

**TABELLE CON LE PROPRIETA' DI SOSTANZE DI  
IMPIEGO COMUNE NELLA FISICA TECNICA**

**TABELLE DI CONVERSIONE DELLE UNITA' DI  
MISURA**

**PIANI TERMODINAMICI**

dipartimento di energetica



## TABELLE CON LE PROPRIETA' DI SOSTANZE DI IMPIEGO COMUNE NELLA FISICA TECNICA

• pesi atomici e molecolari e proprietà critiche di alcuni elementi e componenti comuni.....	1
• proprietà termodinamiche dell'acqua in condizioni di saturazione (temperatura) .....	2
• proprietà termodinamiche dell'acqua in condizioni di saturazione (pressione) .....	4
• proprietà termodinamiche dell'acqua surriscaldata.....	6
• proprietà termodinamiche dell'R134a in condizioni di saturazione (temperatura) .....	10
• proprietà termodinamiche dell'R134a in condizioni di saturazione (pressione) .....	11
• proprietà termodinamiche dell'R134a surriscaldato.....	12
• proprietà dell'aria come gas ideale.....	15
• calori specifici medi impiegabili nell'intervallo 0–100°C.....	16
• coefficienti sperimentali per il calcolo del calore specifico a pressione costante per gas ideale.....	16
• fattore acentrico di alcune sostanze.....	16
• calori specifici di alcuni liquidi e solidi.....	17
• proprietà dei liquidi.....	18
• proprietà dei solidi metallici.....	19
• proprietà dei solidi non metallici.....	20
• proprietà termofisiche dell'aria a pressione atmosferica.....	21
• proprietà termofisiche dell'acqua.....	22
• proprietà termofisiche dell'R134a.....	23
• emissività di alcune superfici (a) metalli.....	24
• emissività di alcune superfici (b) non metalli.....	25

(materiale didattico a diffusione interna e distribuzione gratuita)



### pesi atomici e molecolari e proprietà critiche di alcuni elementi e componenti comuni

(tratta da International Critical Tables e L.C. Nelson e E.F. Obert, Generalized Compressibility Charts, Chem Eng.)

sostanza	formula chimica	M	R [kJ·kg <sup>-1</sup> ·K]	T <sub>c</sub> [K]	p <sub>c</sub> [bar]	Z <sub>c</sub> =(p <sub>c</sub> V <sub>c</sub> )/(RT <sub>c</sub> )
Acetilene	C <sub>2</sub> H <sub>2</sub>	26.04	0.3193	309	62.8	0.274
Aria		28.97	0.2870	133	37.7	0.284
Ammoniaca	NH <sub>3</sub>	17.04	0.4882	406	112.8	0.242
Argon	Ar	39.94	0.2081	151	48.6	0.290
Benzene	C <sub>6</sub> H <sub>6</sub>	78.11	0.1064	563	49.3	0.274
n-Butano	C <sub>4</sub> H <sub>10</sub>	58.12	0.1430	425	38.0	0.274
Carbonio	C	12.01	0.6922			
Biossido di Carbonio	CO <sub>2</sub>	44.01	0.1889	304	73.9	0.276
Monossido di Carbonio	CO	28.01	0.2968	133	35.0	0.294
Rame	Cu	63.54	0.1308			
Etano	C <sub>2</sub> H <sub>6</sub>	30.07	0.2765	305	48.8	0.285
Alcool etilico	C <sub>2</sub> H <sub>5</sub> OH	46.07	0.1805	516	63.8	0.249
Etilene	C <sub>2</sub> H <sub>4</sub>	28.05	0.2964	283	51.2	0.270
Elio	He	4.003	2.0769	5.2	2.3	0.300
Idrogeno	H <sub>2</sub>	2.018	4.1240	33.2	13.0	0.304
Metano	CH <sub>4</sub>	16.04	0.5182	191	46.4	0.290
Metil alcool	CH <sub>3</sub> OH	32.05	0.2594	513	79.5	0.220
Azoto	N <sub>2</sub>	28.01	0.2968	126	33.9	0.291
Ottano	C <sub>8</sub> H <sub>18</sub>	114.22	0.0729	569	24.9	0.258
Ossigeno	O <sub>2</sub>	32.00	0.2598	154	50.5	0.290
Propano	C <sub>3</sub> H <sub>8</sub>	44.09	0.1885	370	42.7	0.276
Propilene	C <sub>3</sub> H <sub>6</sub>	42.08	0.1976	365	46.2	0.276
Refrigerante R134a	CF <sub>3</sub> CH <sub>2</sub> F	102.03	0.08149	374	4.1	
Biossido di Zolfo	SO <sub>2</sub>	64.06	0.1298	431	78.7	0.268
Acqua	H <sub>2</sub> O	18.02	0.4615	647.3	220.9	

**proprietà termodinamiche dell'acqua in condizioni di saturazione – temperatura(1/2)**

temp. T [°C]	press. p [bar]	volume specifico		entropia specifica			entalpia specifica			energia interna specifica		
		v <sub>l</sub> [dm <sup>3</sup> ·kg <sup>-1</sup> ]	v <sub>vs</sub> [m <sup>3</sup> ·kg <sup>-1</sup> ]	s <sub>l</sub> [kJ·kg <sup>-1</sup> ·K <sup>-1</sup> ]	s <sub>vs</sub> [kJ·kg <sup>-1</sup> ·K <sup>-1</sup> ]	s <sub>vs</sub> -s <sub>l</sub> [kJ·kg <sup>-1</sup> ·K <sup>-1</sup> ]	h <sub>l</sub> [kJ·kg <sup>-1</sup> ]	h <sub>vs</sub> [kJ·kg <sup>-1</sup> ]	h <sub>vs</sub> -h <sub>l</sub> [kJ·kg <sup>-1</sup> ]	u <sub>l</sub> [kJ·kg <sup>-1</sup> ]	u <sub>vs</sub> [kJ·kg <sup>-1</sup> ]	u <sub>vs</sub> -u <sub>l</sub> [kJ·kg <sup>-1</sup> ]
0.01	0.006112	1.0002	206.3	0	9.1545	9.1545	0.00	2500.5	2500.5	0	2374.5	2374.5
5	0.008722	1.0000	147.1	0.0764	9.0234	8.9470	21.05	2509.7	2488.6	21.05	2360.4	2339.5
10	0.01275	1.0002	106.4	0.1511	8.8985	8.7474	42.03	2518.9	2476.9	42.03	2388.3	2346.3
15	0.01745	1.0008	77.96	0.2244	8.7793	8.5549	62.96	2528.1	2465.1	62.96	2395.2	2332.2
20	0.02337	1.0017	57.84	0.2963	8.6652	8.3689	83.86	2537.3	2463.4	83.86	2402.1	2318.2
25	0.03166	1.0029	43.41	0.3660	8.5561	8.1892	104.74	2546.4	2441.7	14.74	2409.0	2304.3
30	0.04241	1.0043	32.94	0.4364	8.4516	8.0152	125.61	2555.5	2429.9	125.61	2415.7	2290.1
35	0.05621	1.0059	25.26	0.5046	8.3514	7.8468	146.47	2564.5	2418.0	146.46	2422.5	2276.0
40	0.07374	1.0078	19.56	0.5718	8.2553	7.6835	167.34	2573.5	2406.2	167.33	2429.3	2262.0
45	0.09581	1.0099	15.28	0.6379	8.1631	7.5252	188.22	2582.4	2394.2	188.21	2436.0	2247.8
50	0.12334	1.0121	12.05	0.7031	8.0745	7.3714	209.11	2591.3	2382.2	209.10	2442.7	2333.6
55	0.15740	1.0146	9.583	0.7672	7.9893	7.2221	230.00	2600.1	2370.1	229.98	2449.3	2219.3
60	0.1992	1.0172	7.682	0.8304	7.9074	7.0770	250.91	2608.8	2357.9	250.89	2455.8	2204.9
65	0.2501	1.0200	6.205	0.8928	7.8286	6.9358	271.84	2617.4	2345.5	271.81	2462.2	2190.4
70	0.3116	1.0229	5.048	0.9542	7.7526	6.7984	292.78	2628.9	2333.1	292.75	2468.6	2175.8
75	0.3855	1.0260	4.135	1.0149	7.6794	6.6645	313.74	2634.2	2320.5	313.70	2474.8	2161.1
80	0.4736	1.0293	3.410	1.0747	7.6088	6.5341	334.72	2642.5	2307.8	334.67	2481.0	2146.3
85	0.5780	1.0327	2.829	1.1337	7.5407	6.4070	355.72	2650.7	2295.0	355.66	2487.2	2131.5
90	0.7011	1.0363	2.361	1.1920	7.4749	6.2829	376.75	2658.7	2281.9	374.68	2493.2	2116.5
95	0.8453	1.0400	1.982	1.2495	7.4114	6.1619	397.80	2666.6	2268.6	397.71	2499.1	2101.4
100	1.0132	1.0438	1.673	1.3063	7.3500	6.0437	418.88	2674.4	2255.5	418.77	2504.9	2086.1
105	1.2080	1.0479	1.419	1.3625	7.2906	5.9281	439.99	2682.1	2242.1	439.86	2510.7	2070.8
110	1.4326	1.0520	1.210	1.4179	7.2331	5.8152	461.13	2689.0	2228.5	460.98	2516.3	2055.3
115	1.6905	1.0563	1.036	1.4728	7.1775	5.7047	482.31	2697.0	2214.7	482.13	2521.9	2039.8
120	1.9853	1.0608	0.8913	1.5270	7.1236	5.5966	503.5	2704.2	2201.0	503.3	2527.3	2024.0
125	2.3208	1.0654	0.7700	1.5807	7.0714	5.4907	524.8	2711.4	2186.6	524.6	2532.7	2008.1
130	2.7011	1.0702	0.6679	1.6338	7.0208	5.3870	546.1	2718.3	2172.2	545.8	2537.9	1992.1
135	3.131	1.0751	0.5817	1.6863	6.9717	5.2854	567.5	2725.1	2157.6	567.2	2543.0	1975.8
140	3.614	1.0802	0.5074	1.7383	6.9240	5.1857	588.9	2731.8	2142.9	588.5	2548.1	1959.6
145	4.155	1.0855	0.4459	1.7899	6.8776	5.0877	610.4	2738.3	2127.9	610.0	2553.1	1943.1
150	4.760	1.0910	0.3924	1.8409	6.8325	4.9916	631.9	2744.5	2112.6	631.4	2557.7	1926.3
155	5.433	1.0966	0.3464	1.8915	6.7885	4.8970	653.5	2750.6	2097.1	652.9	2562.4	1909.5
160	6.180	1.1024	0.3068	1.9416	6.7456	4.8040	675.2	2756.5	2081.3	674.5	2566.9	1892.4
165	7.008	1.1085	0.2724	1.9913	6.7037	4.7124	696.9	2762.2	2064.3	696.1	2571.3	1875.2
170	7.920	1.1147	0.2426	2.0407	6.6628	4.6221	718.8	2767.6	2048.8	717.9	2575.5	1857.6
175	8.925	1.1211	0.2166	2.0896	6.6227	4.5331	740.7	2772.7	2032.0	739.7	2579.4	1839.7
180	10.027	1.1278	0.1939	2.1382	6.5833	4.4451	762.7	2777.6	2014.9	761.6	2583.2	1821.6
185	11.234	1.1347	0.1740	2.1864	6.5447	4.3583	784.8	2782.1	1997.3	783.3	2586.6	1803.1
190	12.552	1.1418	0.1564	2.2333	6.5067	4.2724	807.0	2786.3	1979.3	805.6	2590.0	1784.4
195	13.989	1.1491	0.1409	2.2820	6.4692	4.1872	829.4	2790.2	1960.8	827.8	2593.1	1765.3

