463
17,000	352	0.001769	0.008369	1,660.0	745.2	2,405.1	1,690.0	857.4	2,547.4	3.8077	1.3708	5.1785
18,000	357	0.001840	0.007499	1,698.9	675.6	2,374.5	1,732.0	777.5	2,509.5	3.8717	1.2338	5.1055
19,000	361	0.001925	0.006673	1,740.3	598.3	2,338.6	1,776.9	688.5	2,465.4	3.9396	1.0850	5.0246
20,000	366	0.002039	0.005858	1,786.3	507.9	2,294.2	1,827.1	584.3	2,411.4	4.0154	0.9145	4.9299
21,000	370	0.002212	0.004987	1,843.0	389.8	2,232.8	1,889.4	448.1	2,337.5	4.1093	0.6969	4.8062
22,000	374	0.002750	0.003578	1,961.4	124.3	2,085.7	2,021.9	142.5	2,164.5	4.3109	0.2204	4.5312
22,064	373.95	0.003106	0.003106	2,015.7	-	2,015.7	2,084.3	-	2,084.3	4.4070	-	4.4070

ตารางที่ 6 คุณสมบัติไอငของน้ำ ณ อุณหภูมิและความดันต่างๆ

P = 10 kPa Tsat = 45.81 °C					P = 20 kPa Tsat = 60.06 °C					P = 30 kPa Tsat = 69.10 °C				
T	v	u	h	s	T	v	u	h	s	T	v	u	h	s
°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K
sat	14.671	2,437.2	2,583.9	8.1489	sat	7.6482	2,456.0	2,608.9	8.1489	sat	5.2286	2,467.7	2,624.6	7.7675
50	14.867	2,443.3	2,592.0	8.1741										
75	16.035	2,479.5	2,639.8	8.3167	75	8.0004	2,478.0	2,638.0	7.9926	75	5.3221	2,476.5	2,636.2	7.8012
100	17.197	2,515.5	2,687.4	8.4488	100	8.5857	2,514.5	2,686.2	8.1262	100	5.7153	2,513.5	2,684.9	7.9364
150	19.514	2,587.9	2,783.0	8.6892	150	9.7488	2,587.3	2,782.3	8.3680	150	6.4939	2,586.8	2,781.6	8.1796
200	21.826	2,661.3	2,879.6	8.9048	200	10.907	2,661.0	2,879.1	8.5842	200	7.2679	2,660.6	2,878.7	8.3964
250	24.136	2,736.1	2,977.4	9.1014	250	12.064	2,735.8	2,977.1	8.7811	250	8.0400	2,735.6	2,976.8	8.5935
300	26.446	2,812.3	3,076.7	9.2827	300	13.220	2,812.1	3,076.5	8.9624	300	8.8111	2,811.9	3,076.2	8.7750
350	28.755	2,890.0	3,177.5	9.4513	350	14.375	2,889.9	3,177.4	9.1311	350	9.5816	2,889.7	3,177.2	8.9438
400	31.064	2,969.3	3,279.9	9.6093	400	15.530	2,969.2	3,279.8	9.2892	400	10.352	2,969.1	3,279.6	9.1019
450	33.372	3,050.2	3,384.0	9.7584	450	16.684	3,050.1	3,383.8	9.4383	450	11.122	3,050.1	3,383.7	9.2511
500	35.680	3,132.9	3,489.7	9.8997	500	17.839	3,132.8	3,489.6	9.5797	500	11.892	3,132.7	3,489.5	9.3925
550	37.988	3,217.2	3,597.1	10.034	550	18.993	3,217.1	3,597.0	9.7143	550	12.661	3,217.1	3,596.9	9.5271
600	40.296	3,303.3	3,706.3	10.163	600	20.147	3,303.2	3,706.2	9.8431	600	13.431	3,303.2	3,706.1	9.6559
650	42.604	3,391.2	3,817.2	10.287	650	21.301	3,391.1	3,817.1	9.9666	650	14.200	3,391.1	3,817.1	9.7795
700	44.912	3,480.8	3,929.9	10.405	700	22.455	3,480.7	3,929.8	10.086	700	14.970	3,480.7	3,929.8	9.8984
750	47.220	3,572.2	4,044.4	10.520	750	23.609	3,572.1	4,044.3	10.200	750	15.739	3,572.1	4,044.3	10.013
800	49.528	3,665.3	4,160.6	10.631	800	24.763	3,665.3	4,160.6	10.311	800	16.509	3,665.3	4,160.5	10.124
850	51.836	3,760.3	4,278.7	10.739	850	25.917	3,760.3	4,278.6	10.419	850	17.278	3,760.2	4,278.6	10.232
900	54.143	3,856.9	4,398.4	10.843	900	27.071	3,856.9	4,398.3	10.523	900	18.047	3,856.9	4,398.3	10.336
950	56.451	3,955.3	4,519.8	10.944	950	28.225	3,955.2	4,519.7	10.624	950	18.817	3,955.2	4,519.7	10.437
1,000	58.759	4,055.2	4,642.8	11.043	1,000	29.379	4,055.2	4,642.8	10.723	1,000	19.586	4,055.2	4,642.7	10.536
1,050	61.067	4,156.8	4,767.4	11.139	1,050	30.533	4,156.8	4,767.4	10.819	1,050	20.355	4,156.7	4,767.4	10.632
1,100	63.374	4,259.9	4,893.7	11.232	1,100	31.687	4,259.9	4,893.7	10.913	1,100	21.125	4,259.9	4,893.6	10.725
1,150	65.682	4,364.6	5,021.4	11.324	1,150	32.841	4,364.6	5,021.4	11.004	1,150	21.894	4,364.6	5,021.4	10.817
1,200	67.990	4,470.8	5,150.7	11.413	1,200	33.995	4,470.8	5,150.6	11.093	1,200	22.663	4,470.7	5,150.6	10.906

P = 40 kPa Tsat = 75.86 °C					P = 50 kPa Tsat = 81.32 °C					P = 75 kPa Tsat = 91.76 °C				
T	v	u	h	s	T	v	u	h	s	T	v	u	h	s
°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K
sat	3.9931	2,476.3	2,636.1	7.6690	sat	3.2401	2,483.2	2,645.2	7.6690	sat	2.2171	2,496.1	2,662.4	7.4557
100	4.2800	2,512.5	2,683.7	7.8009	100	3.4188	2,511.5	2,682.4	7.6952	100	2.2704	2,508.9	2,679.1	7.5011
150	4.8664	2,586.3	2,780.9	8.0455	150	3.8899	2,585.7	2,780.2	7.9412	150	2.5878	2,584.3	2,778.4	7.7508
200	5.4481	2,660.3	2,878.2	8.2629	200	4.3563	2,660.0	2,877.8	8.1591	200	2.9004	2,659.1	2,876.6	7.9702
250	6.0279	2,735.4	2,976.5	8.4602	250	4.8207	2,735.1	2,976.2	8.3568	250	3.2110	2,734.5	2,975.3	8.1685
300	6.6067	2,811.7	3,076.0	8.6419	300	5.2841	2,811.6	3,075.8	8.5386	300	3.5206	2,811.1	3,075.2	8.3507
350	7.1850	2,889.6	3,177.0	8.8108	350	5.7470	2,889.4	3,176.8	8.7076	350	3.8296	2,889.1	3,176.3	8.5199
400	7.7629	2,969.0	3,279.5	8.9690	400	6.2095	2,968.8	3,279.3	8.8658	400	4.1383	2,968.6	3,278.9	8.6783
450	8.3405	3,050.0	3,383.6	9.1182	450	6.6718	3,049.9	3,383.5	9.0150	450	4.4467	3,049.6	3,383.1	8.8276
500	8.9180	3,132.6	3,489.4	9.2596	500	7.1339	3,132.6	3,489.2	9.1565	500	4.7550	3,132.4	3,489.0	8.9691
550	9.4954	3,217.0	3,596.8	9.3943	550	7.5959	3,216.9	3,596.7	9.2912	550	5.0632	3,216.8	3,596.5	9.1039
600	10.073	3,303.1	3,706.0	9.5231	600	8.0578	3,303.1	3,706.0	9.4200	600	5.3712	3,302.9	3,705.8	9.2327
650	10.650	3,391.0	3,817.0	9.6466	650	8.5196	3,391.0	3,816.9	9.5436	650	5.6792	3,390.8	3,816.8	9.3563
700	11.227	3,480.7	3,929.7	9.7655	700	8.9814	3,480.6	3,929.7	9.6625	700	5.9872	3,480.5	3,929.5	9.4753
750	11.804	3,572.1	4,044.2	9.8803	750	9.4431	3,572.0	4,044.2	9.7772	750	6.2950	3,571.9	4,044.0	9.5900
800	12.381	3,665.2	4,160.5	9.9912	800	9.9048	3,665.2	4,160.4	9.8882	800	6.6029	3,665.1	4,160.3	9.7010
850	12.958	3,760.2	4,278.6	10.099	850	10.367	3,760.2	4,278.5	9.9957	850	6.9108	3,760.1	4,278.4	9.8085
900	13.535	3,856.9	4,398.3	10.203	900	10.828	3,856.8	4,398.2	10.100	900	7.2186	3,856.8	4,398.1	9.9128
950	14.112	3,955.2	4,519.7	10.304	950	11.290	3,955.1	4,519.6	10.201	950	7.5264	3,955.1	4,519.6	10.014
1,000	14.689	4,055.1	4,642.7	10.403	1,000	11.751	4,055.1	4,642.7	10.300	1,000	7.8342	4,055.0	4,642.6	10.113
1,050	15.266	4,156.7	4,767.4	10.499	1,050	12.213	4,156.7	4,767.3	10.396	1,050	8.142	4,156.6	4,767.3	10.209
1,100	15.843	4,259.9	4,893.6	10.593	1,100	12.675	4,259.8	4,893.6	10.490	1,100	8.450	4,259.8	4,893.5	10.302
1,150	16.420	4,364.6	5,021.4	10.684	1,150	13.136	4,364.5	5,021.3	10.581	1,150	8.757	4,364.5	5,021.3	10.394
1,200	16.997	4,470.7	5,150.6	10.773	1,200	13.598	4,470.7	5,150.6	10.670	1,200	9.065	4,470.6	5,150.5	10.483

ตารางที่ 6 คุณสมบัติไอငของน้ำ ณ อุณหภูมิและความดันต่างๆ (ต่อ)

P = 100 kPa Ts _{sat} = 99.61 °C					P = 200 kPa Ts _{sat} = 120.21 °C					P = 300 kPa Ts _{sat} = 133.53 °C				
T	v	u	h	s	T	v	u	h	s	T	v	u	h	s
°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K
sat	1.694	2,505.5	2,674.9	7.3588	sat	0.8857	2,529.1	2,706.2	7.3588	sat	0.6058	2,543.2	2,724.9	6.9916
100	1.6960	2,506.2	2,675.8	7.3610										
150	1.9367	2,582.9	2,776.6	7.6147	150	0.9599	2,577.1	2,769.1	7.2809	150	0.6340	2,571.0	2,761.2	7.0791
200	2.1725	2,658.2	2,875.5	7.8356	200	1.0805	2,654.7	2,870.8	7.5081	200	0.7164	2,651.0	2,866.0	7.3132
250	2.4062	2,733.9	2,974.5	8.0346	250	1.1989	2,731.5	2,971.3	7.7100	250	0.7965	2,729.0	2,967.9	7.5181
300	2.6389	2,810.7	3,074.5	8.2171	300	1.3162	2,808.8	3,072.1	7.8940	300	0.8753	2,807.0	3,069.6	7.7037
350	2.8710	2,888.7	3,175.8	8.3865	350	1.4330	2,887.3	3,173.9	8.0643	350	0.9536	2,885.9	3,172.0	7.8749
400	3.1027	2,968.3	3,278.5	8.5451	400	1.5493	2,967.1	3,277.0	8.2235	400	1.0315	2,966.0	3,275.4	8.0346
450	3.3342	3,049.4	3,382.8	8.6945	450	1.6655	3,048.4	3,381.5	8.3733	450	1.1092	3,047.5	3,380.2	8.1848
500	3.5656	3,132.2	3,488.7	8.8361	500	1.7814	3,131.3	3,487.6	8.5151	500	1.1867	3,130.5	3,486.6	8.3269
550	3.7968	3,216.6	3,596.3	8.9709	550	1.8973	3,215.9	3,595.4	8.6501	550	1.2641	3,215.2	3,594.5	8.4622
600	4.0279	3,302.8	3,705.6	9.0998	600	2.0130	3,302.2	3,704.8	8.7792	600	1.3414	3,301.6	3,704.0	8.5914
650	4.2590	3,390.7	3,816.6	9.2234	650	2.1287	3,390.2	3,815.9	8.9029	650	1.4186	3,389.7	3,815.3	8.7152
700	4.4900	3,480.4	3,929.4	9.3424	700	2.2444	3,479.9	3,928.8	9.0220	700	1.4958	3,479.5	3,928.2	8.8344
750	4.7210	3,571.8	4,043.9	9.4571	750	2.3600	3,571.4	4,043.4	9.1368	750	1.5729	3,571.0	4,042.9	8.9493
800	4.9520	3,665.0	4,160.2	9.5681	800	2.4755	3,664.7	4,159.8	9.2479	800	1.6500	3,664.3	4,159.3	9.0604
850	5.1829	3,760.0	4,278.3	9.6757	850	2.5911	3,759.7	4,277.9	9.3555	850	1.7271	3,759.4	4,277.5	9.1680
900	5.4138	3,856.7	4,398.1	9.7800	900	2.7066	3,856.4	4,397.7	9.4598	900	1.8042	3,856.1	4,397.3	9.2724
950	5.6447	3,955.0	4,519.5	9.8813	950	2.8221	3,954.7	4,519.1	9.5612	950	1.8812	3,954.5	4,518.8	9.3738
1,000	5.8755	4,055.0	4,642.5	9.9799	1,000	2.9376	4,054.7	4,642.2	9.6598	1,000	1.9583	4,054.5	4,642.0	9.4725
1,050	6.1064	4,156.6	4,767.2	10.076	1,050	3.0531	4,156.3	4,766.9	9.7559	1,050	2.0353	4,156.1	4,766.7	9.5686
1,100	6.3372	4,259.7	4,893.5	10.170	1,100	3.1685	4,259.5	4,893.2	9.8496	1,100	2.1123	4,259.3	4,893.0	9.6623
1,150	6.5681	4,364.4	5,021.2	10.261	1,150	3.2840	4,364.2	5,021.0	9.9410	1,150	2.1893	4,364.0	5,020.8	9.7537
1,200	6.7989	4,470.6	5,150.5	10.350	1,200	3.3994	4,470.4	5,150.3	10.030	1,200	2.2663	4,470.2	5,150.1	9.8430

P = 400 kPa Ts _{sat} = 143.61 °C					P = 500 kPa Ts _{sat} = 151.84 °C					P = 600 kPa Ts _{sat} = 158.83 °C				
T	v	u	h	s	T	v	u	h	s	T	v	u	h	s
°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K
sat	0.4624	2,553.1	2,738.1	6.8954	sat	0.3748	2,560.7	2,748.1	6.8954	sat	0.3156	2,566.8	2,756.1	6.7592
150	0.4709	2,564.4	2,752.8	6.9305										
200	0.5343	2,647.3	2,861.0	7.1724	200	0.4250	2,643.4	2,855.9	7.0611	200	0.3521	2,639.4	2,850.7	6.9684
250	0.5952	2,726.5	2,964.6	7.3805	250	0.4744	2,723.9	2,961.1	7.2726	250	0.3939	2,721.3	2,957.7	7.1834
300	0.6549	2,805.2	3,067.1	7.5677	300	0.5226	2,803.3	3,064.6	7.4614	300	0.4344	2,801.4	3,062.1	7.3740
350	0.7139	2,884.4	3,170.0	7.7398	350	0.5701	2,883.0	3,168.1	7.6345	350	0.4743	2,881.5	3,166.1	7.5480
400	0.7726	2,964.8	3,273.9	7.9001	400	0.6173	2,963.6	3,272.3	7.7954	400	0.5137	2,962.5	3,270.7	7.7095
450	0.8311	3,046.5	3,379.0	8.0507	450	0.6642	3,045.6	3,377.7	7.9464	450	0.5530	3,044.6	3,376.4	7.8609
500	0.8894	3,129.7	3,485.5	8.1931	500	0.7109	3,128.9	3,484.4	8.0891	500	0.5920	3,128.1	3,483.3	8.0039
550	0.9475	3,214.5	3,593.6	8.3286	550	0.7576	3,213.9	3,592.6	8.2247	550	0.6309	3,213.2	3,591.7	8.1398
600	1.0056	3,301.0	3,703.2	8.4579	600	0.8041	3,300.4	3,702.5	8.3543	600	0.6698	3,299.8	3,701.7	8.2694
650	1.0636	3,389.2	3,814.6	8.5819	650	0.8506	3,388.6	3,813.9	8.4784	650	0.7085	3,388.1	3,813.2	8.3937
700	1.1215	3,479.0	3,927.6	8.7012	700	0.8970	3,478.6	3,927.0	8.5977	700	0.7473	3,478.1	3,926.5	8.5131
750	1.1794	3,570.6	4,042.4	8.8161	750	0.9433	3,570.2	4,041.9	8.7128	750	0.7859	3,569.8	4,041.4	8.6282
800	1.2373	3,663.9	4,158.9	8.9273	800	0.9897	3,663.6	4,158.4	8.8240	800	0.8246	3,663.2	4,157.9	8.7395
850	1.2952	3,759.0	4,277.1	9.0350	850	1.0360	3,758.7	4,276.7	8.9317	850	0.8632	3,758.4	4,276.3	8.8472
900	1.3530	3,855.8	4,397.0	9.1394	900	1.0823	3,855.5	4,396.6	9.0361	900	0.9018	3,855.2	4,396.2	8.9517
950	1.4108	3,954.2	4,518.5	9.2408	950	1.1285	3,953.9	4,518.2	9.1376	950	0.9404	3,953.6	4,517.8	9.0532
1,000	1.4686	4,054.2	4,641.7	9.3395	1,000	1.1748	4,054.0	4,641.4	9.2363	1,000	0.9789	4,053.7	4,641.1	9.1520
1,050	1.5264	4,155.9	4,766.4	9.4356	1,050	1.2211	4,155.6	4,766.2	9.3325	1,050	1.0175	4,155.4	4,765.9	9.2481
1,100	1.5842	4,259.1	4,892.8	9.5293	1,100	1.2673	4,258.9	4,892.5	9.4262	1,100	1.0560	4,258.7	4,892.3	9.3419
1,150	1.6419	4,363.8	5,020.6	9.6208	1,150	1.3135	4,363.6	5,020.4	9.5176	1,150	1.0946	4,363.4	5,020.2	9.4334
1,200	1.6997	4,470.0	5,149.9	9.7101	1,200	1.3597	4,469.9	5,149.7	9.6070	1,200	1.1331	4,469.7	5,149.5	9.5227

ตารางที่ 6 คุณสมบัติไอငของน้ำ ณ อุณหภูมิและความดันต่างๆ (ต่อ)

P = 700 kPa Ts _{sat} = 164.95 °C					P = 800 kPa Ts _{sat} = 170.41 °C					P = 900 kPa Ts _{sat} = 175.36 °C				
T	v	u	h	s	T	v	u	h	s	T	v	u	h	s
°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K
sat	0.2728	2,571.8	2,762.7	6.7070	sat	0.2403	2,576.0	2,768.3	6.7070	sat	0.2149	2,579.7	2,773.0	6.6212
200	0.3000	2,635.3	2,845.3	6.8884	200	0.2609	2,631.1	2,839.8	6.8176	200	0.2304	2,626.7	2,834.1	6.7538
250	0.3364	2,718.7	2,954.1	7.1071	250	0.2932	2,716.0	2,950.5	7.0403	250	0.2596	2,713.3	2,946.9	6.9806
300	0.3714	2,799.5	3,059.5	7.2995	300	0.3242	2,797.6	3,056.9	7.2345	300	0.2874	2,795.7	3,054.3	7.1768
350	0.4058	2,880.1	3,164.1	7.4745	350	0.3544	2,878.6	3,162.2	7.4106	350	0.3145	2,877.2	3,160.2	7.3538
400	0.4398	2,961.3	3,269.1	7.6366	400	0.3843	2,960.1	3,267.6	7.5733	400	0.3411	2,959.0	3,266.0	7.5172
450	0.4735	3,043.6	3,375.1	7.7884	450	0.4139	3,042.7	3,373.8	7.7255	450	0.3675	3,041.7	3,372.5	7.6698
500	0.5070	3,127.3	3,482.3	7.9317	500	0.4433	3,126.5	3,481.2	7.8690	500	0.3938	3,125.7	3,480.1	7.8136
550	0.5405	3,212.5	3,590.8	8.0678	550	0.4726	3,211.8	3,589.9	8.0053	550	0.4199	3,211.1	3,589.0	7.9501
600	0.5738	3,299.2	3,700.9	8.1976	600	0.5019	3,298.6	3,700.1	8.1353	600	0.4459	3,298.0	3,699.3	8.0803
650	0.6071	3,387.6	3,812.6	8.3220	650	0.5310	3,387.1	3,811.9	8.2598	650	0.4718	3,386.6	3,811.2	8.2049
700	0.6403	3,477.7	3,925.9	8.4415	700	0.5601	3,477.2	3,925.3	8.3794	700	0.4977	3,476.7	3,924.7	8.3246
750	0.6735	3,569.4	4,040.8	8.5567	750	0.5892	3,569.0	4,040.3	8.4947	750	0.5236	3,568.6	4,039.8	8.4399
800	0.7066	3,662.8	4,157.5	8.6680	800	0.6182	3,662.5	4,157.0	8.6060	800	0.5494	3,662.1	4,156.6	8.5513
850	0.7398	3,758.0	4,275.9	8.7758	850	0.6472	3,757.7	4,275.5	8.7139	850	0.5752	3,757.4	4,275.1	8.6592
900	0.7729	3,854.9	4,395.9	8.8803	900	0.6762	3,854.6	4,395.5	8.8184	900	0.6010	3,854.3	4,395.2	8.7638
950	0.8060	3,953.3	4,517.5	8.9819	950	0.7052	3,953.1	4,517.2	8.9200	950	0.6268	3,952.8	4,516.9	8.8654
1,000	0.8390	4,053.5	4,640.8	9.0806	1,000	0.7341	4,053.2	4,640.5	9.0188	1,000	0.6525	4,052.9	4,640.2	8.9642
1,050	0.8721	4,155.2	4,765.6	9.1768	1,050	0.7631	4,154.9	4,765.4	9.1150	1,050	0.6782	4,154.7	4,765.1	9.0605
1,100	0.9051	4,258.4	4,892.0	9.2706	1,100	0.7920	4,258.2	4,891.8	9.2088	1,100	0.7040	4,258.0	4,891.6	9.1543
1,150	0.9382	4,363.2	5,020.0	9.3621	1,150	0.8209	4,363.0	5,019.7	9.3003	1,150	0.7297	4,362.8	5,019.5	9.2458
1,200	0.9712	4,469.5	5,149.3	9.4514	1,200	0.8498	4,469.3	5,149.1	9.3897	1,200	0.7554	4,469.1	5,149.0	9.3352

P = 1.00 MPa Ts _{sat} = 179.89 °C					P = 1.20 MPa Ts _{sat} = 187.96 °C					P = 1.40 MPa Ts _{sat} = 195.05 °C				
T	v	u	h	s	T	v	u	h	s	T	v	u	h	s
°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K
sat	0.1943	2,582.8	2,777.1	6.5850	sat	0.1632	2,587.9	2,783.8	6.5850	sat	0.1408	2,591.8	2,788.9	6.5850
200	0.2060	2,622.3	2,828.3	6.6955	200	0.1693	2,612.9	2,816.1	6.5908	200	0.1430	2,602.8	2,803.0	6.4975
250	0.2327	2,710.5	2,943.2	6.9266	250	0.1924	2,704.8	2,935.7	6.8314	250	0.1635	2,699.0	2,927.9	6.7488
300	0.2580	2,793.7	3,051.7	7.1247	300	0.2139	2,789.8	3,046.4	7.0336	300	0.1823	2,785.8	3,041.0	6.9553
350	0.2825	2,875.7	3,158.2	7.3028	350	0.2345	2,872.7	3,154.1	7.2138	350	0.2003	2,869.7	3,150.1	7.1378
400	0.3066	2,957.8	3,264.4	7.4668	400	0.2548	2,955.4	3,261.2	7.3791	400	0.2178	2,953.0	3,258.0	7.3044
450	0.3304	3,040.8	3,371.2	7.6198	450	0.2748	3,038.8	3,368.6	7.5330	450	0.2351	3,036.9	3,366.0	7.4591
500	0.3541	3,124.9	3,479.0	7.7640	500	0.2946	3,123.3	3,476.8	7.6777	500	0.2522	3,121.6	3,474.7	7.6045
550	0.3777	3,210.4	3,588.1	7.9007	550	0.3143	3,209.0	3,586.2	7.8148	550	0.2691	3,207.7	3,584.4	7.7420
600	0.4011	3,297.4	3,698.6	8.0309	600	0.3339	3,296.3	3,697.0	7.9454	600	0.2860	3,295.1	3,695.4	7.8729
650	0.4245	3,386.1	3,810.5	8.1557	650	0.3535	3,385.0	3,809.2	8.0704	650	0.3028	3,384.0	3,807.8	7.9981
700	0.4478	3,476.3	3,924.1	8.2755	700	0.3730	3,475.4	3,922.9	8.1904	700	0.3195	3,474.5	3,921.8	8.1183
750	0.4711	3,568.2	4,039.3	8.3909	750	0.3924	3,567.4	4,038.3	8.3059	750	0.3362	3,566.6	4,037.2	8.2340
800	0.4944	3,661.8	4,156.1	8.5024	800	0.4118	3,661.0	4,155.2	8.4175	800	0.3529	3,660.3	4,154.3	8.3457
850	0.5176	3,757.0	4,274.7	8.6103	850	0.4312	3,756.4	4,273.9	8.5256	850	0.3695	3,755.7	4,273.0	8.4538
900	0.5408	3,854.0	4,394.8	8.7149	900	0.4506	3,853.4	4,394.1	8.6303	900	0.3861	3,852.8	4,393.3	8.5586
950	0.5640	3,952.5	4,516.5	8.8166	950	0.4699	3,952.0	4,515.9	8.7320	950	0.4027	3,951.4	4,515.2	8.6604
1,000	0.5872	4,052.7	4,639.9	8.9154	1,000	0.4893	4,052.2	4,639.3	8.8309	1,000	0.4193	4,051.7	4,638.7	8.7593
1,050	0.6104	4,154.5	4,764.8	9.0117	1,050	0.5086	4,154.0	4,764.3	8.9272	1,050	0.4359	4,153.5	4,763.8	8.8557
1,100	0.6335	4,257.8	4,891.3	9.1055	1,100	0.5279	4,257.3	4,890.9	9.0210	1,100	0.4525	4,256.9	4,890.4	8.9496
1,150	0.6567	4,362.6	5,019.3	9.1970	1,150	0.5472	4,362.2	5,018.9	9.1126	1,150	0.4690	4,361.8	5,018.5	9.0412
1,200	0.6798	4,468.9	5,148.8	9.2864	1,200	0.5665	4,468.5	5,148.4	9.2020	1,200	0.4856	4,468.2	5,148.0	9.1306