**proprietà termodinamiche dell'acqua in condizioni di saturazione - temperatura(2/2)**

temp.	press.	volume specifico		entropia specifica			entalpia specifica			energia interna specifica		
T [°C]	p [bar]	v <sub>l</sub> [dm <sup>3</sup> ·kg <sup>-1</sup> ]	v <sub>vs</sub> [dm <sup>3</sup> ·kg <sup>-1</sup> ]	s <sub>l</sub> [kJ·kg <sup>-1</sup> ·K <sup>-1</sup> ]	s <sub>vs</sub> [kJ·kg <sup>-1</sup> ·K <sup>-1</sup> ]	s <sub>vs</sub> -s <sub>l</sub> [kJ·kg <sup>-1</sup> ·K <sup>-1</sup> ]	h <sub>l</sub> [kJ·kg <sup>-1</sup> ]	h <sub>vs</sub> [kJ·kg <sup>-1</sup> ]	h <sub>vs</sub> -h <sub>l</sub> [kJ·kg <sup>-1</sup> ]	u <sub>l</sub> [kJ·kg <sup>-1</sup> ]	u <sub>vs</sub> [kJ·kg <sup>-1</sup> ]	u <sub>vs</sub> -u <sub>l</sub> [kJ·kg <sup>-1</sup> ]
200	15.551	1.1568	0.1273	2.3293	6.4322	4.1029	851.8	2793.7	1941.9	850.0	2595.7	1745.7
205	17.245	1.1647	0.1151	2.3764	6.3955	4.0191	874.4	2796.8	1922.4	872.4	2598.3	1725.9
210	19.080	1.1729	0.1043	2.4232	6.3593	3.9361	897.1	2799.4	1902.3	894.9	2600.4	1705.5
215	21.063	1.1814	0.09471	2.4698	6.3233	3.8535	920.0	2801.7	1881.7	917.5	2602.3	1684.8
220	23.201	1.1903	0.08611	2.5162	6.2875	3.7713	943.0	2803.4	1860.4	940.2	2603.6	1663.4
225	25.504	1.1994	0.07841	2.5625	6.2518	3.6893	966.2	2804.6	1838.4	963.1	2604.6	1641.5
230	27.979	1.2090	0.07150	2.6086	6.2162	3.3076	989.6	2805.4	1815.8	986.2	2605.4	1619.2
235	30.635	1.2190	0.06528	2.6545	6.1807	3.5262	1013.2	2805.5	1792.4	1009.5	2605.5	1596.0
240	33.480	1.2293	0.05967	2.7004	6.1452	3.4448	1036.9	2805.1	1768.2	1032.8	2605.3	1572.5
245	36.524	1.2402	0.05460	2.7461	6.1096	3.3635	1060.9	2804.1	1743.3	1056.4	2604.7	1548.3
250	39.78	1.2515	0.05002	2.7818	6.0738	3.2820	1085.1	2802.5	1717.4	1080.1	2603.5	1523.4
255	43.24	1.2633	0.04586	2.8375	6.0380	3.2005	1109.5	2800.3	1690.7	1104.0	2602.0	1498.0
260	46.94	1.2757	0.04209	2.8832	6.0019	3.1187	1134.3	2797.4	1663.1	1128.3	2599.8	1471.5
265	50.87	1.2888	0.03865	2.9289	5.9656	3.0367	1159.3	2793.8	1634.5	1152.8	2597.2	1444.4
270	55.05	1.3025	0.03552	2.9747	5.9290	2.9543	1184.5	2789.5	1604.9	1177.3	2594.0	1416.7
275	59.49	1.3169	0.03266	3.0206	5.8921	2.8715	1210.2	2784.5	1574.3	1202.4	2590.2	1387.8
280	64.19	1.3322	0.03005	3.0666	5.8549	2.7883	1236.1	2778.7	1542.5	1227.5	2585.8	1358.3
285	69.17	1.3483	0.02766	3.1128	5.8174	2.7046	1262.5	2772.2	1509.6	1253.2	2580.9	1327.7
290	74.45	1.3665	0.02546	3.1593	5.7794	2.6201	1289.3	2764.9	1475.6	1279.1	2575.4	1296.3
295	80.03	1.3837	0.02345	3.2061	5.7410	2.5349	1316.5	2756.9	1440.2	1305.4	2569.2	1263.8
300	85.92	1.4033	0.02160	3.2532	5.7022	2.4490	1344.2	2748.0	1403.6	1332.1	2562.4	1230.3
305	92.14	1.424	0.01989	3.3008	5.6620	2.3621	1372.5	2738.3	1365.5	1359.4	2555.1	1195.7
310	98.70	1.447	0.01832	3.3489	5.6232	2.2743	1401.3	2727.7	1326.0	1387.0	2546.9	1159.9
315	105.61	1.471	0.01687	3.3977	5.5837	2.1860	1430.9	2716.8	1285.8	1415.4	2538.6	1123.2
320	112.90	1.498	0.01549	3.4473	5.5401	2.0928	1461.3	2702.4	1241.3	1444.4	2527.5	1083.1
325	120.57	1.527	0.01420	3.4978	5.4924	1.9946	1492.5	2685.7	1193.1	1474.1	2514.5	1040.4
330	128.65	1.560	0.01298	3.5495	5.4422	1.8927	1524.8	2666.4	1141.5	1504.7	2499.4	994.7
335	137.14	1.597	0.01184	3.6026	5.3884	1.7858	1558.4	2644.3	1086.0	1536.5	2481.9	945.4
340	146.08	1.638	0.010777	3.6577	5.3321	1.6744	1593.5	2620.2	1026.7	1569.6	2462.9	893.3
345	155.45	1.687	0.009765	3.7154	5.2733	1.5579	1630.5	2593.4	963.0	1604.3	2441.6	837.3
350	165.37	1.746	0.008803	3.7768	5.2087	1.4319	1670.3	2562.3	892.2	1641.4	2416.7	775.3
355	175.77	1.817	0.007878	3.8431	5.1371	1.2940	1714.5	2527.4	812.8	1682.6	2388.8	706.2
360	186.74	1.908	0.006967	3.9159	5.0545	1.1386	1762.2	2483.1	720.9	1726.6	2353.0	626.4
365	198.30	2.03	0.00604	4.0013	4.9541	0.9528	1817.9	2425.9	608.0	1777.6	2306.1	528.5
370	210.52	2.23	0.00499	4.1131	4.8069	0.6938	1893.7	2339.9	446.2	1846.8	2234.9	388.1
371	213.06	2.30	0.00474	4.1437	4.7675	0.6238	1914.2	2316.1	401.9	1865.2	2214.2	349.0
372	215.62	2.37	0.00447	4.1801	4.7211	0.5410	1938.1	2287.1	349.0	1887.0	2190.7	303.7
373	218.22	2.49	0.00415	4.229	4.6625	0.434	1972.0	2252.3	280.4	1917.7	2161.7	244.0
374	220.86	2.79	0.00362	4.325	4.548	0.223	2043.2	2187.5	144.4	1981.6	2107.5	125.9
374.15	221.29	3.18	0.00318		4.430	0		2099.7	0		2029.3	0