P = 3.0 MPa Ts _{sat} = 233.86 °C					P = 4.0 MPa Ts _{sat} = 250.36 °C					P = 5.0 MPa Ts _{sat} = 263.94 °C				
<i>T</i>	<i>v</i>	<i>u</i>	<i>h</i>	<i>s</i>	<i>T</i>	<i>v</i>	<i>u</i>	<i>h</i>	<i>s</i>	<i>T</i>	<i>v</i>	<i>u</i>	<i>h</i>	<i>s</i>
°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K
sat	0.0667	2,603.3	2,803.3	6.1858	sat	0.0498	2,601.8	2,800.9	6.1858	sat	0.0394	2,597.0	2,794.2	6.1858
250	0.0706	2,644.7	2,856.5	6.2893										
300	0.0812	2,750.8	2,994.3	6.5412	300	0.0589	2,726.2	2,961.7	6.3638	300	0.0453	2,698.9	2,925.6	6.2109
350	0.0906	2,844.4	3,116.1	6.7449	350	0.0665	2,827.4	3,093.3	6.5843	350	0.0520	2,809.4	3,069.3	6.4515
400	0.0994	2,933.4	3,231.6	6.9233	400	0.0734	2,920.6	3,214.4	6.7712	400	0.0578	2,907.4	3,196.6	6.6481
450	0.1079	3,021.0	3,344.7	7.0853	450	0.0800	3,010.8	3,331.0	6.9383	450	0.0633	3,000.4	3,317.0	6.8208
500	0.1162	3,108.5	3,457.0	7.2356	500	0.0864	3,100.1	3,445.8	7.0919	500	0.0686	3,091.6	3,434.5	6.9778
550	0.1244	3,196.5	3,569.6	7.3767	550	0.0927	3,189.4	3,560.2	7.2353	550	0.0737	3,182.3	3,550.8	7.1235
600	0.1324	3,285.5	3,682.8	7.5102	600	0.0989	3,279.4	3,674.8	7.3704	600	0.0787	3,273.3	3,666.8	7.2604
650	0.1405	3,375.6	3,797.0	7.6373	650	0.1049	3,370.4	3,790.2	7.4989	650	0.0836	3,365.1	3,783.3	7.3901
700	0.1484	3,467.1	3,912.3	7.7590	700	0.1110	3,462.5	3,906.4	7.6215	700	0.0885	3,457.9	3,900.5	7.5137
750	0.1563	3,560.1	4,029.0	7.8759	750	0.1170	3,556.0	4,023.8	7.7391	750	0.0933	3,551.8	4,018.6	7.6321
800	0.1642	3,654.5	4,147.0	7.9885	800	0.1229	3,650.8	4,142.5	7.8523	800	0.0982	3,647.1	4,137.9	7.7459
850	0.1720	3,750.4	4,266.5	8.0974	850	0.1288	3,747.1	4,262.5	7.9616	850	0.1029	3,743.7	4,258.4	7.8557
900	0.1799	3,847.9	4,387.5	8.2027	900	0.1348	3,844.9	4,383.9	8.0674	900	0.1077	3,841.8	4,380.2	7.9618
950	0.1877	3,947.0	4,510.0	8.3050	950	0.1406	3,944.2	4,506.8	8.1699	950	0.1124	3,941.4	4,503.5	8.0647
1,000	0.1955	4,047.6	4,634.0	8.4044	1,000	0.1465	4,045.0	4,631.1	8.2696	1,000	0.1171	4,042.5	4,628.2	8.1646
1,050	0.2033	4,149.8	4,759.6	8.5011	1,050	0.1524	4,147.4	4,756.9	8.3665	1,050	0.1219	4,145.0	4,754.3	8.2618
1,100	0.2110	4,253.4	4,886.6	8.5953	1,100	0.1582	4,251.3	4,884.2	8.4609	1,100	0.1266	4,249.1	4,881.8	8.3564
1,150	0.2188	4,358.6	5,015.0	8.6872	1,150	0.1641	4,356.6	5,012.9	8.5530	1,150	0.1312	4,354.6	5,010.8	8.4486
1,200	0.2266	4,465.2	5,144.9	8.7768	1,200	0.1699	4,463.3	5,143.0	8.6428	1,200	0.1359	4,461.4	5,141.0	8.5385

ตารางที่ 6 คุณสมบัติไอငของน้ำ ณ อุณหภูมิและความดันต่างๆ (ต่อ)

P = 6.0 MPa Ts _{sat} = 275.59 °C					P = 7.0 MPa Ts _{sat} = 285.83 °C					P = 8.0 MPa Ts _{sat} = 295.01 °C				
T	v	u	h	s	T	v	u	h	s	T	v	u	h	s
°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K
sat	0.0324	2,589.9	2,784.6	5.8901	sat	0.0274	2,580.9	2,772.6	5.8901	sat	0.0235	2,570.4	2,758.6	5.8901
300	0.0362	2,668.3	2,885.5	6.0702	300	0.0295	2,633.4	2,839.8	5.9335	300	0.0243	2,592.1	2,786.4	5.7935
350	0.0423	2,790.3	3,043.9	6.3356	350	0.0353	2,770.0	3,016.8	6.2303	350	0.0300	2,748.2	2,988.1	6.1319
400	0.0474	2,893.6	3,178.2	6.5431	400	0.0400	2,879.4	3,159.1	6.4501	400	0.0343	2,864.5	3,139.3	6.3657
450	0.0522	2,989.8	3,302.8	6.7216	450	0.0442	2,978.8	3,288.2	6.6351	450	0.0382	2,967.7	3,273.2	6.5577
500	0.0567	3,082.9	3,422.9	6.8824	500	0.0482	3,074.1	3,411.3	6.7997	500	0.0418	3,065.2	3,399.4	6.7264
550	0.0610	3,175.1	3,541.2	7.0306	550	0.0520	3,167.8	3,531.5	6.9505	550	0.0452	3,160.4	3,521.8	6.8798
600	0.0653	3,267.2	3,658.8	7.1692	600	0.0557	3,261.0	3,650.6	7.0909	600	0.0485	3,254.7	3,642.4	7.0221
650	0.0694	3,359.8	3,776.4	7.3002	650	0.0593	3,354.4	3,769.4	7.2232	650	0.0517	3,349.0	3,762.4	7.1557
700	0.0735	3,453.2	3,894.5	7.4248	700	0.0628	3,448.5	3,888.5	7.3488	700	0.0548	3,443.8	3,882.4	7.2823
750	0.0776	3,547.7	4,013.4	7.5439	750	0.0664	3,543.6	4,008.1	7.4687	750	0.0579	3,539.4	4,002.9	7.4030
800	0.0816	3,643.4	4,133.3	7.6583	800	0.0698	3,639.7	4,128.7	7.5837	800	0.0610	3,636.0	4,124.0	7.5186
850	0.0856	3,740.4	4,254.3	7.7685	850	0.0733	3,737.0	4,250.2	7.6944	850	0.0641	3,733.7	4,246.1	7.6298
900	0.0896	3,838.8	4,376.6	7.8751	900	0.0767	3,835.7	4,372.9	7.8013	900	0.0671	3,832.6	4,369.3	7.7371
950	0.0936	3,938.6	4,500.2	7.9783	950	0.0802	3,935.8	4,496.9	7.9048	950	0.0701	3,933.0	4,493.7	7.8409
1,000	0.0976	4,039.9	4,625.2	8.0784	1,000	0.0836	4,037.3	4,622.3	8.0053	1,000	0.0731	4,034.8	4,619.4	7.9416
1,050	0.1015	4,142.7	4,751.7	8.1758	1,050	0.0870	4,140.3	4,749.0	8.1029	1,050	0.0761	4,138.0	4,746.4	8.0395
1,100	0.1054	4,246.9	4,879.5	8.2706	1,100	0.0903	4,244.7	4,877.1	8.1979	1,100	0.0790	4,242.5	4,874.7	8.1347
1,150	0.1093	4,352.5	5,008.6	8.3630	1,150	0.0937	4,350.5	5,006.5	8.2905	1,150	0.0820	4,348.5	5,004.3	8.2274
1,200	0.1133	4,459.6	5,139.1	8.4531	1,200	0.0971	4,457.7	5,137.2	8.3807	1,200	0.0849	4,455.8	5,135.3	8.3178

P = 10.0 MPa Ts _{sat} = 311.00 °C					P = 12.5 MPa Ts _{sat} = 327.82 °C					P = 15.0 MPa Ts _{sat} = 342.16 °C				
T	v	u	h	s	T	v	u	h	s	T	v	u	h	s
°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K
sat	0.0180	2,545.1	2,725.5	5.6159	sat	0.0135	2,505.7	2,674.5	5.6159	sat	0.0103	2,455.8	2,610.9	5.6159
350	0.0224	2,699.5	2,924.0	5.9458	350	0.0161	2,624.7	2,826.5	5.7128	350	0.0115	2,520.8	2,693.0	5.4435
400	0.0264	2,833.0	3,097.4	6.2139	400	0.0200	2,789.5	3,039.9	6.0431	400	0.0157	2,740.5	2,975.5	5.8817
450	0.0298	2,944.4	3,242.3	6.4217	450	0.0230	2,913.6	3,201.4	6.2748	450	0.0185	2,880.7	3,157.8	6.1433
500	0.0328	3,046.9	3,375.1	6.5993	500	0.0256	3,023.2	3,343.6	6.4650	500	0.0208	2,998.4	3,310.8	6.3479
550	0.0357	3,145.4	3,501.9	6.7584	550	0.0280	3,126.1	3,476.5	6.6317	550	0.0229	3,106.3	3,450.5	6.5230
600	0.0384	3,242.1	3,625.8	6.9045	600	0.0303	3,226.0	3,604.8	6.7829	600	0.0249	3,209.5	3,583.3	6.6797
650	0.0410	3,338.2	3,748.3	7.0409	650	0.0325	3,324.4	3,730.5	6.9229	650	0.0268	3,310.4	3,712.4	6.8235
700	0.0436	3,434.3	3,870.3	7.1696	700	0.0346	3,422.3	3,855.0	7.0542	700	0.0286	3,410.2	3,839.5	6.9576
750	0.0461	3,531.0	3,992.3	7.2918	750	0.0367	3,520.4	3,979.0	7.1785	750	0.0304	3,509.8	3,965.6	7.0839
800	0.0486	3,628.5	4,114.7	7.4087	800	0.0387	3,619.1	4,103.1	7.2969	800	0.0321	3,609.6	4,091.3	7.2039

P = 17.5 MPa Ts _{sat} = 354.67 °C					P = 20.0 MPa Ts _{sat} = 365.75 °C					P = 22.0 MPa Ts _{sat} = 373.71 °C				
T	v	u	h	s	T	v	u	h	s	T	v	u	h	s
°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K
sat	0.0079	2,390.4	2,529.1	5.1428	sat	0.0059	2,294.2	2,411.4	5.1428	sat	0.0036	2,085.7	2,164.5	5.1428
400	0.0125	2,684.2	2,902.3	5.7209	400	0.0099	2,617.8	2,816.8	5.5525	400	0.0083	2,554.2	2,735.8	5.4050
450	0.0152	2,845.3	3,111.3	6.0210	450	0.0127	2,807.1	3,061.5	5.9041	450	0.0111	2,774.4	3,019.0	5.8124
500	0.0174	2,972.4	3,276.7	6.2423	500	0.0148	2,945.3	3,241.2	6.1445	500	0.0131	2,922.8	3,211.8	6.0704
550	0.0193	3,085.9	3,423.7	6.4266	550	0.0166	3,064.8	3,396.2	6.3390	550	0.0148	3,047.6	3,373.8	6.2736
600	0.0211	3,192.7	3,561.5	6.5891	600	0.0182	3,175.5	3,539.2	6.5077	600	0.0163	3,161.6	3,521.2	6.4475
650	0.0227	3,296.1	3,694.1	6.7369	650	0.0197	3,281.7	3,675.6	6.6596	650	0.0178	3,270.0	3,660.6	6.6029
700	0.0243	3,397.9	3,823.9	6.8738	700	0.0211	3,385.5	3,808.2	6.7994	700	0.0191	3,375.5	3,795.5	6.7451
750	0.0259	3,499.0	3,952.1	7.0023	750	0.0225	3,488.1	3,938.5	6.9301	750	0.0204	3,479.4	3,927.6	6.8776
800	0.0274	3,600.0	4,079.5	7.1239	800	0.0239	3,590.4	4,067.7	7.0534	800	0.0216	3,582.6	4,058.2	7.0022

ตารางที่ 6 คุณสมบัติไอငของน้ำ ณ อุณหภูมิและความดันต่างๆ (ต่อ)

P = 25 MPa					P = 30 MPa					P = 40 MPa				
T	v	u	h	s	T	v	u	h	s	T	v	u	h	s
^{°C}	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	^{°C}	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	^{°C}	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K
400	0.0060	2,428.6	2,578.7	5.1401	400	0.0028	2,068.8	2,152.8	4.4756	400	0.0019	1,854.8	1,931.2	4.1142
450	0.0092	2,721.0	2,950.4	5.6755	450	0.0067	2,618.8	2,820.9	5.4419	450	0.0037	2,364.0	2,511.6	4.9446
500	0.0111	2,887.4	3,165.9	5.9642	500	0.0087	2,824.1	3,084.8	5.7956	500	0.0056	2,681.7	2,906.7	5.4746
550	0.0127	3,020.9	3,339.3	6.1816	550	0.0102	2,974.6	3,279.8	6.0403	550	0.0070	2,875.2	3,154.6	5.7859
600	0.0141	3,140.2	3,493.7	6.3638	600	0.0114	3,103.5	3,446.9	6.2374	600	0.0081	3,026.9	3,350.4	6.0170
650	0.0154	3,252.2	3,638.0	6.5246	650	0.0126	3,222.0	3,599.7	6.4077	650	0.0091	3,159.6	3,521.8	6.2079
700	0.0166	3,360.3	3,776.4	6.6706	700	0.0137	3,334.6	3,744.2	6.5602	700	0.0099	3,282.2	3,679.4	6.3743
750	0.0178	3,466.2	3,911.2	6.8057	750	0.0147	3,443.9	3,883.8	6.7000	750	0.0107	3,398.8	3,828.8	6.5239
800	0.0189	3,570.9	4,044.0	6.9324	800	0.0156	3,551.4	4,020.2	6.8303	800	0.0115	3,511.9	3,972.8	6.6614

P = 50 MPa					P = 60 MPa					P = 80 MPa				
T	v	u	h	s	T	v	u	h	s	T	v	u	h	s
^{°C}	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	^{°C}	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	^{°C}	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K
400	0.0017	1,787.8	1,874.4	4.0029	400	0.0016	1,745.2	1,843.2	3.9316	400	0.0015	1,687.4	1,808.7	3.8338
450	0.0025	2,160.0	2,284.4	4.5892	450	0.0021	2,054.7	2,179.8	4.4134	450	0.0018	1,945.7	2,087.6	4.2331
500	0.0039	2,528.0	2,722.5	5.1759	500	0.0030	2,393.3	2,570.4	4.9357	500	0.0022	2,222.5	2,397.6	4.6475
550	0.0051	2,769.8	3,025.7	5.5566	550	0.0040	2,664.8	2,902.1	5.3519	550	0.0028	2,489.1	2,710.0	5.0391
600	0.0061	2,947.2	3,252.6	5.8245	600	0.0048	2,866.9	3,157.0	5.6528	600	0.0034	2,717.4	2,988.1	5.3674
650	0.0070	3,095.6	3,443.5	6.0372	650	0.0056	3,031.3	3,366.8	5.8867	650	0.0040	2,907.7	3,225.7	5.6321
700	0.0077	3,228.9	3,614.8	6.2180	700	0.0063	3,175.5	3,551.4	6.0815	700	0.0045	3,071.6	3,432.9	5.8509
750	0.0084	3,353.3	3,774.1	6.3777	750	0.0069	3,307.7	3,720.6	6.2512	750	0.0050	3,218.7	3,619.7	6.0382
800	0.0091	3,472.3	3,926.0	6.5226	800	0.0075	3,432.7	3,880.2	6.4034	800	0.0055	3,355.2	3,793.3	6.2039

ตารางที่ 7 คุณสมบัติของของเหลว ณ อุณหภูมิและความดันต่างๆ

P = 5 MPa Tsat = 263.9 °C					P = 6 MPa Tsat = 275.6 °C					P = 7 MPa Tsat = 285.8 °C				
T	v	u	h	s	T	v	u	h	s	T	v	u	h	s
°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K
5	0.00100	21.0	26.0	0.0761	5	0.00100	21.0	27.0	0.0761	5	0.00100	21.0	28.0	0.0761
10	0.00100	41.9	46.9	0.1506	10	0.00100	41.9	47.9	0.1505	10	0.00100	41.8	48.8	0.1504
15	0.00100	62.8	67.8	0.2237	15	0.00100	62.7	68.7	0.2235	15	0.00100	62.7	69.7	0.2234
20	0.00100	83.6	88.6	0.2955	20	0.00100	83.6	89.5	0.2952	20	0.00100	83.5	90.5	0.2950
25	0.00100	104.5	109.5	0.3660	25	0.00100	104.4	110.4	0.3657	25	0.00100	104.3	111.3	0.3654
30	0.00100	125.3	130.3	0.4353	30	0.00100	125.2	131.2	0.4350	30	0.00100	125.1	132.1	0.4346
35	0.00100	146.1	151.1	0.5034	35	0.00100	146.0	152.0	0.5031	35	0.00100	145.9	152.9	0.5027
40	0.00101	166.9	172.0	0.5705	40	0.00101	166.8	172.8	0.5701	40	0.00100	166.7	173.7	0.5697
45	0.00101	187.8	192.8	0.6365	45	0.00101	187.6	193.7	0.6361	45	0.00101	187.5	194.5	0.6356
50	0.00101	208.6	213.6	0.7015	50	0.00101	208.4	214.5	0.7010	50	0.00101	208.3	215.4	0.7006
100	0.00104	417.6	422.8	1.3032	100	0.00104	417.3	423.5	1.3024	100	0.00104	417.0	424.3	1.3017
125	0.00106	523.0	528.4	1.5770	125	0.00106	522.7	529.1	1.5761	125	0.00106	522.3	529.7	1.5752
150	0.00109	629.6	635.1	1.8369	150	0.00109	629.2	635.7	1.8358	150	0.00109	628.7	636.3	1.8347
175	0.00112	737.7	743.3	2.0855	175	0.00112	737.2	743.9	2.0842	175	0.00112	736.6	744.4	2.0829
200	0.00115	848.0	853.8	2.3254	200	0.00115	847.3	854.2	2.3238	200	0.00115	846.6	854.6	2.3223
225	0.00120	961.4	967.4	2.5593	225	0.00119	960.5	967.7	2.5574	225	0.00119	959.6	967.9	2.5555
250	0.00125	1,079.4	1,085.7	2.7909	250	0.00125	1,078.2	1,085.7	2.7885	250	0.00125	1,076.9	1,085.6	2.7861
					275	0.00132	1,202.8	1,210.7	3.0219	275	0.00131	1,201.0	1,210.2	3.0187

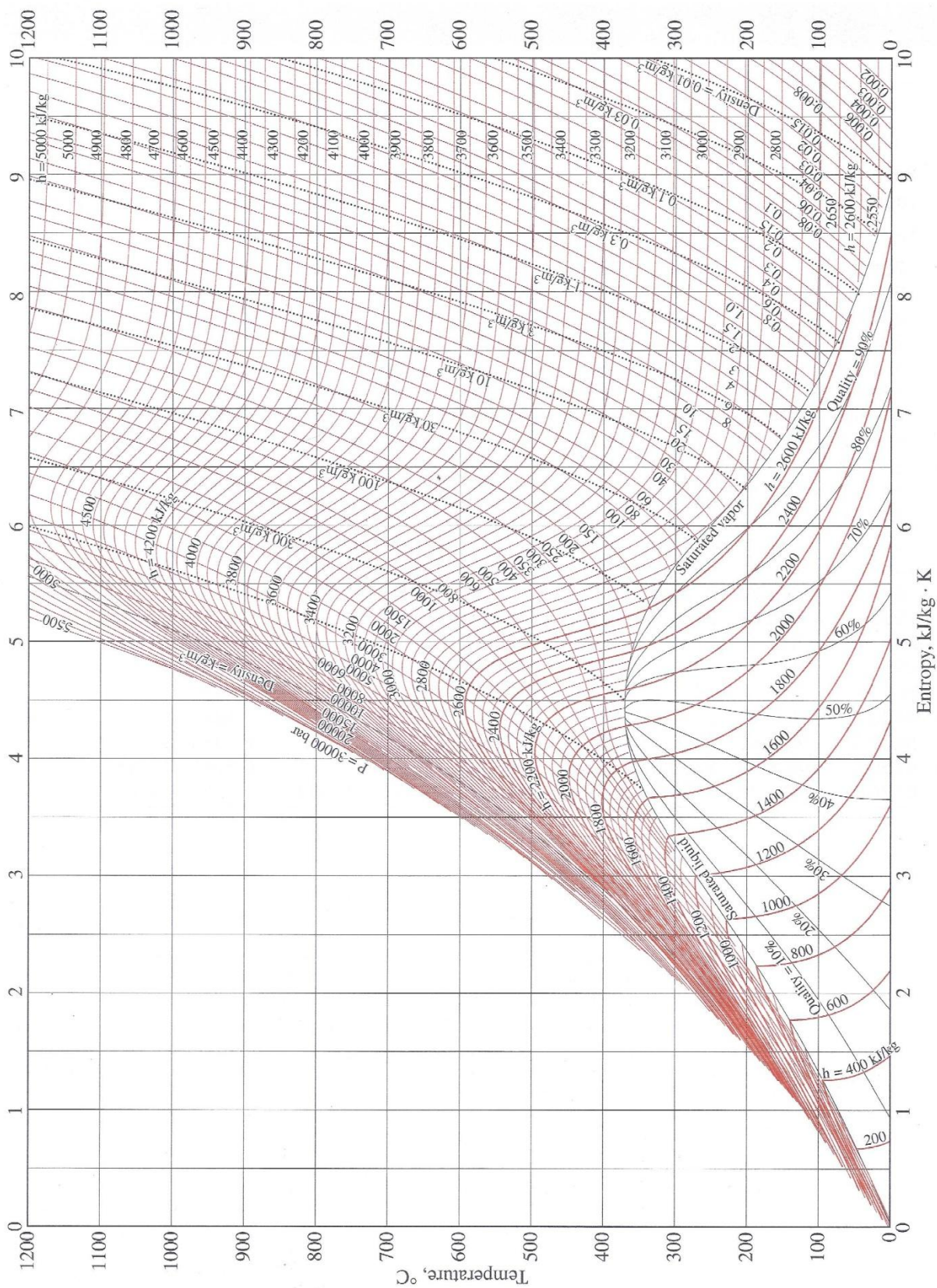
P = 8 MPa Tsat = 295.0 °C					P = 9 MPa Tsat = 303.3 °C					P = 10 MPa Tsat = 311.0 °C				
T	v	u	h	s	T	v	u	h	s	T	v	u	h	s
°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K	°C	m ³ /kg	kJ/kg	kJ/kg	kJ/kg K
5	0.00100	21.0	28.9	0.0760	5	0.00100	21.0	29.9	0.0760	5	0.00100	21.0	30.9	0.0759
10	0.00100	41.8	49.8	0.1503	10	0.00100	41.8	50.8	0.1502	10	0.00100	41.8	51.7	0.1501
15	0.00100	62.6	70.6	0.2232	15	0.00100	62.6	71.6	0.2230	15	0.00100	62.5	72.5	0.2229
20	0.00100	83.4	91.4	0.2948	20	0.00100	83.4	92.4	0.2946	20	0.00100	83.3	93.3	0.2944
25	0.00100	104.2	112.2	0.3652	25	0.00100	104.1	113.1	0.3649	25	0.00100	104.1	114.1	0.3646
30	0.00100	125.0	133.0	0.4343	30	0.00100	124.9	133.9	0.4340	30	0.00100	124.8	134.8	0.4337
35	0.00100	145.8	153.8	0.5024	35	0.00100	145.7	154.7	0.5020	35	0.00100	145.6	155.6	0.5017
40	0.00100	166.6	174.6	0.5693	40	0.00100	166.5	175.5	0.5689	40	0.00100	166.3	176.4	0.5685
45	0.00101	187.4	195.4	0.6352	45	0.00101	187.2	196.3	0.6348	45	0.00101	187.1	197.2	0.6344
50	0.00101	208.1	216.2	0.7001	50	0.00101	208.0	217.1	0.6996	50	0.00101	207.9	217.9	0.6992
75	0.00102	312.2	320.4	1.0106	75	0.00102	312.0	321.2	1.0100	75	0.00102	311.8	322.0	1.0094
100	0.00104	416.7	425.0	1.3009	100	0.00104	416.4	425.8	1.3001	100	0.00104	416.2	426.5	1.2994
125	0.00106	522.0	530.4	1.5743	125	0.00106	521.6	531.1	1.5734	125	0.00106	521.2	531.8	1.5724
150	0.00109	628.2	636.9	1.8337	150	0.00108	627.8	637.6	1.8326	150	0.00108	627.3	638.2	1.8315
175	0.00112	736.0	744.9	2.0816	175	0.00111	735.4	745.5	2.0804	175	0.00111	734.9	746.0	2.0791
200	0.00115	845.9	855.1	2.3207	200	0.00115	845.1	855.5	2.3192	200	0.00115	844.4	855.9	2.3177
225	0.00119	958.6	968.2	2.5537	225	0.00119	957.7	968.4	2.5518	225	0.00119	956.8	968.7	2.5500
250	0.00124	1,075.7	1,085.7	2.7837	250	0.00124	1,074.5	1,085.7	2.7814	250	0.00124	1,073.3	1,085.7	2.7791
275	0.00131	1,199.3	1,209.8	3.0155	275	0.00131	1,197.7	1,209.4	3.0124					