**proprietà termodinamiche dell'acqua in condizioni di saturazione – pressione(1/2)**

press. <b>p</b>	temp. <b>T</b>		vol. spec. <b>v<sub>vs</sub></b>	entropia specifica			entalpia specifica			energia interna specifica				
	<b>bar</b>	<b>°C</b>		<b>K</b>	<b>m<sup>3</sup>·kg<sup>-1</sup></b>	<b>s<sub>l</sub></b>	<b>s<sub>vs</sub></b>	<b>s<sub>vs</sub> – s<sub>l</sub></b>	<b>h<sub>l</sub></b>	<b>h<sub>vs</sub></b>	<b>h<sub>vs</sub> – h<sub>l</sub></b>	<b>u<sub>l</sub></b>	<b>u<sub>vs</sub></b>	<b>u<sub>vs</sub> – u<sub>l</sub></b>
					<b>kJ·kg<sup>-1</sup>·K<sup>-1</sup></b>	<b>kJ·kg<sup>-1</sup>·K<sup>-1</sup></b>	<b>kJ·kg<sup>-1</sup>·K<sup>-1</sup></b>	<b>kJ·kg<sup>-1</sup></b>	<b>kJ·kg<sup>-1</sup></b>	<b>kJ·kg<sup>-1</sup></b>	<b>kJ·kg<sup>-1</sup></b>	<b>kJ·kg<sup>-1</sup></b>	<b>kJ·kg<sup>-1</sup></b>	<b>kJ·kg<sup>-1</sup></b>
0.01	6.98	280.14	129.2	0.1061	8.9734	8.8673	29.35	2513.4	2484.0	29.35	2384.2	2354.0		
0.015	13.03	286.19	87.99	0.1957	8.8256	8.6299	54.72	2524.5	2469.8	54.7	2392.5	2337.8		
0.02	17.51	290.67	67.02	0.2607	8.7214	8.4607	73.45	2532.7	2459.3	73.45	2398.7	2325.3		
0.025	21.09	294.25	54.27	0.3119	8.6409	8.3290	88.43	2539.3	2450.8	88.43	2403.6	2315.2		
0.03	24.10	297.26	45.68	0.3543	8.5754	8.2211	100.97	2544.7	2443.8	100.97	2407.7	2306.7		
0.04	28.98	302.14	34.81	0.4223	8.4725	8.0502	121.36	2553.6	2432.3	121.36	2414.4	2293.0		
0.05	32.90	306.06	28.20	0.4761	8.3930	7.9169	137.71	2460.7	2423.0	137.71	2419.7	2282.0		
0.06	36.19	309.35	23.75	0.5206	8.3283	7.8077	151.42	2566.7	2415.2	151.42	2424.2	2272.8		
0.08	41.54	314.70	18.11	0.5922	8.2266	7.6344	173.76	2576.3	2402.5	173.76	2431.4	2257.6		
0.10	45.84	319.00	14.68	0.6489	8.1480	7.4991	191.71	2583.9	2392.2	191.70	2437.1	2245.4		
0.12	49.45	322.61	12.37	0.6959	8.0841	7.3882	206.80	2590.3	2383.5	206.79	2441.9	2235.1		
0.15	54.00	327.16	10.03	0.7545	8.0061	7.2516	225.82	2598.3	2372.5	225.80	2447.9	2222.1		
0.20	60.09	333.25	7.652	0.8216	7.9060	7.0744	251.28	2608.9	2357.6	251.26	2455.9	2204.6		
0.25	64.99	338.14	6.206	0.8927	7.8287	6.9360	271.81	2617.4	2345.6	271.78	2462.3	2190.5		
0.30	69.12	342.28	5.231	0.9435	7.7657	6.8222	289.11	2624.4	2335.3	289.08	2467.5	2478.4		
0.40	75.89	349.05	3.994	1.0255	7.6667	6.6412	317.46	2635.7	2318.3	317.42	2475.9	2158.5		
0.50	81.35	354.51	3.241	1.0906	7.5903	6.4997	340.37	2644.7	2304.4	340.32	2482.7	2142.4		
0.60	85.95	359.11	2.732	1.1449	7.5280	6.3831	359.73	2652.2	2292.5	359.67	2488.3	2128.6		
0.70	89.96	363.12	2.365	1.1915	7.4754	6.2839	376.58	2658.6	2282.1	376.51	2493.1	2116.6		
0.80	93.51	366.67	2.087	1.2324	7.4300	6.1976	391.53	2664.3	2272.7	391.45	2497.3	2105.9		
0.90	96.71	369.87	1.869	1.2690	7.3901	6.1211	405.02	2669.3	2264.3	404.93	2501.1	2096.2		
1.0	99.63	372.79	1.694	1.3022	7.3544	6.0522	417.33	2673.8	2256.5	417.23	2504.4	2087.2		
1.1	102.32	375.48	1.549	1.3324	7.3222	5.9898	428.66	2678.0	2249.3	428.55	2507.6	2079.1		
1.2	104.81	377.97	1.428	1.3603	7.2928	5.9325	439.18	2681.8	2242.6	439.05	2510.4	2071.4		
1.3	107.13	380.29	1.325	1.3862	7.2658	5.8796	449.01	2685.3	2236.3	448.78	2513.1	2064.3		
1.4	109.32	382.48	1.236	1.4104	7.2409	5.8305	458.24	2688.6	2230.3	458.09	2515.6	2057.5		
1.5	111.37	384.53	1.159	1.4331	7.2177	5.7846	466.94	2691.6	2224.7	466.79	2517.8	2051.0		
1.6	113.32	386.48	1.091	1.4544	7.1960	5.7416	475.20	2694.5	2219.3	475.03	2519.9	2044.9		
1.8	116.93	390.09	0.9769	1.4938	7.1565	5.6627	490.52	2699.8	2209.3	490.33	2624.0	2033.7		
2.0	120.23	393.39	0.8852	1.5295	7.1212	5.5917	504.52	2704.6	2200.1	504.31	2527.6	2023.3		
2.2	123.27	396.43	0.8096	1.5622	7.0893	5.5271	517.4	2708.9	2191.5	517.2	2531.2	2014.2		
2.4	126.09	399.25	0.7462	1.5923	7.0602	5.4679	529.5	2712.9	2183.4	529.2	2533.8	2004.6		
2.6	128.73	401.89	0.6923	1.6203	7.0335	5.4132	540.7	2716.6	2175.9	540.4	2536.6	1996.2		
2.8	131.21	404.37	0.6458	1.6465	7.0088	5.3623	551.3	2720.0	2168.7	551.0	2539.2	1988.2		
3.0	133.54	406.70	0.6054	1.6711	6.9859	5.3148	561.2	2723.0	2161.9	560.9	2537.0	1976.1		
3.2	135.76	408.92	0.5698	1.6942	6.9644	5.2702	570.7	2726.2	2155.5	570.4	2543.9	1973.5		
3.4	137.86	411.02	0.5383	1.7161	6.9442	5.2281	579.7	2729.0	2149.2	579.3	2546.0	1966.7		
3.6	139.87	413.03	0.5102	1.7370	6.9252	5.1882	588.3	2731.6	2143.3	587.9	2547.9	1960.0		
3.8	141.79	414.85	0.4849	1.7568	6.9072	5.1504	596.5	2734.1	2137.6	596.1	2549.8	1953.7		
4.0	143.63	416.79	0.4621	1.7757	6.8902	5.1145	604.4	2736.5	2132.1	604.0	2551.7	1947.7		