ตารางที่ 8 ตารางอุณหภูมิของไอน้ำและน้ำแข็งอิ่มตัว

Saturated ice-water vapor

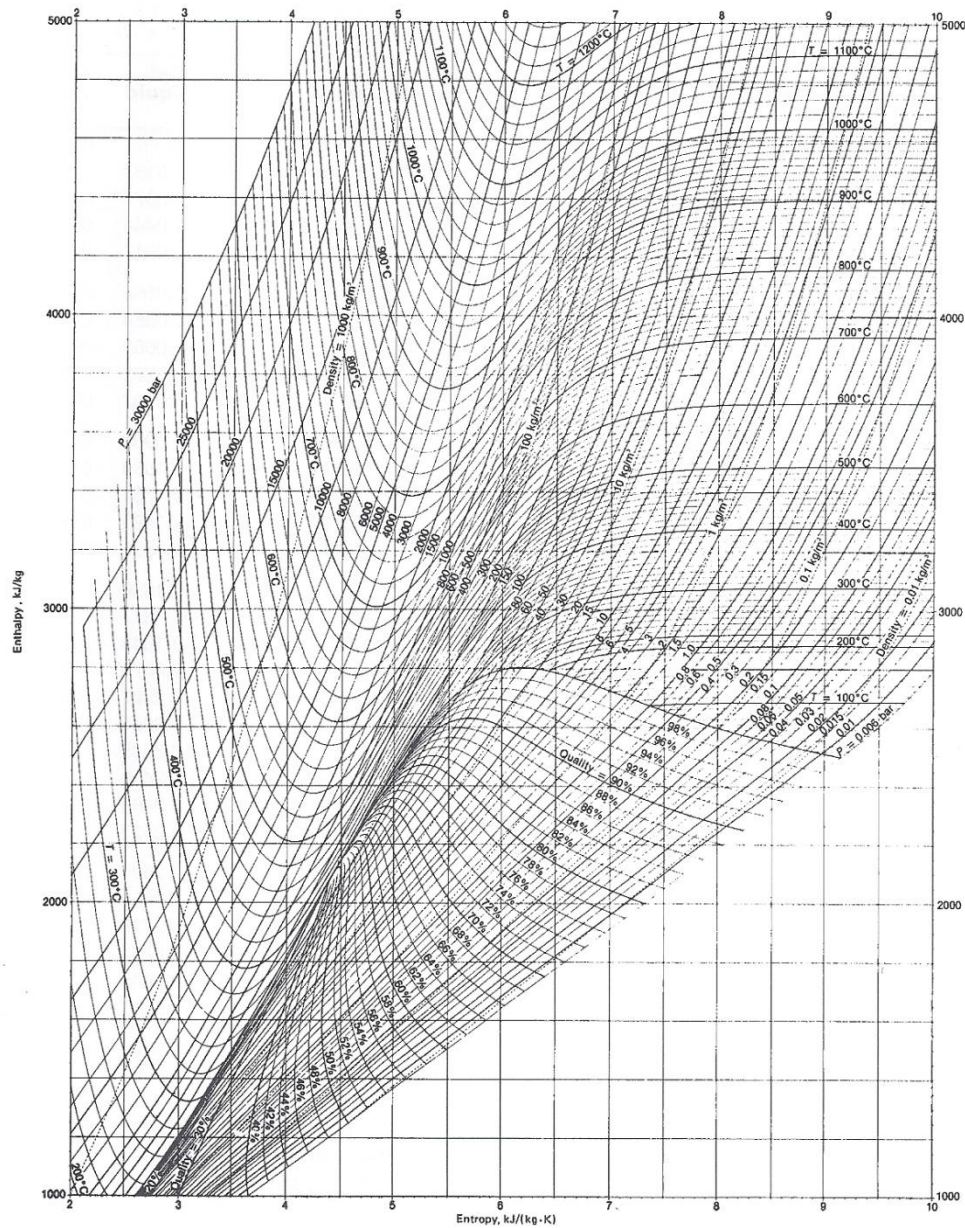
Temp. T °C	Sat. press. P_{sat} kPa	Specific volume m^3/kg		Internal energy kJ/kg			Enthalpy kJ/kg			Entropy kJ/(kg · K)		
		Sat. ice $v_i \times 10^3$	Sat. vapor v_g	Sat. ice u_i	Subl. u_{ig}	Sat. vapor u_g	Sat. ice h_i	Subl. h_{ig}	Sat. vapor h_g	Sat. ice s_i	Subl. s_{ig}	Sat. vapor s_g
0.01	0.6113	1.0908	206.1	-333.40	2708.7	2375.3	-333.40	2834.8	2501.4	-1.221	10.378	9.156
0	0.6108	1.0908	206.3	-333.43	2708.8	2375.3	-333.43	2834.8	2501.3	-1.221	10.378	9.157
-2	0.5176	1.0904	241.7	-337.62	2710.2	2372.6	-337.62	2835.3	2497.7	-1.237	10.456	9.219
-4	0.4375	1.0901	283.8	-341.78	2711.6	2369.8	-341.78	2835.7	2494.0	-1.253	10.536	9.283
-6	0.3689	1.0898	334.2	-345.91	2712.9	2367.0	-345.91	2836.2	2490.3	-1.268	10.616	9.348
-8	0.3102	1.0894	394.4	-350.02	2714.2	2364.2	-350.02	2836.6	2486.6	-1.284	10.698	9.414
-10	0.2602	1.0891	466.7	-354.09	2715.5	2361.4	-354.09	2837.0	2482.9	-1.299	10.781	9.481
-12	0.2176	1.0888	553.7	-358.14	2716.8	2358.7	-358.14	2837.3	2479.2	-1.315	10.865	9.550
-14	0.1815	1.0884	658.8	-362.15	2718.0	2355.9	-362.15	2837.6	2475.5	-1.331	10.950	9.619
-16	0.1510	1.0881	786.0	-366.14	2719.2	2353.1	-366.14	2837.9	2471.8	-1.346	11.036	9.690
-18	0.1252	1.0878	940.5	-370.10	2720.4	2350.3	-370.10	2838.2	2468.1	-1.362	11.123	9.762
-20	0.1035	1.0874	1128.6	-374.03	2721.6	2347.5	-374.03	2838.4	2464.3	-1.377	11.212	9.835
-22	0.0853	1.0871	1358.4	-377.93	2722.7	2344.7	-377.93	2838.6	2460.6	-1.393	11.302	9.909
-24	0.0701	1.0868	1640.1	-381.80	2723.7	2342.0	-381.80	2838.7	2456.9	-1.408	11.394	9.985
-26	0.0574	1.0864	1986.4	-385.64	2724.8	2339.2	-385.64	2838.9	2453.2	-1.424	11.486	10.062
-28	0.0469	1.0861	2413.7	-389.45	2725.8	2336.4	-389.45	2839.0	2449.5	-1.439	11.580	10.141
-30	0.0381	1.0858	2943	-393.23	2726.8	2333.6	-393.23	2839.0	2445.8	-1.455	11.676	10.221
-32	0.0309	1.0854	3600	-396.98	2727.8	2330.8	-396.98	2839.1	2442.1	-1.471	11.773	10.303
-34	0.0250	1.0851	4419	-400.71	2728.7	2328.0	-400.71	2839.1	2438.4	-1.486	11.872	10.386
-36	0.0201	1.0848	5444	-404.40	2729.6	2325.2	-404.40	2839.1	2434.7	-1.501	11.972	10.470
-38	0.0161	1.0844	6731	-408.06	2730.5	2322.4	-408.06	2839.0	2430.9	-1.517	12.073	10.556
-40	0.0129	1.0841	8354	-411.70	2731.3	2319.6	-411.70	2839.9	2427.2	-1.532	12.176	10.644

แผนภาพที่ 9 อุณหภูมิและเอนโทรปีของน้ำ



แผนภาพที่ 10 แผนภาพ Mollier ของน้ำ

Mollier diagram for water. (Source: Lester Haar, John S. Gallagher, and George S. Kell, *NBS/NRC Steam Tables*, 1984. With permission from Hemisphere Publishing Corporation, New York.)



ตารางที่ 11 ตารางอุณหภูมิของสารทำความเย็น R-12

Saturated refrigerant-12–Temperature table

Temp. °C <i>T</i>	Sat. press. MPa <i>P_{sat}</i>	Specific volume m ³ /kg		Internal energy kJ/kg		Enthalpy kJ/kg			Entropy kJ/(kg · K)	
		Sat. liquid <i>v_f</i>	Sat. vapor <i>v_g</i>	Sat. liquid <i>u_f</i>	Sat. vapor <i>u_g</i>	Sat. liquid <i>h_f</i>	Evap. <i>h_{fg}</i>	Sat. vapor <i>h_g</i>	Sat. liquid <i>s_f</i>	Sat. vapor <i>s_g</i>
–40	0.06417	0.0006 595	0.241 91	–0.04	154.07	0	169.59	169.59	0	0.7274
–35	0.08071	0.0006 656	0.195 40	4.37	156.13	4.42	167.48	171.90	0.0187	0.7219
–30	0.10041	0.0006 720	0.159 38	8.79	158.20	8.86	165.33	174.20	0.0371	0.7170
–28	0.10927	0.0006 746	0.147 28	10.58	159.02	10.65	164.46	175.11	0.0444	0.7153
–26	0.11872	0.0006 773	0.136 28	12.35	159.84	12.43	163.59	176.02	0.0517	0.7135
–25	0.12368	0.0006 786	0.131 17	13.25	160.26	13.33	163.15	176.48	0.0552	0.7126
–24	0.12880	0.0006 800	0.126 28	14.13	160.67	14.22	162.71	176.93	0.0589	0.7119
–22	0.13953	0.0006 827	0.117 17	15.92	161.48	16.02	161.82	177.83	0.0660	0.7103
–20	0.15093	0.0006 855	0.108 85	17.72	162.31	17.82	160.92	178.74	0.0731	0.7087
–18	0.16304	0.0006 883	0.101 24	19.51	163.12	19.62	160.01	179.63	0.0802	0.7073
–15	0.18260	0.0006 926	0.091 02	22.20	164.35	22.33	158.64	180.97	0.0906	0.7051
–10	0.21912	0.0007 000	0.076 65	26.72	166.39	26.87	156.31	183.19	0.1080	0.7019
–5	0.26096	0.0007 078	0.064 96	31.27	168.42	31.45	153.93	185.37	0.1251	0.6991
0	0.30861	0.0007 159	0.055 39	35.83	170.44	36.05	151.48	187.53	0.1420	0.6965
4	0.35124	0.0007 227	0.048 95	39.51	172.04	39.76	149.47	189.23	0.1553	0.6946
8	0.39815	0.0007 297	0.043 40	43.21	173.63	43.50	147.41	190.91	0.1686	0.6929
12	0.44962	0.0007 370	0.038 60	46.93	175.20	47.26	145.30	192.56	0.1817	0.6913
16	0.50591	0.0007 446	0.034 42	50.67	176.78	51.05	143.14	194.19	0.1948	0.6898
20	0.56729	0.0007 525	0.030 78	54.44	178.32	54.87	140.91	195.78	0.2078	0.6884
24	0.63405	0.0007 607	0.027 59	58.25	179.85	58.73	138.61	197.34	0.2207	0.6871
26	0.66954	0.0007 650	0.026 14	60.17	180.61	60.68	137.44	198.11	0.2271	0.6865
28	0.70648	0.0007 694	0.024 78	62.09	181.36	62.63	136.24	198.87	0.2335	0.6859
30	0.74490	0.0007 739	0.023 51	64.01	182.11	64.59	135.03	199.62	0.2400	0.6853
32	0.78485	0.0007 785	0.022 31	65.96	182.85	66.57	133.79	200.36	0.2463	0.6847
34	0.82636	0.0007 832	0.021 18	67.90	183.59	68.55	132.53	201.09	0.2527	0.6842
36	0.86948	0.0007 880	0.020 12	69.86	184.31	70.55	131.25	201.80	0.2591	0.6836
38	0.91423	0.0007 929	0.019 12	71.84	185.03	72.56	129.94	202.51	0.2655	0.6831
40	0.96065	0.0007 980	0.018 17	73.82	185.74	74.59	128.61	203.20	0.2718	0.6825
42	1.0088	0.0008 033	0.017 28	75.82	186.45	76.63	127.25	203.88	0.2782	0.6820
44	1.0587	0.0008 086	0.016 44	77.82	187.13	78.68	125.87	204.54	0.2845	0.6814
48	1.1639	0.0008 199	0.014 88	81.88	188.51	82.83	123.00	205.83	0.2973	0.6802
52	1.2766	0.0008 318	0.013 49	86.00	189.83	87.06	119.99	207.05	0.3101	0.6791
56	1.3972	0.0008 445	0.012 24	90.18	191.10	91.36	116.84	208.20	0.3229	0.6779
60	1.5259	0.0008 581	0.011 11	94.43	192.31	95.74	113.52	209.26	0.3358	0.6765
112	4.1155	0.0017 92	0.001 79	175.98	175.98	183.35	0	183.35	0.5687	0.5687

Source: Tables A-11 through A-13 are adapted from Kenneth Wark, *Thermodynamics*, 4th ed., McGraw-Hill, New York, 1983, pp. 807–812. Originally published by E. I. du Pont de Nemours & Company, Inc., 1969.

ตารางที่ 12 ตารางความดันของสารทำความเย็น R-12

Saturated refrigerant-12-Pressure table

Press. MPa P	Sat. temp. $^{\circ}\text{C}$ T_{sat}	Specific volume m^3/kg		Internal energy kJ/kg		Enthalpy kJ/kg			Entropy $\text{kJ}/(\text{kg} \cdot \text{K})$	
		Sat. liquid v_f	Sat. vapor v_g	Sat. liquid u_f	Sat. vapor u_g	Sat. liquid h_f	Evap. h_{fg}	Sat. vapor h_g	Sat. liquid s_f	Sat. vapor s_g
0.06	-41.42	0.000 657 8	0.2575	-1.29	153.49	-1.25	170.19	168.94	-0.0054	0.7290
0.10	-30.10	0.000 671 9	0.1600	8.71	158.15	8.78	165.37	174.15	0.0368	0.7171
0.12	-25.74	0.000 677 6	0.1349	12.58	159.95	12.66	163.48	176.14	0.0526	0.7133
0.14	-21.91	0.000 682 8	0.1168	15.99	161.52	16.09	161.78	177.87	0.0663	0.7102
0.16	-18.49	0.000 687 6	0.1031	19.07	162.91	19.18	160.23	179.41	0.0784	0.7076
0.18	-15.38	0.000 692 1	0.092 25	21.86	164.19	21.98	158.82	180.80	0.0893	0.7054
0.20	-12.53	0.000 686 2	0.083 54	24.43	165.36	24.57	157.50	182.07	0.0992	0.7035
0.24	-7.42	0.000 704 0	0.070 33	29.06	167.44	29.23	155.09	184.32	0.1168	0.7004
0.28	-2.93	0.000 711 1	0.060 76	33.15	169.26	33.35	152.92	186.27	0.1321	0.6980
0.32	1.11	0.000 717 7	0.053 51	36.85	170.88	37.08	150.92	188.00	0.1457	0.6960
0.40	8.15	0.000 729 9	0.043 21	43.35	173.69	43.64	147.33	190.97	0.1691	0.6928
0.50	15.60	0.000 743 8	0.034 82	50.30	176.61	50.67	143.35	194.02	0.1935	0.6899
0.60	22.00	0.000 756 6	0.029 13	56.35	179.09	56.80	139.77	196.57	0.2142	0.6878
0.70	27.65	0.000 768 6	0.025 01	61.75	181.23	62.29	136.45	198.74	0.2324	0.6860
0.80	32.74	0.000 780 2	0.021 88	66.68	183.13	67.30	133.33	200.63	0.2487	0.6845
0.90	37.37	0.000 791 4	0.019 42	71.22	184.81	71.93	130.36	202.29	0.2634	0.6832
1.0	41.64	0.000 802 3	0.017 44	75.46	186.32	76.26	127.50	203.76	0.2770	0.6820
1.2	49.31	0.000 823 7	0.014 41	83.22	188.95	84.21	122.03	206.24	0.3015	0.6799
1.4	56.09	0.000 844 8	0.012 22	90.28	191.11	91.46	116.76	208.22	0.3232	0.6778
1.6	62.19	0.000 866 0	0.010 54	96.80	192.95	98.19	111.62	209.81	0.3329	0.6758

ตารางที่ 13 ตารางคุณสมบัติไอငของสารทำความเย็น R-12

Superheated refrigerant-12

Temp. °C	v m ³ /kg	u kJ/kg	h kJ/kg	s kJ/(kg · K)	v m ³ /kg	u kJ/kg	h kJ/kg	s kJ/(kg · K)
0.060 MPa ($T_{\text{sat}} = -41.42^{\circ}\text{C}$)					0.10 MPa ($T_{\text{sat}} = -30.10^{\circ}\text{C}$)			
Sat.	0.257 5	153.49	168.94	0.7290	0.160 0	158.15	174.15	0.7171
-40	0.259 3	154.16	169.72	0.7324				
-20	0.283 8	163.91	180.94	0.7785	0.167 7	163.22	179.99	0.7406
0	0.307 9	174.05	192.52	0.8225	0.182 7	173.50	191.77	0.7854
10	0.319 8	179.26	198.45	0.8439	0.190 0	178.77	197.77	0.8070
20	0.331 7	184.57	204.47	0.8647	0.197 3	184.12	203.85	0.8281
30	0.343 5	189.96	210.57	0.8852	0.204 5	189.57	210.02	0.8488
40	0.355 2	195.46	216.77	0.9053	0.211 7	195.09	216.26	0.8691
50	0.367 0	201.02	223.04	0.9251	0.218 8	200.70	222.58	0.8889
60	0.378 7	206.69	229.41	0.9444	0.226 0	206.38	228.98	0.9084
80	0.402 0	218.25	242.37	0.9822	0.240 1	218.00	242.01	0.9464
0.14 MPa ($T_{\text{sat}} = -21.91^{\circ}\text{C}$)					0.18 MPa ($T_{\text{sat}} = -15.38^{\circ}\text{C}$)			
Sat.	0.116 8	161.52	177.87	0.7102	0.092.2	164.20	180.80	0.7054
-20	0.117 9	162.50	179.01	0.7147				
-10	0.123 5	167.69	184.97	0.7378	0.092 5	164.39	181.03	0.7181
0	0.128 9	172.94	190.99	0.7602	0.099 1	172.37	190.21	0.7408
10	0.134 3	178.28	197.08	0.7821	0.103 4	177.77	196.38	0.7630
20	0.139 7	183.67	203.23	0.8035	0.107 6	183.23	202.60	0.7846
30	0.144 9	189.17	209.46	0.8243	0.111 8	188.77	208.89	0.8057
40	0.150 2	194.72	215.75	0.8447	0.116 0	194.35	215.23	0.8263
50	0.155 3	200.38	222.12	0.8648	0.120 1	200.02	221.64	0.8464
60	0.160 5	206.08	228.55	0.8844	0.124 1	205.78	228.12	0.8662
80	0.170 7	217.74	241.64	0.9225	0.132 2	217.47	241.27	0.9045
100	0.180 9	229.67	255.00	0.9593	0.140 2	229.45	254.69	0.9414
0.20 MPa ($T_{\text{sat}} = -12.53^{\circ}\text{C}$)					0.24 MPa ($T_{\text{sat}} = -7.42^{\circ}\text{C}$)			
Sat.	0.083 5	165.37	182.07	0.7035	0.070 3	167.45	184.32	0.7004
0	0.088 6	172.08	189.08	0.7325	0.072 9	171.49	188.99	0.7177
10	0.092 6	177.50	196.02	0.7548	0.076 3	176.98	195.29	0.7404
20	0.096 4	183.00	202.28	0.7766	0.079 6	182.53	201.63	0.7624
30	0.100 2	188.56	208.60	0.7978	0.082 8	188.14	208.01	0.7838
40	0.104 0	194.17	214.97	0.8184	0.086 0	193.80	214.44	0.8047
50	0.107 7	199.86	221.40	0.8387	0.089 2	199.51	220.92	0.8251
60	0.111 4	205.62	227.90	0.8585	0.092 3	205.31	227.46	0.8450
80	0.118 7	217.35	241.09	0.8969	0.098 5	217.07	240.71	0.8836
100	0.125 9	229.35	254.53	0.9339	0.104 5	229.12	254.20	0.9208
120	0.133 1	241.59	268.21	0.9696	0.110 5	241.41	267.93	0.9566

ตารางที่ 13 ตารางคุณสมบัติไอคงของสารทำความเย็น R-12 (ต่อ)

(Continued)

Temp. °C	v m ³ /kg	u kJ/kg	h kJ/kg	s kJ/(kg · K)	v m ³ /kg	u kJ/kg	h kJ/kg	s kJ/(kg · K)
0.28 MPa ($T_{\text{sat}} = -2.93^{\circ}\text{C}$)					0.32 MPa ($T_{\text{sat}} = 1.11^{\circ}\text{C}$)			
Sat.	0.060 76	169.26	186.27	0.6980	0.053 51	170.88	188.00	0.6960
0	0.061 66	170.89	188.15	0.7049				
10	0.064 64	176.45	194.55	0.7279	0.055 90	175.90	193.79	0.7167
20	0.067 55	182.06	200.97	0.7502	0.058 52	181.57	200.30	0.7393
30	0.070 40	187.71	207.42	0.7718	0.061 06	187.28	206.82	0.7612
40	0.073 19	193.42	213.91	0.7928	0.063 55	193.02	213.36	0.7824
50	0.075 94	199.18	220.44	0.8134	0.066 00	198.82	219.94	0.8031
60	0.078 65	205.00	227.02	0.8334	0.068 41	204.68	226.57	0.8233
80	0.083 99	216.82	240.34	0.8722	0.073 14	216.55	239.96	0.8623
100	0.089 24	228.29	253.88	0.9095	0.077 78	228.66	253.55	0.8997
120	0.094 43	241.21	267.65	0.9455	0.082 36	241.00	267.36	0.9358
0.40 MPa ($T_{\text{sat}} = 8.15^{\circ}\text{C}$)					0.50 MPa ($T_{\text{sat}} = 15.60^{\circ}\text{C}$)			
Sat.	0.043 21	173.69	190.97	0.6928	0.034 82	176.61	194.02	0.6899
10	0.043 63	174.76	192.21	0.6972				
20	0.045 84	180.57	198.91	0.7204	0.035 65	179.26	197.08	0.7004
30	0.047 97	186.39	205.58	0.7428	0.037 46	185.23	203.96	0.7235
40	0.050 05	192.23	212.25	0.7645	0.039 22	191.20	210.81	0.7457
50	0.052 07	198.11	218.94	0.7855	0.040 91	197.19	217.64	0.7672
60	0.054 06	204.03	225.65	0.8060	0.042 57	203.20	224.48	0.7881
80	0.057 91	216.03	239.19	0.8454	0.045 78	215.32	238.21	0.8281
100	0.061 73	228.20	252.89	0.8831	0.048 89	227.61	252.05	0.8662
120	0.065 46	240.61	266.79	0.9194	0.051 93	240.10	266.06	0.9028
140	0.069 13	253.23	280.88	0.9544	0.054 92	252.77	280.23	0.9379
0.60 MPa ($T_{\text{sat}} = 22.00^{\circ}\text{C}$)					0.70 MPa ($T_{\text{sat}} = 27.65^{\circ}\text{C}$)			
Sat.	0.029 13	179.09	196.57	0.6878	0.025 01	181.23	198.74	0.6860
30	0.030 42	184.01	202.26	0.7068	0.025 35	182.72	200.46	0.6917
40	0.031 97	190.13	209.31	0.7297	0.026 76	189.00	207.73	0.7153
50	0.033 45	196.23	216.30	0.7516	0.028 10	195.23	214.90	0.7378
60	0.034 89	202.34	223.27	0.7729	0.029 39	201.45	222.02	0.7595
80	0.037 65	214.61	237.20	0.8135	0.031 84	213.88	236.17	0.8008
100	0.040 32	227.01	251.20	0.8520	0.034 19	226.40	250.33	0.8398
120	0.042 91	239.57	265.32	0.8889	0.036 46	239.05	264.57	0.8769
140	0.045 45	252.31	279.58	0.9243	0.038 67	251.85	278.92	0.9125
160	0.047 94	265.25	294.01	0.9584	0.040 85	264.83	293.42	0.9468

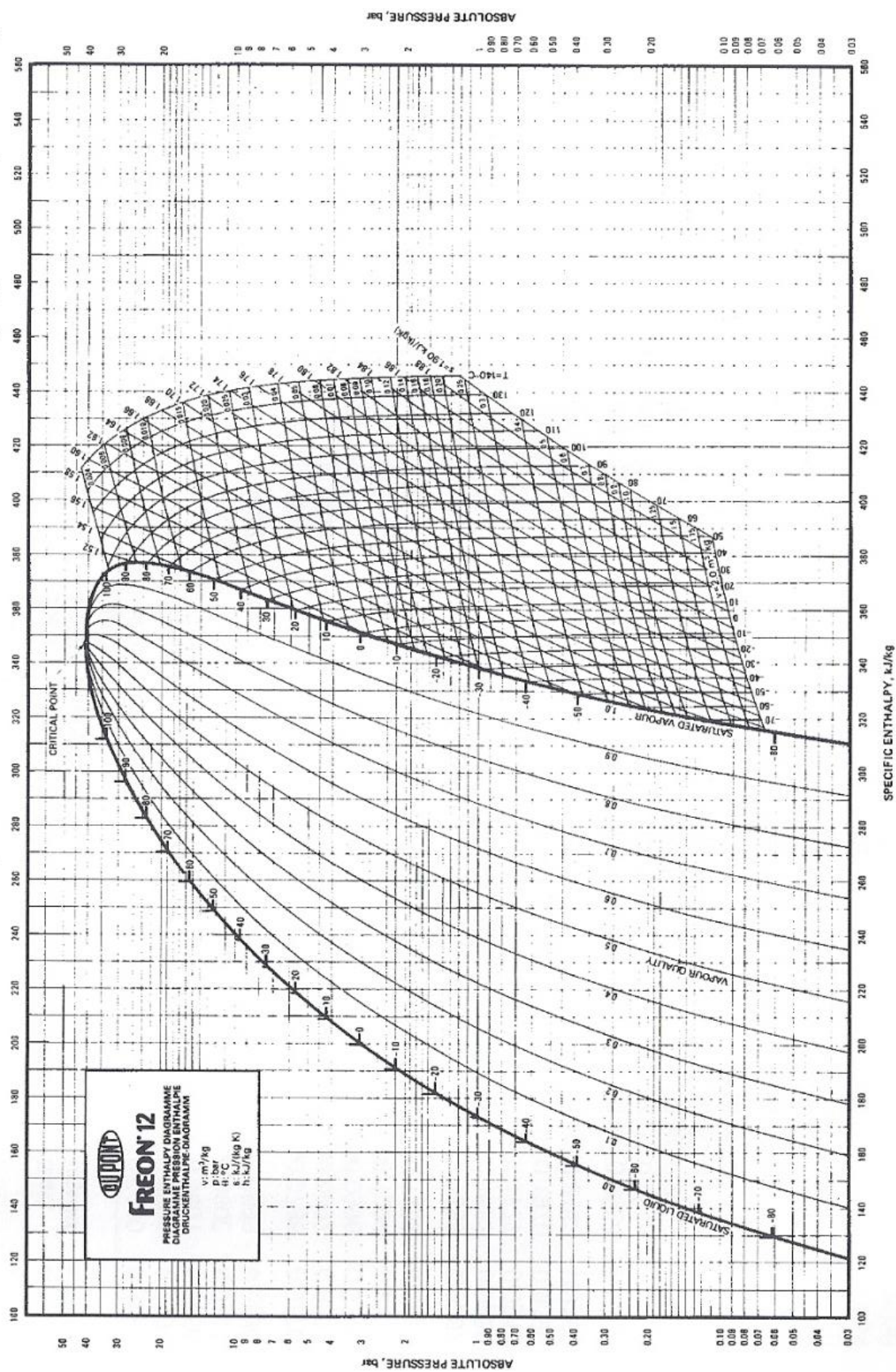
ตารางที่ 13 ตารางคุณสมบัติไอငของสารทำความเย็น R-12 (ต่อ)

(Continued)