**proprietà termodinamiche dell'acqua in condizioni di saturazione – pressione(2/2)**

press. p bar	temp. T		vol. spec. v <sub>vs</sub> m <sup>3</sup> ·kg <sup>-1</sup>	entropia specifica			entalpia specifica			energia interna specifica			
	°C	K		s <sub>l</sub> kJ·kg <sup>-1</sup> ·K <sup>-1</sup>	s <sub>vs</sub> kJ·kg <sup>-1</sup> ·K <sup>-1</sup>	s <sub>vs</sub> – s <sub>l</sub> kJ·kg <sup>-1</sup> ·K <sup>-1</sup>	h <sub>l</sub> kJ·kg <sup>-1</sup>	h <sub>vs</sub> kJ·kg <sup>-1</sup>	h <sub>vs</sub> – h <sub>l</sub> kJ·kg <sup>-1</sup>	u <sub>l</sub> kJ·kg <sup>-1</sup>	u <sub>vs</sub> kJ·kg <sup>-1</sup>	u <sub>vs</sub> – u <sub>l</sub> kJ·kg <sup>-1</sup>	
5.0	151.85	425.01	0.3746	1.8596	6.8161	4.9565	639.9	2746.8	2107.0	639.4	2559.5	1920.1	
6.0	158.84	432.00	0.3155	1.9300	6.7555	4.8255	670.1	2755.2	2085.1	669.4	2565.9	1896.5	
8.0	170.41	443.57	0.2403	2.0447	6.6594	4.6147	720.6	2768.0	2047.5	719.7	2575.8	1856.1	
10.0	179.88	453.04	0.1944	2.1370	6.5843	4.4473	762.2	2777.5	2015.3	761.1	2583.1	1822.0	
11.0	184.06	457.22	0.1775	2.1774	6.5519	4.3745	780.7	2781.3	2000.6	779.5	2586.1	1807.6	
12.0	187.96	461.12	0.1633	2.2148	6.5221	4.3073	797.9	2784.7	1986.7	796.5	2588.7	1792.2	
14.0	195.04	468.20	0.1408	2.2823	6.4689	4.1866	829.5	2790.2	1960.7	827.9	2593.1	1765.2	
16.0	201.37	474.53	0.1238	2.3422	6.4221	4.0799	858.0	2794.6	1936.6	856.2	2596.5	1740.4	
18.0	207.11	480.27	0.1104	2.3961	6.3802	3.9841	884.0	2798.0	1914.0	881.9	2599.3	1717.4	
20.0	212.37	485.53	0.09964	2.4453	6.3422	3.8969	908.0	2800.6	1892.6	905.7	2601.3	1685.7	
22.0	217.24	490.40	0.09074	2.4906	6.3072	3.8166	930.3	2802.5	1872.2	927.7	2602.9	1675.2	
24.0	221.78	494.94	0.08328	2.5327	6.2748	3.7421	951.3	2803.9	1852.7	948.4	2604.0	1655.5	
26.0	226.03	499.19	0.07682	2.5720	6.2445	3.6725	971.0	2804.8	1833.8	967.9	2604.8	1636.9	
28.0	230.04	503.20	0.07144	2.6089	6.2159	3.6070	989.8	2805.4	1815.6	986.4	2605.4	1619.0	
30.0	233.84	507.00	0.06667	2.6438	6.1890	3.5452	1007.7	2805.5	1797.9	1004.1	2605.5	1601.4	
32	237.44	510.60	0.06247	2.6739	6.1634	3.4865	1024.7	2805.4	1780.7	1020.8	2605.5	1584.7	
34	240.88	514.04	0.05874	1.7084	6.1389	3.4305	1041.1	2805.0	1763.9	1036.9	2605.3	1568.4	
36	244.16	517.32	0.05542	2.7385	6.1155	3.3770	1056.9	2804.4	1747.5	1052.4	2604.9	1552.5	
38	247.31	520.47	0.04243	2.7672	6.0931	3.3259	1072.1	2803.3	1931.4	1079.4	2604.3	1536.9	
40	250.33	523.49	0.04973	2.7949	6.0714	3.2765	1086.7	2802.4	1715.7	1071.7	2603.3	1521.8	
42	253.24	526.40	0.04728	2.8215	6.0506	3.2291	1100.9	2801.2	1700.2	1095.6	2602.6	1507.0	
44	256.05	529.21	0.04504	2.8471	6.0134	3.1833	1114.7	2799.7	1685.0	1109.1	2601.5	1492.4	
46	258.76	531.92	0.04299	2.8718	6.0109	3.1391	1128.1	2798.2	1670.1	1122.3	2600.4	1478.1	
48	261.38	534.54	0.04111	2.8958	5.9919	3.0961	1141.1	2796.5	1655.3	1135.0	2599.2	1464.2	
50	263.92	537.58	0.03937	2.9190	5.9735	3.0545	1153.8	2794.6	1640.8	1147.4	2597.8	1450.4	
55	259.94	543.10	0.03556	2.9741	5.9294	2.9553	1184.2	2789.6	1605.3	1177.0	2594.0	1417.0	
60	275.56	548.72	0.03236	3.0257	5.8880	2.8623	1213.1	2783.9	1570.8	1205.2	2589.7	1384.5	
65	280.83	553.99	0.02964	3.0743	5.8487	2.7744	1240.5	2777.7	1537.2	1231.8	2585.0	1353.2	
70	285.80	558.96	0.02729	3.1203	5.8113	2.6910	1266.7	2771.1	1504.3	1257.2	2580.1	1322.9	
75	190.51	563.67	0.02525	3.1640	5.7755	2.5115	1282.0	2764.1	1472.0	1281.5	2574.7	1293.2	
80	294.98	568.14	0.02346	3.2059	5.7412	2.5253	1316.4	2756.9	1444.4	1305.7	2569.2	1263.5	
85	299.24	572.40	0.02187	3.2460	5.7081	2.4621	1339.9	2749.4	1409.2	1328.0	2563.5	1235.5	
90	303.31	576.47	0.02045	3.2847	5.6762	2.3915	1362.9	2741.6	1378.5	1350.2	2557.6	1207.4	
100	310.96	584.12	0.01803	3.3582	5.6155	2.2573	1407.0	2725.6	1318.2	1392.5	2545.3	1152.8	
120	324.64	597.80	0.01429	3.4941	5.4971	2.0030	1490.2	2687.2	1196.3	1471.9	2515.7	1044.2	
140	336.63	609.69	0.01149	3.6203	5.3726	1.7523	1569.6	2637.7	1066.7	1547.1	2476.8	929.7	
160	347.32	620.48	0.009314	3.7433	5.2471	1.5038	1648.5	2581.2	929.9	1621.1	2432.2	811.1	
180	356.96	630.12	0.007518	3.8707	5.1062	1.2355	1732.9	2511.4	778.5	1699.6	2376.1	676.5	
200	365.71	638.87	0.00591	4.0151	4.9375	0.9224	1826.7	2416.0	589.3	1785.5	2297.8	512.3	
220	373.7	646.86	0.00385	4.2802	4.6023	0.3221	2009.7	2218.0	208.4	1951.6	2133.3	181.7	
221.29	374.15	647.31	0.00318	4.430			0	2099.7		0	2029.3		0

tratta da: J.Kestin. A Course in Thermodynamics. Mc Graw Hill 1979.

**proprietà termodinamiche dell'acqua surriscaldata (1/4)**

<b>t</b> °C	<b>v</b> m <sup>3</sup> ·kg <sup>-1</sup>	<b>u</b> kJ·kg <sup>-1</sup>	<b>h</b> kJ·kg <sup>-1</sup>	<b>s</b> kJ·kg <sup>-1</sup> ·K <sup>-1</sup>	<b>v</b> m <sup>3</sup> ·kg <sup>-1</sup>	<b>u</b> kJ·kg <sup>-1</sup>	<b>h</b> kJ·kg <sup>-1</sup>	<b>s</b> kJ·kg <sup>-1</sup> ·K <sup>-1</sup>	<b>v</b> m <sup>3</sup> ·kg <sup>-1</sup>	<b>u</b> kJ·kg <sup>-1</sup>	<b>h</b> kJ·kg <sup>-1</sup>	<b>s</b> kJ·kg <sup>-1</sup> ·K <sup>-1</sup>
	p = 0.01 MPa (45.81 °C)				p = 0.05 MPa (81.33 °C)				p = 0.10 MPa (99.63 °C)			
Sat	14.674	2437.9	2584.7	8.1502	3.240	2483.9	2645.9	7.5939	1.6940	2506.1	2675.5	7.3594
50	14.869	2443.9	2592.6	8.1749								
100	17.196	2515.5	2687.5	8.4479	3.418	2511.6	2682.5	7.6947	1.6958	2506.7	2676.2	7.3614
150	19.512	2587.9	2783.0	8.6882	3.889	2585.6	2780.1	7.9401	1.9364	2582.8	2776.4	7.6134
200	21.825	2661.3	2879.5	8.9038	4.356	2659.9	2877.7	8.1580	2.172	2658.1	2875.3	7.8343
250	24.136	2736.0	2977.3	9.1002	4.820	2735.0	2976.0	8.3556	2.406	2733.7	2974.3	8.0333
300	26.445	2812.1	3076.5	9.2813	5.284	2811.3	3075.5	8.5373	2.639	2810.4	3074.3	8.2158
400	31.063	2968.9	3279.6	9.6077	6.209	2968.5	3278.9	8.8642	3.103	2967.9	3278.2	8.5435
500	35.679	3132.3	3489.1	9.8978	7.134	3132.0	3488.7	9.1546	3.565	3131.6	3488.1	8.8342
600	40.295	3302.5	3705.4	10.1608	8.057	3302.2	3705.1	9.4178	4.028	3301.9	3704.4	9.0976
700	44.911	3479.6	3928.7	10.4028	8.981	3479.4	3928.5	9.6599	4.490	3479.2	3928.2	9.3398
800	49.526	3663.8	4159.0	10.6281	9.904	3663.6	4158.9	9.8852	4.952	3663.5	4158.6	9.5652
900	54.141	3855.0	4396.4	10.8396	10.828	3854.9	4396.3	10.0967	5.414	3854.8	4396.1	9.7767
1000	58.757	4053.0	4640.6	11.0393	11.751	4052.9	4640.5	10.2964	5.875	4052.8	4640.3	9.9764
	p = 0.20 MPa (120.23 °C)				p = 0.30 MPa (133.55 °C)				p = 0.40 MPa (143.63 °C)			
Sat.	0.8857	2529.5	2706.7	7.1272	0.6058	2543.6	2725.3	6.9919	0.4625	2553.6	2738.6	6.8959
150	0.9596	2576.9	2768.8	7.2795	0.6339	2570.8	2761.0	7.0778	0.4708	2564.5	2752.8	6.9299
200	1.0803	2654.4	2870.5	7.5066	0.7163	2650.7	2865.6	7.3115	0.5342	2646.8	2860.5	7.1706
250	1.1988	2731.2	2971.0	7.7086	0.7964	2728.7	2967.6	7.5166	0.5951	2726.1	2964.2	7.3789
300	1.3162	2808.6	3071.8	7.8926	0.8753	2806.7	3069.3	7.7022	0.6548	2804.8	3066.8	7.5662
400	1.5493	2966.7	3276.6	8.2218	1.0315	2965.6	3275.0	8.0330	0.7726	2964.4	3273.4	7.8985
500	1.7814	3130.8	3487.1	8.5133	1.1867	3130.0	3486.0	8.3251	0.8893	3129.2	3484.9	8.1913
600	2.013	3301.4	3704.0	8.7770	1.3414	3300.8	3703.2	8.5892	1.0055	3300.2	3702.4	8.4558
700	2.244	3478.8	3927.6	9.0194	1.4957	3478.4	3927.1	8.8319	1.1215	3477.9	3926.5	8.6987
800	2.475	3663.1	4158.2	9.2449	1.6499	3662.9	4157.8	9.0576	1.2372	3662.4	4157.3	8.9244
900	2.705	3854.5	4395.8	9.4566	1.8041	3854.2	4395.4	9.2692	1.3529	3853.9	4395.1	9.1362
1000	2.937	4052.5	4640.0	9.6563	1.9581	4052.3	4639.7	9.4690	1.4685	4052.0	4639.4	8.3360
1100	3.168	4257.0	4890.7	9.8458	2.1121	4256.8	4890.4	9.6585	1.5840	4256.5	4890.2	9.5256
	p = 0.50 MPa (151.86 °C)				p = 0.60 MPa (158.85 °C)				p = 0.80 MPa (170.43 °C)			
Sat.	0.3749	2561.2	2748.7	6.8213	0.3157	2567.4	2756.8	6.7600	0.2404	2576.8	2769.1	6.6628
200	0.4249	2642.9	2855.4	7.0592	0.3520	2638.9	2850.1	6.9665	0.2608	2630.6	2839.3	6.8158
250	0.4744	2723.5	2960.7	7.2709	0.3938	2720.9	2957.2	7.1816	0.2931	2715.5	2950.0	7.0384
300	0.5226	2802.9	3064.2	7.4599	0.4344	2801.0	3061.6	7.3724	0.3241	2797.2	3056.5	7.2328
350	0.5701	2882.6	3167.7	7.6329	0.4742	2881.2	3165.7	7.5464	0.3544	2878.2	3161.7	7.4089
400	0.6173	2963.2	3271.9	7.7938	0.5137	2962.1	3270.3	7.7079	0.3843	2959.7	3267.1	7.5716
500	0.7109	3128.4	3483.9	8.0873	0.5920	3127.6	3482.8	8.0021	0.4433	3126.0	3480.6	7.8673
600	0.8041	3299.6	3701.7	7.3522	0.6697	3299.1	3700.9	8.2674	0.5018	3297.9	3699.4	8.1333
700	0.8969	3477.5	3925.9	8.5952	0.7472	3477.0	3925.3	8.5107	0.5601	3476.2	3924.2	8.3770
800	0.9896	3662.1	4156.9	8.8211	0.8245	3661.8	4156.5	8.7367	0.6181	3661.1	4155.6	8.6033
900	1.0822	3853.6	4394.7	9.0329	0.9017	3853.4	4394.4	8.9486	0.6761	3852.8	4393.7	8.8153
1000	1.1747	4051.8	4639.1	9.2328	0.9788	4051.5	4638.8	9.1485	0.7340	4051.0	4638.2	9.0153
1100	1.2672	4256.3	4889.9	9.4224	1.0559	4256.1	4889.6	9.3381	0.7919	4255.6	4889.1	9.2050