Temp. °C	v m ³ /kg	u kJ/kg	h kJ/kg	s kJ/(kg · K)	v m ³ /kg	u kJ/kg	h kJ/kg	s kJ/(kg · K)
0.80 MPa ($T_{\text{sat}} = 32.74^{\circ}\text{C}$)					0.90 MPa ($T_{\text{sat}} = 37.37^{\circ}\text{C}$)			
Sat.	0.021 88	183.13	200.63	0.6845	0.019 42	184.81	202.29	0.6832
40	0.022 83	187.81	206.07	0.7021	0.019 74	186.55	204.32	0.6897
50	0.024 07	194.19	213.45	0.7253	0.020 91	193.10	211.92	0.7136
60	0.025 25	200.52	220.72	0.7474	0.022 01	199.56	219.37	0.7363
80	0.027 48	213.13	235.11	0.7894	0.024 07	212.37	234.03	0.7790
100	0.029 59	225.77	249.44	0.8289	0.026 01	225.13	248.54	0.8190
120	0.031 62	238.51	263.81	0.8664	0.027 85	237.97	263.03	0.8569
140	0.033 59	251.39	278.26	0.9022	0.029 64	250.90	277.58	0.8930
160	0.035 52	264.41	292.83	0.9367	0.031 38	263.99	292.23	0.9276
180	0.037 42	277.60	307.54	0.9699	0.033 09	277.23	307.01	0.9609
1.0 MPa ($T_{\text{sat}} = 41.64^{\circ}\text{C}$)					1.2 MPa ($T_{\text{sat}} = 49.31^{\circ}\text{C}$)			
Sat.	0.017 44	186.32	203.76	0.6820	0.014 41	188.95	206.24	0.6799
50	0.018 37	191.95	210.32	0.7026	0.014 48	189.43	206.81	0.6816
60	0.019 41	198.56	217.97	0.7259	0.015 46	196.41	214.96	0.7065
80	0.021 34	211.57	232.91	0.7695	0.017 22	209.91	230.57	0.7520
100	0.023 13	224.48	247.61	0.8100	0.018 81	223.13	245.70	0.7937
120	0.024 84	237.41	262.25	0.8482	0.020 30	236.27	260.53	0.8326
140	0.026 47	250.43	276.90	0.8845	0.021 72	249.45	275.51	0.8696
160	0.028 07	263.56	291.63	0.9193	0.023 09	263.70	290.41	0.9048
180	0.029 63	276.84	306.47	0.9528	0.024 43	276.05	305.37	0.9385
200	0.031 16	290.26	321.42	0.9851	0.025 74	289.55	320.44	0.9711
1.4 MPa ($T_{\text{sat}} = 56.09^{\circ}\text{C}$)					1.6 MPa ($T_{\text{sat}} = 62.19^{\circ}\text{C}$)			
Sat.	0.012 22	191.11	208.22	0.6778	0.01054	192.95	209.81	0.6758
60	0.012 58	194.00	211.61	0.6881				
80	0.014 25	208.11	228.06	0.7360	0.011 98	206.17	225.34	0.7209
100	0.015 71	221.70	243.69	0.7791	0.013 37	220.19	241.58	0.7656
120	0.017 05	235.09	258.96	0.8189	0.014 61	233.84	257.22	0.8065
140	0.018 32	248.43	274.08	0.8564	0.015 77	247.38	272.61	0.8447
160	0.019 54	261.80	289.16	0.8921	0.016 86	260.90	287.88	0.8808
180	0.020 71	275.27	304.26	0.9262	0.017 92	274.47	303.14	0.9152
200	0.021 86	288.84	319.44	0.9589	0.018 95	288.11	318.43	0.9482
220	0.022 99	302.51	334.70	0.9905	0.019 96	301.84	333.78	0.9800

แผนภาพที่ 14 ความดันและเอนทาลปีของสารทำความเย็น R-12

P-h diagram for refrigerant-12. (Freon 12 is the du Pont trademark for refrigerant-12. Copyright E. I. du Pont de Nemours & Company; used with permission.)



ตารางที่ 15-A ตารางอุณหภูมิของสารทำความเย็น R-134a อิมตัว

Saturated refrigerant-134a–Temperature table

Temp. °C T	Press. MPa P_{sat}	Specific volume m^3/kg		Internal energy kJ/kg		Enthalpy kJ/kg			Entropy $\text{kJ}/(\text{kg} \cdot \text{K})$	
		Sat. liquid v_f	Sat. vapor v_g	Sat. liquid u_f	Sat. vapor u_g	Sat. liquid h_f	Evap. h_{fg}	Sat. vapor h_g	Sat. liquid s_f	Sat. vapor s_g
–40	0.051 64	0.000 705 5	0.3569	–0.04	204.45	0.00	222.88	222.88	0.0000	0.9560
–36	0.063 32	0.000 711 3	0.2947	4.68	206.73	4.73	220.67	225.40	0.0201	0.9506
–32	0.077 04	0.000 717 2	0.2451	9.47	209.01	9.52	218.37	227.90	0.0401	0.9456
–28	0.093 05	0.000 723 3	0.2052	14.31	211.29	14.37	216.01	230.38	0.0600	0.9411
–26	0.101 99	0.000 726 5	0.1882	16.75	212.43	16.82	214.80	231.62	0.0699	0.9390
–24	0.111 60	0.000 729 6	0.1728	19.21	213.57	19.29	213.57	232.85	0.0798	0.9370
–22	0.121 92	0.000 732 8	0.1590	21.68	214.70	21.77	212.32	234.08	0.0897	0.9351
–20	0.132 99	0.000 736 1	0.1464	24.17	215.84	24.26	211.05	235.31	0.0996	0.9332
–18	0.144 83	0.000 739 5	0.1350	26.67	216.97	26.77	209.76	236.53	0.1094	0.9315
–16	0.157 48	0.000 742 8	0.1247	29.18	218.10	29.30	208.45	237.74	0.1192	0.9298
–12	0.185 40	0.000 749 8	0.1068	34.25	220.36	34.39	205.77	240.15	0.1388	0.9267
–8	0.217 04	0.000 756 9	0.0919	39.38	222.60	39.54	203.00	242.54	0.1583	0.9239
–4	0.252 74	0.000 764 4	0.0794	44.56	224.84	44.75	200.15	244.90	0.1777	0.9213
0	0.292 82	0.000 772 1	0.0689	49.79	227.06	50.02	197.21	247.23	0.1970	0.9190
4	0.337 65	0.000 780 1	0.0600	55.08	229.27	55.35	194.19	249.53	0.2162	0.9169
8	0.387 56	0.000 788 4	0.0525	60.43	231.46	60.73	191.07	251.80	0.2354	0.9150
12	0.442 94	0.000 797 1	0.0460	65.83	233.63	66.18	187.85	254.03	0.2545	0.9132
16	0.504 16	0.000 806 2	0.0405	71.29	235.78	71.69	184.52	256.22	0.2735	0.9116
20	0.571 60	0.000 815 7	0.0358	76.80	237.91	77.26	181.09	258.36	0.2924	0.9102
24	0.645 66	0.000 825 7	0.0317	82.37	240.01	82.90	177.55	260.45	0.3113	0.9089
26	0.685 30	0.000 830 9	0.0298	85.18	241.05	85.75	175.73	261.48	0.3208	0.9082
28	0.726 75	0.000 836 2	0.0281	88.00	242.08	88.61	173.89	262.50	0.3302	0.9076
30	0.770 06	0.000 841 7	0.0265	90.84	243.10	91.49	172.00	263.50	0.3396	0.9070
32	0.815 28	0.000 847 3	0.0250	93.70	244.12	94.39	170.09	264.48	0.3490	0.9064
34	0.862 47	0.000 853 0	0.0236	96.58	245.12	97.31	168.14	265.45	0.3584	0.9058
36	0.911 68	0.000 859 0	0.0223	99.47	246.11	100.25	166.15	266.40	0.3678	0.9053
38	0.962 98	0.000 865 1	0.0210	102.38	247.09	103.21	164.12	267.33	0.3772	0.9047
40	1.016 4	0.000 871 4	0.0199	105.30	248.06	106.19	162.05	268.24	0.3866	0.9041
42	1.072 0	0.000 878 0	0.0188	108.25	249.02	109.19	159.94	269.14	0.3960	0.9035
44	1.129 9	0.000 884 7	0.0177	111.22	249.96	112.22	157.79	270.01	0.4054	0.9030
48	1.252 6	0.000 898 9	0.0159	117.22	251.79	118.35	153.33	271.68	0.4243	0.9017
52	1.385 1	0.000 914 2	0.0142	123.31	253.55	124.58	148.66	273.24	0.4432	0.9004
56	1.527 8	0.000 930 8	0.0127	129.51	255.23	130.93	143.75	274.68	0.4622	0.8990
60	1.681 3	0.000 948 8	0.0114	135.82	256.81	137.42	138.57	275.99	0.4814	0.8973
70	2.116 2	0.001 002 7	0.0086	152.22	260.15	154.34	124.08	278.43	0.5302	0.8918
80	2.632 4	0.001 076 6	0.0064	169.88	262.14	172.71	106.41	279.12	0.5814	0.8827
90	3.243 5	0.001 194 9	0.0046	189.82	261.34	193.69	82.63	276.32	0.6380	0.8655
100	3.974 2	0.001 544 3	0.0027	218.60	248.49	224.74	34.40	259.13	0.7196	0.8117

Source: Tables A-15 and A-16 are adapted from M. J. Moran and H. N. Shapiro, *Fundamentals of Engineering Thermodynamics*, 2d ed., Wiley, New York, 1992, pp. 710–715. Originally based on equations from D. P. Wilson and R. S. Basu, "Thermodynamic Properties of a New Stratospherically Safe Working Fluid—Refrigerant 134a," *ASHRAE Trans.*, Vol. 94, Pt. 2, 1988, pp. 2095–2118.

ตารางที่ 15-B ตารางความดันของสารทำความเย็น R-134a อิมตัว

Saturated refrigerant-134a–Pressure table

Press. MPa P	Temp. °C T_{sat}	Specific volume m^3/kg		Internal energy kJ/kg		Enthalpy kJ/kg			Entropy $\text{kJ}/(\text{kg} \cdot \text{K})$	
		Sat. liquid v_f	Sat. vapor v_g	Sat. liquid u_f	Sat. vapor u_g	Sat. liquid h_f	Evap. h_{fg}	Sat. vapor h_g	Sat. liquid s_f	Sat. vapor s_g
0.06	−37.07	0.000 709 7	0.3100	3.41	206.12	3.46	221.27	224.72	0.0147	0.9520
0.08	−31.21	0.000 718 4	0.2366	10.41	209.46	10.47	217.92	228.39	0.0440	0.9447
0.10	−26.43	0.000 725 8	0.1917	16.22	212.18	16.29	215.06	231.35	0.0678	0.9395
0.12	−22.36	0.000 732 3	0.1614	21.23	214.50	21.32	212.54	233.86	0.0879	0.9354
0.14	−18.80	0.000 738 1	0.1395	25.66	216.52	25.77	210.27	236.04	0.1055	0.9322
0.16	−15.62	0.000 743 5	0.1229	29.66	218.32	29.78	208.18	237.97	0.1211	0.9295
0.18	−12.73	0.000 748 5	0.1098	33.31	219.94	33.45	206.26	239.71	0.1352	0.9273
0.20	−10.09	0.000 753 2	0.0993	36.69	221.43	36.84	204.46	241.30	0.1481	0.9253
0.24	−5.37	0.000 761 8	0.0834	42.77	224.07	42.95	201.14	244.09	0.1710	0.9222
0.28	−1.23	0.000 769 7	0.0719	48.18	226.38	48.39	198.13	246.52	0.1911	0.9197
0.32	2.48	0.000 777 0	0.0632	53.06	228.43	53.31	195.35	248.66	0.2089	0.9177
0.36	5.84	0.000 783 9	0.0564	57.54	230.28	57.82	192.76	250.58	0.2251	0.9160
0.4	8.93	0.000 790 4	0.0509	61.69	231.97	62.00	190.32	252.32	0.2399	0.9145
0.5	15.74	0.000 805 6	0.0409	70.93	235.64	71.33	184.74	256.07	0.2723	0.9117
0.6	21.58	0.000 819 6	0.0341	78.99	238.74	79.48	179.71	259.19	0.2999	0.9097
0.7	26.72	0.000 832 8	0.0292	86.19	241.42	86.78	175.07	261.85	0.3242	0.9080
0.8	31.33	0.000 845 4	0.0255	92.75	243.78	93.42	170.73	264.15	0.3459	0.9066
0.9	35.53	0.000 857 6	0.0226	98.79	245.88	99.56	166.62	266.18	0.3656	0.9054
1.0	39.39	0.000 869 5	0.0202	104.42	247.77	105.29	162.68	267.97	0.3838	0.9043
1.2	46.32	0.000 892 8	0.0166	114.69	251.03	115.76	155.23	270.99	0.4164	0.9023
1.4	52.43	0.000 915 9	0.0140	123.98	253.74	125.26	148.14	273.40	0.4453	0.9003
1.6	57.92	0.000 939 2	0.0121	132.52	256.00	134.02	141.31	275.33	0.4714	0.8982
1.8	62.91	0.000 963 1	0.0105	140.49	257.88	142.22	134.60	276.83	0.4954	0.8959
2.0	67.49	0.000 987 8	0.0093	148.02	259.41	149.99	127.95	277.94	0.5178	0.8934
2.5	77.59	0.001 056 2	0.0069	165.48	261.84	168.12	111.06	279.17	0.5687	0.8854
3.0	86.22	0.001 141 6	0.0053	181.88	262.16	185.30	92.71	278.01	0.6156	0.8735