**proprietà termodinamiche dell'acqua surriscaldata (2/4)**

<b>t</b> °C	<b>v</b> m <sup>3</sup> ·kg <sup>-1</sup>	<b>u</b> kJ·kg <sup>-1</sup>	<b>h</b> kJ·kg <sup>-1</sup>	<b>s</b> kJ·kg <sup>-1</sup> ·K <sup>-1</sup>	<b>v</b> m <sup>3</sup> ·kg <sup>-1</sup>	<b>u</b> kJ·kg <sup>-1</sup>	<b>h</b> kJ·kg <sup>-1</sup>	<b>S</b> kJ·kg <sup>-1</sup> ·K <sup>-1</sup>	<b>v</b> m <sup>3</sup> ·kg <sup>-1</sup>	<b>u</b> kJ·kg <sup>-1</sup>	<b>h</b> kJ·kg <sup>-1</sup>	<b>s</b> kJ·kg <sup>-1</sup> ·K <sup>-1</sup>
	P = 1.00 MPa (179.91 °C)				p = 1.20 MPa (187.99 °C)				p = 1.40 MPa (195.07 °C)			
Sat	0.19444	2583.6	1778.1	6.5865	0.16333	2588.8	2784.8	6.5233	0.14084	2592.8	2790.0	6.4693
200	0.2060	2621.9	2827.9	6.6940	0.16930	2612.8	2815.9	6.5898	0.14302	2603.1	2803.3	6.4975
250	0.2327	2709.9	2942.6	6.9247	0.19234	2704.2	2935.0	6.8294	0.16350	2698.3	2927.2	6.7467
300	0.2579	2793.2	3051.2	7.1229	0.2138	2789.2	3045.8	7.0317	0.18228	2785.2	3040.4	6.9534
400	0.3066	2957.3	3263.9	7.4651	0.2548	2954.9	3260.7	7.3774	0.2178	2952.5	3257.5	7.3026
500	0.3542	3124.4	3478.5	7.7622	0.2946	3122.8	3476.3	7.6759	0.2521	3121.1	3474.1	7.6027
600	0.4011	3296.8	3697.9	8.0290	0.3339	3295.6	3696.3	7.9435	0.2860	3294.4	3694.8	7.8710
700	0.4478	3475.3	3923.1	8.2731	0.3729	3474.4	3922.0	8.1881	0.3185	3473.6	3920.8	8.1160
800	0.4943	3660.4	4154.7	8.4996	0.4118	3659.7	4153.8	8.4148	0.3528	3659.0	4153.0	8.3431
900	0.5407	3852.2	4382.9	8.7118	0.4505	3851.6	4392.2	8.6272	0.3861	3851.1	4391.5	8.5556
1000	0.5871	4050.5	4637.6	8.9119	0.4892	4050.0	4637.0	8.8274	0.4192	4049.5	4636.4	8.7559
1100	0.6335	4255.1	4888.6	9.1017	0.5278	4254.6	4888.0	9.0172	0.4524	4254.1	4887.5	8.9457
1200	0.6798	4465.5	5145.4	9.2822	0.5665	4465.1	5144.9	9.1972	0.4855	4464.7	5144.4	9.1262
1300	0.7261	4681.3	5407.4	9.4543	0.6051	4680.9	5407.0	9.3698	0.5186	4680.4	5406.5	9.2984
	p = 1.60 MPa (201.41 °C)				p = 1.80 MPa (207.15 °C)				p = 2.00 MPa (212.42 °C)			
Sat.	0.12380	2596.0	2794.0	6.4218	0.11042	2598.4	2797.1	6.3794	0.09963	2600.3	2799.5	6.3409
225	0.13287	2644.7	2857.3	6.5518	0.11673	2636.6	2846.7	6.4808	0.10377	2628.3	2836.8	6.4147
250	0.14184	2682.3	2919.2	6.6732	0.12497	2686.0	2911.0	6.6066	0.11144	2679.6	2902.5	6.5453
300	0.15862	2781.1	3034.8	6.8844	0.14021	2776.9	3029.2	6.8226	0.12547	2772.6	3023.5	6.7664
350	0.17456	2866.1	3145.4	7.0694	0.15457	2863.0	3141.2	7.0100	0.13857	2859.8	3137.0	6.9563
400	0.19005	2950.1	3254.2	7.2374	0.16847	2947.7	3250.9	7.1794	0.15120	2945.2	3247.6	7.1271
500	0.2203	3119.5	3472.0	7.5390	0.19550	3117.9	3469.8	7.4826	0.17568	3116.2	3467.6	7.4317
600	0.2500	3293.3	3693.2	7.8080	0.2220	3292.1	3691.7	7.7523	0.19960	3290.9	3690.1	7.7024
700	0.2794	3472.7	3919.7	8.0535	0.2482	3471.8	3918.5	7.9983	0.2232	3470.9	3917.4	7.9487
800	0.3086	3685.3	4152.1	8.2808	0.2742	3685.6	4151.2	8.2252	0.2467	3685.0	4150.3	8.1764
900	0.3377	3850.5	4390.8	8.4935	0.3001	3849.9	4390.1	8.4386	0.2700	3849.3	4389.4	8.3895
1000	0.3668	4049.0	4635.8	8.6938	0.3260	4048.5	4635.2	8.6391	0.2933	4048.0	4634.6	8.5901
1100	0.3958	4253.7	4887.0	8.8837	0.3518	4253.2	4886.4	8.8290	0.3166	4252.7	4885.9	8.7800
	p = 2.50 MPa (233.99 °C)				p = 3.00 MPa (233.90 °C)				p = 3.50 MPa (242.60 °C)			
Sat.	0.07998	2603.1	2803.1	6.2575	0.06668	2604.1	2804.2	6.1869	0.05707	2603.7	2803.4	6.1253
250	0.08700	2662.6	2880.1	6.4085	0.07058	2644.0	2855.8	6.2872	0.05872	2623.7	2829.2	6.1749
300	0.09890	2761.6	3008.8	6.6438	0.08114	2750.1	2993.5	6.5390	0.06842	2738.0	2977.5	6.4461
350	0.10976	2851.9	3126.3	6.8403	0.09053	2843.7	3115.3	6.7428	0.07678	2835.3	3104.0	6.6579
400	0.12010	2939.1	3239.3	7.0148	0.09936	2932.8	3230.9	6.9212	0.08453	2926.4	3222.3	6.8405
450	0.13014	3025.5	3350.8	7.1746	0.10787	3020.4	3344.0	7.0834	0.09196	3015.3	3337.2	7.0052
500	0.13993	3112.1	3462.1	7.3234	0.11619	3108.0	3456.5	7.2338	0.09918	3103.0	3450.9	7.1572
600	0.15930	3288.0	3686.3	7.5960	0.13243	3284.0	3682.3	7.5085	0.11324	3285.1	3678.4	7.4339
700	0.17832	3468.7	3914.5	7.8435	0.14838	3466.5	3911.7	7.7571	0.12699	3464.3	3908.8	7.6837
800	0.19716	3655.3	4148.2	8.0720	0.16414	3653.3	4145.9	7.9862	0.14056	3651.8	4143.7	7.9134
900	0.21590	3847.9	4387.6	8.2853	0.17980	3846.5	4385.9	8.1999	0.15402	3845.0	4384.1	8.1276
1000	0.2346	4046.7	4633.1	8.4861	0.19541	4045.4	4631.6	8.4009	0.14743	4044.1	4630.1	8.3288
1100	0.2532	4251.5	4884.6	8.6762	0.21098	4251.3	4883.3	8.5912	0.18080	4249.2	4881.9	8.5192