ตารางที่ 16 คุณสมบัติไอငของสารทำความเย็น R-134a

Superheated refrigerant 134a

T °C	v m ³ /kg	u kJ/kg	h kJ/kg	s kJ/(kg · K)	v m ³ /kg	u kJ/kg	h kJ/kg	s kJ/(kg · K)
$P = 0.06 \text{ MPa } (T_{\text{sat}} = -37.07^\circ\text{C})$					$P = 0.10 \text{ MPa } (T_{\text{sat}} = -26.43^\circ\text{C})$			
Sat.	0.31003	206.12	224.72	0.9520	0.19170	212.18	231.35	0.9395
-20	0.33536	217.86	237.98	1.0062	0.19770	216.77	236.54	0.9602
-10	0.34992	224.97	245.96	1.0371	0.20686	224.01	244.70	0.9918
0	0.36433	232.24	254.10	1.0675	0.21587	231.41	252.99	1.0227
10	0.37861	239.69	262.41	1.0973	0.22473	238.96	261.43	1.0531
20	0.39279	247.32	270.89	1.1267	0.23349	246.67	270.02	1.0829
30	0.40688	255.12	279.53	1.1557	0.24216	254.54	278.76	1.1122
40	0.42091	263.10	288.35	1.1844	0.25076	262.58	287.66	1.1411
50	0.43487	271.25	297.34	1.2126	0.25930	270.79	296.72	1.1696
60	0.44879	279.58	306.51	1.2405	0.26779	279.16	305.94	1.1977
70	0.46266	288.08	315.84	1.2681	0.27623	287.70	315.32	1.2254
80	0.47650	296.75	325.34	1.2954	0.28464	296.40	324.87	1.2528
90	0.49031	305.58	335.00	1.3224	0.29302	305.27	334.57	1.2799
$P = 0.14 \text{ MPa } (T_{\text{sat}} = -18.80^\circ\text{C})$					$P = 0.18 \text{ MPa } (T_{\text{sat}} = -12.73^\circ\text{C})$			
Sat.	0.13945	216.52	236.04	0.9322	0.10983	219.94	239.71	0.9273
-10	0.14549	223.03	243.40	0.9606	0.11135	222.02	242.06	0.9362
0	0.15219	230.55	251.86	0.9922	0.11678	229.67	250.69	0.9684
10	0.15875	238.21	260.43	1.0230	0.12207	237.44	259.41	0.9998
20	0.16520	246.01	269.13	1.0532	0.12723	245.33	268.23	1.0304
30	0.17155	253.96	277.97	1.0828	0.13230	253.36	277.17	1.0604
40	0.17783	262.06	286.96	1.1120	0.13730	261.53	286.24	1.0898
50	0.18404	270.32	296.09	1.1407	0.14222	269.85	295.45	1.1187
60	0.19020	278.74	305.37	1.1690	0.14710	278.31	304.79	1.1472
70	0.19633	287.32	314.80	1.1969	0.15193	286.93	314.28	1.1753
80	0.20241	296.06	324.39	1.2244	0.15672	295.71	323.92	1.2030
90	0.20846	304.95	334.14	1.2516	0.16148	304.63	333.70	1.2303
100	0.21449	314.01	344.04	1.2785	0.16622	313.72	343.63	1.2573
$P = 0.20 \text{ MPa } (T_{\text{sat}} = -10.09^\circ\text{C})$					$P = 0.24 \text{ MPa } (T_{\text{sat}} = -5.37^\circ\text{C})$			
Sat.	0.09933	221.43	241.30	0.9253	0.08343	224.07	244.09	0.9222
-10	0.09938	221.50	241.38	0.9256	0.08574	228.31	248.89	0.9399
0	0.10438	229.23	250.10	0.9582	0.08993	236.26	257.84	0.9721
10	0.10922	237.05	258.89	0.9898	0.09399	244.30	266.85	1.0034
20	0.11394	244.99	267.78	1.0206	0.09794	252.45	275.95	1.0339
30	0.11856	253.06	276.77	1.0508	0.10181	260.72	285.16	1.0637
40	0.12311	261.26	285.88	1.0804	0.10562	269.12	294.47	1.0930
50	0.12758	269.61	295.12	1.1094	0.10937	277.67	303.91	1.1218
60	0.13201	278.10	304.50	1.1380	0.11307	286.35	313.49	1.1501
70	0.13639	286.74	314.02	1.1661	0.11674	295.18	323.19	1.1780
80	0.14073	295.53	323.68	1.1939	0.12037	304.15	333.04	1.2055
90	0.14504	304.47	333.48	1.2212	0.12398	313.27	343.03	1.2326
100	0.14932	313.57	343.43	1.2483				

ตารางที่ 16 คุณสมบัติไอငของสารทำความเย็น R-134a (ต่อ)

(Continued)

T °C	v m ³ /kg	u kJ/kg	h kJ/kg	s kJ/(kg · K)	v m ³ /kg	u kJ/kg	h kJ/kg	s kJ/(kg · K)
$P = 0.28 \text{ MPa } (T_{\text{sat}} = -1.23^{\circ}\text{C})$					$P = 0.32 \text{ MPa } (T_{\text{sat}} = 2.48^{\circ}\text{C})$			
Sat.	0.07193	226.38	246.52	0.9197	0.06322	228.43	248.66	0.9177
0	0.07240	227.37	247.64	0.9238				
10	0.07613	235.44	256.76	0.9566	0.06576	234.61	255.65	0.9427
20	0.07972	243.59	265.91	0.9883	0.06901	242.87	264.95	0.9749
30	0.08320	251.83	275.12	1.0192	0.07214	251.19	274.28	1.0062
40	0.08660	260.17	284.42	1.0494	0.07518	259.61	283.67	1.0367
50	0.08992	268.64	293.81	1.0789	0.07815	268.14	293.15	1.0665
60	0.09319	277.23	303.32	1.1079	0.08106	276.79	302.72	1.0957
70	0.09641	285.96	312.95	1.1364	0.08392	285.56	312.41	1.1243
80	0.09960	294.82	322.71	1.1644	0.08674	294.46	322.22	1.1525
90	0.10275	303.83	332.60	1.1920	0.08953	303.50	332.15	1.1802
100	0.10587	312.98	342.62	1.2193	0.09229	312.68	342.21	1.2076
110	0.10897	322.27	352.78	1.2461	0.09503	322.00	352.40	1.2345
120	0.11205	331.71	363.08	1.2727	0.09774	331.45	362.73	1.2611
$P = 0.40 \text{ MPa } (T_{\text{sat}} = 8.93^{\circ}\text{C})$					$P = 0.50 \text{ MPa } (T_{\text{sat}} = 15.74^{\circ}\text{C})$			
Sat.	0.05089	231.97	252.32	0.9145	0.04086	235.64	256.07	0.9117
10	0.05119	232.87	253.35	0.9182				
20	0.05397	241.37	262.96	0.9515	0.04188	239.40	260.34	0.9264
30	0.05662	249.89	272.54	0.8937	0.04416	248.20	270.28	0.9597
40	0.05917	258.47	282.14	1.0148	0.04633	256.99	280.16	0.9918
50	0.06164	267.13	291.79	1.0452	0.04842	265.83	290.04	1.0229
60	0.06405	275.89	301.51	1.0748	0.05043	274.73	299.95	1.0531
70	0.06641	284.75	311.32	1.1038	0.05240	283.72	309.92	1.0825
80	0.06873	293.73	321.23	1.1322	0.05432	292.80	319.96	1.1114
90	0.07102	302.84	331.25	1.1602	0.05620	302.00	330.10	1.1397
100	0.07327	312.07	341.38	1.1878	0.05805	311.31	340.33	1.1675
110	0.07550	321.44	351.64	1.2149	0.05988	320.74	350.68	1.1949
120	0.07771	330.94	362.03	1.2417	0.06168	330.30	361.14	1.2218
130	0.07991	340.58	372.54	1.2681	0.06347	339.98	371.72	1.2484
140	0.08208	350.35	383.18	1.2941	0.06524	349.79	382.42	1.2746

ตารางที่ 16 คุณสมบัติไอငของสารทำความเย็น R-134a (ต่อ)

(Continued)

T °C	v m ³ /kg	u kJ/kg	h kJ/kg	s kJ/(kg · K)	v m ³ /kg	u kJ/kg	h kJ/kg	s kJ/(kg · K)
$P = 0.60 \text{ MPa } (T_{\text{sat}} = 21.58^{\circ}\text{C})$					$P = 0.70 \text{ MPa } (T_{\text{sat}} = 26.72^{\circ}\text{C})$			
Sat.	0.03408	238.74	259.19	0.9097	0.02918	241.42	261.85	0.9080
30	0.03581	246.41	267.89	0.9388	0.02979	244.51	265.37	0.9197
40	0.03774	255.45	278.09	0.9719	0.03157	253.83	275.93	0.9539
50	0.03958	264.48	288.23	1.0037	0.03324	263.08	286.35	0.9867
60	0.04134	273.54	298.35	1.0346	0.03482	272.31	296.69	1.0182
70	0.04304	282.66	308.48	1.0645	0.03634	281.57	307.01	1.0487
80	0.04469	291.86	318.67	1.0938	0.03781	290.88	317.35	1.0784
90	0.04631	301.14	328.93	1.1225	0.03924	300.27	327.74	1.1074
100	0.04790	310.53	339.27	1.1505	0.04064	309.74	338.19	1.1358
110	0.04946	320.03	349.70	1.1781	0.04201	319.31	348.71	1.1637
120	0.05099	329.64	360.24	1.2053	0.04335	328.98	359.33	1.1910
130	0.05251	339.38	370.88	1.2320	0.04468	338.76	370.04	1.2179
140	0.05402	349.23	381.64	1.2584	0.04599	348.66	380.86	1.2444
150	0.05550	359.21	392.52	1.2844	0.04729	358.68	391.79	1.2706
160	0.05698	369.32	403.51	1.3100	0.04857	368.82	402.82	1.2963
$P = 0.80 \text{ MPa } (T_{\text{sat}} = 31.33^{\circ}\text{C})$					$P = 0.90 \text{ MPa } (T_{\text{sat}} = 35.53^{\circ}\text{C})$			
Sat.	0.02547	243.78	264.15	0.9066	0.02255	245.88	266.18	0.9054
40	0.02691	252.13	273.66	0.9374	0.02325	250.32	271.25	0.9217
50	0.02846	261.62	284.39	0.9711	0.02472	260.09	282.34	0.9566
60	0.02992	271.04	294.98	1.0034	0.02609	269.72	293.21	0.9897
70	0.03131	280.45	305.50	1.0345	0.02738	279.30	303.94	1.0214
80	0.03264	289.89	316.00	1.0647	0.02861	288.87	314.62	1.0521
90	0.03393	299.37	326.52	1.0940	0.02980	298.46	325.28	1.0819
100	0.03519	308.93	337.08	1.1227	0.03095	308.11	335.96	1.1109
110	0.03642	318.57	347.71	1.1508	0.03207	317.82	346.68	1.1392
120	0.03762	328.31	358.40	1.1784	0.03316	327.62	357.47	1.1670
130	0.03881	338.14	369.19	1.2055	0.03423	337.52	368.33	1.1943
140	0.03997	348.09	380.07	1.2321	0.03529	347.51	379.27	1.2211
150	0.04113	358.15	391.05	1.2584	0.03633	357.61	390.31	1.2475
160	0.04227	368.32	402.14	1.2843	0.03736	367.82	401.44	1.2735
170	0.04340	378.61	413.33	1.3098	0.03838	378.14	412.68	1.2992
180	0.04452	389.02	424.63	1.3351	0.03939	388.57	424.02	1.3245

ตารางที่ 16 คุณสมบัติไอငของสารทำความเย็น R-134a (ต่อ)

(Continued)

T °C	v m ³ /kg	u kJ/kg	h kJ/kg	s kJ/(kg · K)	v m ³ /kg	u kJ/kg	h kJ/kg	s kJ/(kg · K)
$P = 1.00 \text{ MPa } (T_{\text{sat}} = 39.39^\circ\text{C})$					$P = 1.20 \text{ MPa } (T_{\text{sat}} = 46.32^\circ\text{C})$			
Sat.	0.02020	247.77	267.97	0.9043	0.01663	251.03	270.99	0.9023
40	0.02029	248.39	268.68	0.9066				
50	0.02171	258.48	280.19	0.9428	0.01712	254.98	275.52	0.9164
60	0.02301	268.35	291.36	0.9768	0.01835	265.42	287.44	0.9527
70	0.02423	278.11	302.34	1.0093	0.01947	275.59	298.96	0.9868
80	0.02538	287.82	313.20	1.0405	0.02051	285.62	310.24	1.0192
90	0.02649	297.53	324.01	1.0707	0.02150	295.59	321.39	1.0503
100	0.02755	307.27	334.82	1.1000	0.02244	305.54	332.47	1.0804
110	0.02858	317.06	345.65	1.1286	0.02335	315.50	343.52	1.1096
120	0.02959	326.93	356.52	1.1567	0.02423	325.51	354.58	1.1381
130	0.03058	336.88	367.46	1.1841	0.02508	335.58	365.68	1.1660
140	0.03154	346.92	378.46	1.2111	0.02592	345.73	376.83	1.1933
150	0.03250	357.06	389.56	1.2376	0.02674	355.95	388.04	1.2201
160	0.03344	367.31	400.74	1.2638	0.02754	366.27	399.33	1.2465
170	0.03436	377.66	412.02	1.2895	0.02834	376.69	410.70	1.2724
180	0.03528	388.12	423.40	1.3149	0.02912	387.21	422.16	1.2980
$P = 1.40 \text{ MPa } (T_{\text{sat}} = 52.43^\circ\text{C})$					$P = 1.60 \text{ MPa } (T_{\text{sat}} = 57.92^\circ\text{C})$			
Sat.	0.01405	253.74	273.40	0.9003	0.01208	256.00	275.33	0.8982
60	0.01495	262.17	283.10	0.9297	0.01233	258.48	278.20	0.9069
70	0.01603	272.87	295.31	0.9658	0.01340	269.89	291.33	0.9457
80	0.01701	283.29	307.10	0.9997	0.01435	280.78	303.74	0.9813
90	0.01792	293.55	318.63	1.0319	0.01521	291.39	315.72	1.0148
100	0.01878	303.73	330.02	1.0628	0.01601	301.84	327.46	1.0467
110	0.01960	313.88	341.32	1.0927	0.01677	312.20	339.04	1.0773
120	0.02039	324.05	352.59	1.1218	0.01750	322.53	350.53	1.1069
130	0.02115	334.25	363.86	1.1501	0.01820	332.87	361.99	1.1357
140	0.02189	344.50	375.15	1.1777	0.01887	343.24	373.44	1.1638
150	0.02262	354.82	386.49	1.2048	0.01953	353.66	384.91	1.1912
160	0.02333	365.22	397.89	1.2315	0.02017	364.15	396.43	1.2181
170	0.02403	375.71	409.36	1.2576	0.02080	374.71	407.99	1.2445
180	0.02472	386.29	420.90	1.2834	0.02142	385.35	419.62	1.2704
190	0.02541	396.96	432.53	1.3088	0.02203	396.08	431.33	1.2960
200	0.02608	407.73	444.24	1.3338	0.02263	406.90	443.11	1.3212