**proprietà termodinamiche dell'acqua surriscaldata (3/4)**

<b>t</b> °C	<b>v</b> m <sup>3</sup> ·kg <sup>-1</sup>	<b>u</b> kJ·kg <sup>-1</sup>	<b>h</b> kJ·kg <sup>-1</sup>	<b>s</b> kJ·kg <sup>-1</sup> ·K <sup>-1</sup>	<b>v</b> m <sup>3</sup> ·kg <sup>-1</sup>	<b>u</b> kJ·kg <sup>-1</sup>	<b>h</b> kJ·kg <sup>-1</sup>	<b>s</b> kJ·kg <sup>-1</sup> ·K <sup>-1</sup>	<b>v</b> m <sup>3</sup> ·kg <sup>-1</sup>	<b>u</b> kJ·kg <sup>-1</sup>	<b>h</b> kJ·kg <sup>-1</sup>	<b>s</b> kJ·kg <sup>-1</sup> ·K <sup>-1</sup>
	p = 4.00 MPa (250.40 °C)				P = 4.5 MPa (257.49°C)				p = 5.0 MPa (263.99 °C)			
Sat	0.04978	2602.3	2801.4	6.0701	0.04406	2600.1	2798.3	6.0198	0.03944	2597.1	2794.3	5.9734
275	0.05457	2667.9	2886.2	6.2285	0.04730	2650.3	2863.2	6.1401	0.04141	2631.3	2838.3	6.0544
300	0.05884	2725.3	2960.7	6.3615	0.05135	2712.0	2943.1	6.2828	0.04532	2698.0	2924.5	6.2084
350	0.06645	2826.7	3092.5	6.5821	0.05840	2817.8	3080.6	6.5131	0.05194	2808.7	3068.4	6.4493
400	0.07341	2919.9	3213.6	6.7690	0.06475	2913.3	3204.7	6.7047	0.05781	2906.6	3195.7	6.6459
500	0.08643	3099.5	3445.3	7.0901	0.07651	3095.3	3439.6	7.0301	0.06857	3091.0	3433.8	6.9759
600	0.09885	3279.1	3674.4	7.3688	0.08765	3276.0	3670.5	7.3110	0.07869	3273.0	3666.5	7.2589
700	0.11095	3462.1	3905.9	7.6198	0.09847	3459.9	3903.0	7.5631	0.08849	3457.6	3900.1	7.5122
800	0.12287	3650.0	4141.5	7.8502	0.10911	3648.3	4139.3	7.7942	0.09811	3646.6	4137.1	7.7440
900	0.13469	3843.6	4382.3	8.0647	0.11965	3842.2	4380.6	8.0091	0.10762	3840.7	4378.8	7.9593
1000	0.14645	4042.9	4628.7	8.2662	0.13013	4041.6	4627.2	8.2108	0.11707	4040.4	4625.7	8.1612
1100	0.15817	4248.0	4880.6	8.4567	0.14056	4246.8	4879.3	8.4015	0.12648	4245.6	4878.0	8.3520
1200	0.16987	4458.6	5138.1	8.6378	0.15098	4457.5	5136.9	8.5825	0.13587	4456.3	5135.7	8.5331
1300	0.18156	4674.3	5400.5	8.8100	0.16139	4632.1	5399.4	8.7549	0.14526	4672.0	5398.2	8.7055
	p = 6.0 MPa (275.64°C)				p = 7.0 MPa (285.88 °C)				p = 8.0 MPa (295.06 °C)			
Sat.	0.03244	2589.7	2784.3	5.8892	0.02737	2580.5	2772.1	5.8133	0.02352	2569.8	2758.0	5.7432
300	0.03616	2667.2	2884.2	6.0674	0.02947	2632.2	2838.4	5.9305	0.02426	2590.9	2785.0	5.7906
350	0.04223	2789.6	3043.0	6.3335	0.03524	2769.4	3016.0	6.2283	0.02995	2747.7	2987.3	6.1301
400	0.04739	2892.9	3177.2	6.5408	0.03993	2878.6	3158.1	6.4478	0.03432	2863.8	3138.3	6.3634
500	0.05665	3082.2	3422.2	6.8803	0.04814	3073.4	3410.3	6.7975	0.04175	3064.3	3398.3	6.7240
600	0.06525	3266.9	3658.4	7.1677	0.05565	3260.7	3650.3	7.0894	0.04845	3254.4	3642.0	7.0206
700	0.07352	3453.1	3894.2	7.4234	0.06283	3448.5	3888.3	7.3476	0.05481	3443.9	3882.4	7.2812
800	0.08160	3643.1	4132.7	7.6566	0.06981	3639.5	4128.2	7.5822	0.06097	3636.0	4123.8	7.5173
900	0.08958	3837.8	4375.3	7.8727	0.07669	3835.0	4371.8	7.7991	0.06702	3832.1	4368.3	7.7351
1000	0.09749	4037.8	4622.7	8.0751	0.08350	4035.3	4619.8	8.0020	0.07301	4032.8	4616.9	7.9384
1100	0.10536	4243.3	4875.4	8.2661	0.09027	4240.9	4872.8	8.1933	0.07896	4238.6	4870.3	8.1300
1200	0.11321	4454.0	5133.3	8.4474	0.09703	4451.7	5430.9	8.3747	0.08489	4449.5	5128.5	8.3115
1300	0.12067	4669.6	5396.0	8.6199	0.10377	4667.3	5393.7	8.5475	0.09080	4665.0	6391.5	8.4842
	p = 9.0 MPa (303.40°C)				p = 10.0 MPa (311.06 °C)				p = 12.5 MPa (327.89 °C)			
Sat.	0.02048	2557.8	2742.1	5.6772	0.018026	2544.4	2724.7	5.6141	0.013495	2505.1	2673.8	5.4624
350	0.02580	2724.4	2956.6	6.0361	0.02242	2699.2	2923.4	5.9443	0.016126	2624.6	2826.2	5.7118
400	0.02993	2848.4	3117.8	6.2854	0.02641	2832.4	3096.5	6.2120	0.02000	2789.3	3039.3	6.0417
450	0.03350	2955.2	3256.6	6.4844	0.02975	2943.4	3240.9	6.4190	0.02299	2912.5	3199.8	6.2719
500	0.03677	3055.2	3386.1	6.6576	0.03279	3045.8	3373.7	6.5966	0.02560	3021.7	3341.8	6.4618
600	0.04285	3248.1	3633.7	6.9589	0.03837	3241.7	3625.3	6.9029	0.03029	3225.4	3604.0	6.7810
700	0.04857	3439.3	3876.5	7.2221	0.04358	3434.7	3870.5	7.1687	0.03460	3422.9	3855.3	7.0536
800	0.05409	3632.5	4119.3	7.4596	0.04859	3628.9	4114.8	7.4077	0.03869	3620.0	4103.6	7.2965
900	0.05950	3829.2	4364.8	7.6783	0.05349	3826.3	4361.2	7.6272	0.04267	3819.1	4352.5	7.5182
1000	0.06485	4030.3	4614.0	7.8821	0.05832	4027.8	4611.0	7.8315	0.04658	4021.6	4603.8	7.7237
1100	0.07016	4236.3	4867.7	8.0740	0.06312	4234.0	4865.1	8.0237	0.05045	4228.2	4858.8	7.9165
1200	0.07544	4447.2	5126.2	8.2556	0.06789	4444.9	5123.8	8.2055	0.05430	4439.3	5118.0	8.0937
1300	0.08072	4662.7	5389.2	8.4284	0.07265	4460.5	5387.0	8.3783	0.05813	4654.8	5381.4	8.2717

**proprietà termodinamiche dell'acqua surriscaldata (4/4)**

<b>t</b> °C	<b>v</b> m <sup>3</sup> ·kg <sup>-1</sup>	<b>u</b> kJ·kg <sup>-1</sup>	<b>h</b> kJ·kg <sup>-1</sup>	<b>s</b> kJ·kg <sup>-1</sup> ·K <sup>-1</sup>	<b>v</b> m <sup>3</sup> ·kg <sup>-1</sup>	<b>u</b> kJ·kg <sup>-1</sup>	<b>h</b> kJ·kg <sup>-1</sup>	<b>s</b> kJ·kg <sup>-1</sup> ·K <sup>-1</sup>	<b>v</b> m <sup>3</sup> ·kg <sup>-1</sup>	<b>u</b> kJ·kg <sup>-1</sup>	<b>h</b> kJ·kg <sup>-1</sup>	<b>s</b> kJ·kg <sup>-1</sup> ·K <sup>-1</sup>
	p = 15.0 MPa (342.24 °C)				p = 17.5 MPa (354.75°C)				p = 20.0 MPa (365.81 °C)			
Sat	0.010337	2455.5	2610.5	5.3098	0.007920	2390.2	2528.8	5.1419	0.005834	2293.0	2409.7	4.9269
350	0.011470	2520.4	2682.4	5.4421								
400	0.015649	2740.7	2975.5	5.8811	0.012447	2684.0	2902.9	5.7213	0.009942	2619.3	2818.1	5.5540
450	0.018445	2879.5	3156.2	6.1404	0.015174	2844.2	3109.7	6.0184	0.012695	2806.2	3060.1	5.9017
500	0.02080	2996.6	3308.6	6.3443	0.017358	2970.3	3274.1	6.2383	0.014768	2942.9	3238.2	6.1401
550	0.02293	3104.7	3448.6	6.5199	0.019288	3083.9	3421.4	6.4230	0.016555	3062.4	3393.5	6.3348
600	0.02491	3208.6	3582.3	6.6776	0.02106	3191.5	3560.1	6.5866	0.018178	3174.0	3537.6	6.5048
700	0.02861	3410.9	3840.1	6.9572	0.02434	3398.7	3824.6	6.8736	0.02113	3386.4	3809.0	6.7993
800	0.03210	3610.9	4092.4	7.2040	0.02738	3601.8	4081.1	7.1244	0.02384	3592.7	4069.7	7.0544
900	0.03546	3811.9	4343.8	7.4279	0.03031	3804.7	4335.1	7.3507	0.02645	3797.5	4326.4	7.2830
1000	0.03875	4015.4	4596.6	7.6348	0.03316	4009.3	4589.5	7.5589	0.02897	4003.1	4582.5	7.4925
1100	0.04200	4222.6	4852.6	7.8283	0.03597	4216.9	4846.4	7.7531	0.03145	4211.3	4840.2	7.6874
1200	0.04523	4433.8	5112.3	8.0108	0.03876	4428.3	5106.6	7.9360	0.03391	4422.8	4101.0	7.8707
1300	0.04845	4649.1	5376.0	8.1840	0.04154	4643.5	5370.5	8.1093	0.03636	4638.1	5365.1	8.0442
	P = 25.0 MPa				p = 30.0 MPa				p = 35.0 MPa			
375	0.0019731	1798.7	1848.0	4.0320	0.0017892	1737.8	1791.5	3.9305	0.0017003	1702.9	1762.4	3.8722
400	0.006004	2430.1	2580.2	5.1418	0.002790	2067.4	2151.1	4.4728	0.002100	1914.1	1987.6	4.2126
450	0.009162	2720.7	2949.7	5.6744	0.006735	2619.3	2821.4	5.4424	0.004961	2498.7	2682.4	5.1962
500	0.011123	2884.3	3162.4	5.9592	0.008678	2820.7	3081.1	5.7905	0.006927	2751.9	2994.4	5.6282
550	0.012724	3017.5	3335.6	6.1765	0.010168	3970.3	3275.4	6.0342	0.008345	2921.1	3213.0	5.9026
600	0.014137	3137.9	3491.4	6.3602	0.011446	3100.5	3443.9	6.2331	0.009527	3062.0	3395.5	6.1179
700	0.016646	3361.3	3777.5	6.6707	0.013661	33.5.8	3745.6	6.5606	0.011533	3309.8	3713.5	6.4631
800	0.018912	3574.3	4047.1	6.9345	0.015623	3555.5	4024.2	6.8332	0.013278	3536.7	4001.5	6.7450
900	0.021045	3783.0	4309.1	7.1680	0.017448	3768.5	4291.9	7.0718	0.014883	3754.0	4274.9	6.9386
1000	0.02310	3990.9	4568.5	7.3802	0.019196	3987.8	4554.7	7.2867	0.016410	3966.7	4541.1	7.2064
1100	0.02512	4200.2	4828.2	7.5765	0.020903	4189.2	4816.3	7.4845	0.017895	4178.3	4804.6	7.4037
1200	0.2711	4412.0	5089.9	7.7605	0.022589	4401.3	5079.0	7.6692	0.019360	4390.7	5068.3	7.5910
1300	0.2910	4626.9	5354.4	7.9342	0.24266	4616.0	5344.0	7.8432	0.020815	4605.1	5333.6	7.7653
	P = 40.0 MPa				p = 50.0 MPa				p = 60.0 MPa			
375	0.0016407	1677.1	1742.8	3.8290	0.0015594	1638.6	1716.6	3.7639	0.0015028	1609.4	1699.5	3.7141
400	0.0019077	1854.6	1930.9	4.1135	0.0017309	1788.1	1874.6	4.0031	0.0016335	1745.4	1843.4	3.9318
425	0.002532	2096.9	2198.1	4.5029	0.002007	1959.7	2060.0	4.2734	0.0018165	1892.7	2001.7	4.1626
450	0.003696	2365.1	2512.8	4.9459	0.002486	2159.6	2284.0	4.5884	0.002085	2053.9	2179.0	4.4121
500	0.005622	2678.4	2903.3	5.4700	0.003892	2525.5	2720.1	5.1726	0.002956	2390.6	2567.9	4.9321
600	0.008094	3022.6	3346.4	6.0144	0.006112	2942.0	3247.6	5.8178	0.004834	2861.1	3151.2	5.6452
700	0.009941	3283.6	3681.2	6.3750	0.007727	3230.5	3616.8	6.2189	0.006272	3177.2	3553.5	6.0824
800	0.011523	3517.8	3978.7	6.6662	0.009076	3479.8	3933.6	6.5290	0.007459	3441.5	3889.1	6.4109
900	0.012962	3739.4	4257.9	6.9150	0.010283	3710.3	4224.4	6.7882	0.008508	3681.0	4191.5	6.6805
1000	0.014324	3954.6	4527.6	7.1356	0.011411	3930.5	4501.1	7.0146	0.009480	3906.4	4475.2	6.9127
1100	0.015642	4167.4	4793.1	7.3364	0.012496	4145.7	4770.5	7.2184	0.010409	4124.1	4748.6	7.1195
1200	0.016940	4380.1	5057.7	7.5224	0.013561	4659.1	5037.2	7.4058	0.011317	4338.2	5017.2	7.3083
1300	0.018229	4594.3	5323.5	7.6969	0.014616	4572.8	5303.6	7.5808	0.012215	4551.4	5284.3	7.4837

**proprietà termodinamiche dell'R134a in condizioni di saturazione - temperatura**

temperatura °C	pressione MPa	volume specifico m <sup>3</sup> ·kg <sup>-1</sup>		energia interna kJ·kg <sup>-1</sup>		entalpia kJ·kg <sup>-1</sup>			entropia kJ·kg <sup>-1</sup> ·K <sup>-1</sup>	
		v <sub>l</sub>	v <sub>vs</sub>	u <sub>l</sub>	u <sub>vs</sub>	h <sub>l</sub>	h <sub>vs</sub> -h <sub>l</sub>	h <sub>vs</sub>	s <sub>l</sub>	s <sub>vs</sub>
-40	0.05164	0.0007055	0.3569	-0.04	204.45	0.00	222.88	222.88	0.0000	0.9560
-36	0.06332	0.0007113	0.2947	4.68	206.73	4.73	220.67	225.40	0.0201	0.9506
-32	0.07704	0.0007172	0.2451	9.47	209.01	9.52	218.37	227.90	0.0401	0.9456
-28	0.09305	0.0007233	0.2052	14.31	211.29	14.37	216.01	230.38	0.0600	0.9411
-26	0.10199	0.0007265	0.1882	16.75	212.43	16.82	214.80	231.62	0.0699	0.9390
-24	0.11160	0.0007296	0.1728	19.21	213.57	19.29	213.57	232.85	0.0798	0.9370
-22	0.12192	0.0007328	0.1590	21.68	214.70	21.77	212.32	234.08	0.0897	0.9351
-20	0.13299	0.0007361	0.1464	24.17	215.84	24.26	211.05	235.31	0.0996	0.9332
-18	0.14483	0.0007395	0.1350	26.67	216.97	26.77	209.76	236.53	0.1094	0.9315
-16	0.15748	0.0007428	0.1247	29.18	218.10	29.30	208.45	237.74	0.1192	0.9298
-12	0.18540	0.0007198	0.1068	34.25	220.36	34.39	205.77	240.15	0.1388	0.9267
-8	0.21704	0.0007569	0.0919	39.38	222.60	39.54	203.00	242.54	0.1583	0.9239
-4	0.25274	0.0007644	0.0794	44.56	224.84	44.75	200.15	244.90	0.1777	0.9213
0	0.29282	0.0007721	0.0689	49.79	227.06	50.02	197.21	247.23	0.1970	0.9190
4	0.33765	0.0007801	0.0600	55.08	229.27	55.35	194.19	249.53	0.2162	0.9169
8	0.38756	0.0007884	0.0525	60.43	231.46	60.73	191.07	251.80	0.2354	0.9150
12	0.44294	0.0007671	0.0460	65.83	233.63	66.18	187.85	254.03	0.2545	0.9132
16	0.50416	0.0008062	0.0405	71.29	235.78	71.69	184.52	256.22	0.2735	0.9116
20	0.57160	0.0008157	0.0358	76.80	237.91	77.26	181.09	258.35	0.2924	0.9102
24	0.64566	0.0008257	0.0317	82.37	240.01	82.90	177.55	260.45	0.3113	0.9089
26	0.68530	0.0008309	0.0298	85.18	240.05	85.75	175.73	261.48	0.3208	0.9082
28	0.72675	0.0008362	0.0281	88.00	242.08	88.61	173.89	262.50	0.3302	0.9076
30	0.77006	0.0008417	0.0265	90.84	243.10	91.49	172.00	263.50	0.3396	0.9070
32	0.81528	0.0008473	0.0250	93.70	244.12	94.39	170.09	264.48	0.3490	0.9064
34	0.86247	0.0008430	0.0236	96.58	245.12	97.31	168.14	265.45	0.3584	0.9058
36	0.91168	0.0008490	0.0223	99.47	246.11	100.25	166.15	266.40	0.3678	0.9053
38	0.96298	0.0008651	0.0210	102.38	247.09	103.21	164.12	267.33	0.3772	0.9047
40	1.0164	0.0008714	0.0199	105.31	248.06	106.19	162.05	268.24	0.2866	0.9041
42	1.0720	0.0008780	0.0188	108.25	249.02	109.19	159.94	269.14	0.3960	0.9035
44	1.1299	0.0008847	0.0177	111.22	249.96	112.22	157.79	270.01	0.4054	0.9030
48	1.2526	0.0008989	0.0159	117.22	251.79	118.35	153.33	271.68	0.4243	0.9017
52	1.3851	0.0009142	0.0142	123.31	253.55	124.58	148.66	273.24	0.4432	0.9004
56	1.5278	0.0009308	0.0127	129.51	255.23	130.93	143.75	274.68	0.4622	0.8990
60	1.6813	0.0009488	0.0114	135.82	256.81	137.42	138.47	275.99	0.4814	0.8973
70	2.1162	0.0010027	0.0086	152.22	260.15	154.34	124.08	278.43	0.5302	0.8918
80	2.6324	0.0010766	0.0064	169.88	262.14	172.71	106.41	279.12	0.5814	0.8827
90	3.2435	0.0011949	0.0046	189.82	261.34	193.69	82.63	276.32	0.6380	0.8655
100	3.9742	0.0015443	0.0027	218.60	268.49	224.74	34.40	259.13	0.7196	0.8117

**proprietà termodinamiche dell'R134a in condizioni di saturazione - pressione**

pressione MPa	temperatura °C	volume specifico $\text{m}^3\cdot\text{kg}^{-1}$		energia interna $\text{kJ}\cdot\text{kg}^{-1}$		entalpia $\text{kJ}\cdot\text{kg}^{-1}$			entropia $\text{kJ}\cdot\text{kg}^{-1}\cdot\text{K}^{-1}$	
		$v_l$	$v_{vs}$	$u_l$	$u_{vs}$	$h_l$	$h_{vs}-h_l$	$h_{vs}$	$s_l$	$s_{vs}$
0.06	-37.07	0.0007097	0.3100	3.41	206.12	3.46	221.27	224.72	0.0147	0.9520
0.08	-31.21	0.0007184	0.2366	10.41	209.46	10.47	217.92	228.39	0.0440	0.9447
0.10	-26.43	0.0007258	0.1917	16.22	212.18	16.29	215.06	231.35	0.0678	0.9395
0.12	-22.36	0.0007323	0.1614	21.23	214.50	21.32	212.54	233.86	0.0879	0.9354
0.14	-18.80	0.0007381	0.1395	25.66	216.52	25.77	210.27	236.04	0.1055	0.9322
0.16	-15.62	0.0007435	0.1229	29.66	218.32	29.78	208.18	237.97	0.1211	0.9295
0.18	-12.73	0.0007485	0.1098	33.31	219.94	33.45	206.26	239.71	0.1352	0.9273
0.20	-10.09	0.0007532	0.0993	36.69	221.43	36.84	204.46	241.30	0.1481	0.9253
0.24	-5.37	0.0007618	0.0834	42.77	224.07	42.95	201.14	244.09	0.1710	0.9222
0.28	-1.23	0.0007697	0.0719	48.18	226.38	48.39	198.13	246.52	0.1911	0.9197
0.32	2.48	0.0007770	0.0632	53.06	228.43	53.31	195.35	248.66	0.2089	0.9177
0.36	5.84	0.0007839	0.0564	57.54	230.28	57.82	192.76	250.58	0.2251	0.9160
0.4	8.93	0.0007904	0.0509	61.69	231.97	62.00	190.32	252.32	0.2399	0.9145
0.5	15.74	0.0008056	0.0409	70.93	235.64	71.33	184.74	256.07	0.2723	0.9117
0.6	21.58	0.0008196	0.0341	78.99	238.74	79.48	179.71	259.19	0.2999	0.9097
0.7	26.72	0.0008328	0.0292	86.19	241.42	86.78	175.07	261.85	0.3242	0.9080
0.8	31.33	0.0008454	0.0255	92.75	243.78	93.42	170.73	264.15	0.3459	0.9066
0.9	35.53	0.0008576	0.0226	98.79	245.88	99.56	166.62	266.18	0.3656	0.9054
1.0	39.39	0.0008695	0.0202	104.42	247.77	105.29	162.68	267.97	0.3838	0.9043
1.2	46.32	0.0008928	0.0166	114.69	251.03	115.76	155.23	270.99	0.4164	0.9023
1.4	52.43	0.0009159	0.0140	123.98	253.74	125.26	148.14	273.40	0.4453	0.9003
1.6	57.92	0.0009392	0.0121	132.52	256.00	134.02	141.31	275.33	0.4714	0.8982
1.8	62.91	0.0009631	0.0105	140.49	247.88	142.22	134.60	276.83	0.4954	0.8959
2.0	67.49	0.0009878	0.0093	148.02	259.41	149.99	127.95	277.94	0.5178	0.8934
2.5	77.59	0.0010562	0.0069	165.48	261.84	168.12	111.06	279.17	0.5687	0.8854
3.0	86.22	0.0011416	0.0053	181.88	262.16	185.30	92.71	278.01	0.6156	0.8735

**proprietà termodinamiche dell'R134a surriscaldato (1/3)**

<b>t</b> °C	<b>v</b> m <sup>3</sup> kg <sup>-1</sup>	<b>u</b> kJ kg <sup>-1</sup>	<b>h</b> kJ kg <sup>-1</sup>	<b>s</b> kJ kg <sup>-1</sup> K <sup>-1</sup>	<b>v</b> m <sup>3</sup> kg <sup>-1</sup>	<b>u</b> kJ kg <sup>-1</sup>	<b>h</b> kJ kg <sup>-1</sup>	<b>s</b> kJ kg <sup>-1</sup> K <sup>-1</sup>	<b>v</b> m <sup>3</sup> kg <sup>-1</sup>	<b>u</b> kJ kg <sup>-1</sup>	<b>h</b> kJ kg <sup>-1</sup>	<b>s</b> kJ kg <sup>-1</sup> K <sup>-1</sup>
	<b>p= 0.06 MPa (Tsat=-37.07°C)</b>				<b>p= 0.10 MPa (Tsat=-26.43°C)</b>				<b>p= 0.14 MPa (Tsat=-18.80°C)</b>			
sat	0.31003	206.12	224.72	0.9520	0.19170	212.18	231.35	0.9395	0.13945	216.52	236.04	0.9322
-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	0.14549	223.03	243.40	0.9606
0	0.36433	232.24	254.10	1.0675	0.21587	231.40	252.99	1.0227	0.15219	230.55	251.86	0.9922
10	0.37861	239.69	262.41	1.0973	0.22473	238.96	261.43	1.0531	0.15875	238.21	260.43	1.0230
20	0.39279	247.32	270.89	1.1267	0.23349	246.67	270.02	1.0829	0.16520	246.01	269.13	1.0532
30	0.40688	255.12	279.53	1.1557	0.24216	254.54	278.76	1.1122	0.17155	253.96	277.97	1.0828
40	0.42091	263.10	288.35	1.1844	0.25076	262.58	287.66	1.1411	0.17783	262.06	286.96	1.1120
50	0.43487	271.25	297.34	1.2126	0.25930	270.79	296.72	1.1696	0.18404	270.32	296.09	1.1407
60	0.44879	279.58	306.51	1.2405	0.26779	279.16	305.94	1.1977	0.19020	278.74	305.37	1.1690
70	0.16266	288.08	315.84	1.2680	0.27623	287.70	315.32	1.2254	0.19633	287.32	314.80	1.1969
80	0.47650	296.75	325.34	1.2954	0.28464	296.40	324.87	1.2528	0.20241	296.06	324.39	1.2244
90	0.49031	305.58	335.00	1.3224	0.29302	305.27	334.57	1.2799	0.20846	304.95	334.14	1.2516
100									0.21449	314.01	344.14	1.2785
	<b>p= 0.18 MPa (Tsat=-12.73°C)</b>				<b>p= 0.20 MPa (Tsat=-10.09°C)</b>				<b>p= 0.24 MPa (Tsat=-5.37°C)</b>			
sat	0.01983	219.94	269.71	0.9273	0.09933	221.43	241.30	0.9253	0.08343	224.07	244.09	0.9222
-10	0.11135	222.02	242.06	0.9362	0.09938	221.50	241.38	0.9256				
0	0.11678	229.67	250.69	0.9684	0.10438	229.23	250.10	0.9582	0.08574	228.31	248.89	0.9399
10	0.12207	237.44	259.41	0.9998	0.10922	237.05	258.89	0.9898	0.08993	236.26	257.84	0.9721
20	0.12723	245.33	268.23	1.0304	0.11394	244.99	267.78	1.0206	0.09339	244.30	266.85	1.0034
30	0.13230	253.36	277.17	1.0604	0.11856	253.06	276.77	1.0508	0.09794	252.45	275.95	1.0339
40	0.13730	261.53	286.24	1.0898	0.12311	261.26	285.88	1.0804	0.10181	260.72	285.16	1.0637
50	0.14222	269.85	295.45	1.1187	0.12758	269.61	295.12	1.1094	0.10562	269.12	294.47	1.0930
60	0.14710	278.31	304.79	1.1472	0.13201	278.10	304.50	1.1380	0.10937	277.67	303.91	1.1218
70	0.15193	296.93	314.28	1.1765	0.13639	286.74	314.02	1.1661	0.11307	286.35	313.49	1.1501
80	0.15672	295.71	323.92	1.2030	0.14073	295.53	323.68	1.1939	0.11674	295.18	323.19	1.1780
90	0.16148	304.63	33.70	1.2303	0.14504	304.47	323.48	1.2212	0.12037	304.15	333.04	1.2055
100	0.16622	323.72	343.63	1.2537	0.14932	313.57	343.43	1.2483	0.12387	313.27	343.03	1.2326

**proprietà termodinamiche dell'R134a surriscaldato (2/3)**

<b>t</b> <b>°C</b>	<b>v</b> <b>m<sup>3</sup> kg<sup>-1</sup></b>	<b>u</b> <b>kJ kg<sup>-1</sup></b>	<b>h</b> <b>kJ kg<sup>-1</sup></b>	<b>s</b> <b>kJ kg<sup>-1</sup> K<sup>-1</sup></b>	<b>v</b> <b>m<sup>3</sup> kg<sup>-1</sup></b>	<b>u</b> <b>kJ kg<sup>-1</sup></b>	<b>h</b> <b>kJ kg<sup>-1</sup></b>	<b>s</b> <b>kJ kg<sup>-1</sup> K<sup>-1</sup></b>	<b>v</b> <b>m<sup>3</sup> kg<sup>-1</sup></b>	<b>u</b> <b>kJ kg<sup>-1</sup></b>	<b>h</b> <b>kJ kg<sup>-1</sup></b>	<b>s</b> <b>kJ kg<sup>-1</sup> K<sup>-1</sup></b>
	<b>p= 0.28 MPa (Tsat=-1.23°C)</b>				<b>p= 0.32 MPa (Tsat=2.48°C)</b>				<b>p= 0.40 MPa (Tsat=8.93°C)</b>			
sat	0.07193	226.38	246.52	0.9197	0.06322	228.43	248.66	0.9177	0.05089	231.97	252.32	0.9145
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	0.05119	232.87	253.35	0.9182
20	0.07972	243.59	265.91	0.9883	0.06901	242.87	264.85	0.9749	0.05397	241.37	262.96	0.9515
30	0.08320	251.83	275.12	1.0192	0.07214	251.19	274.28	1.0062	0.05662	249.89	272.54	0.9937
40	0.08660	260.17	284.42	1.0494	0.07518	259.61	283.67	1.0347	0.05917	258.47	282.14	1.0148
50	0.08992	268.64	293.81	1.0789	0.07815	268.14	293.15	1.0665	0.06164	267.13	291.79	1.0452
60	0.09319	277.23	303.32	1.1079	0.08106	276.79	302.72	1.0957	0.06405	275.89	301.51	1.0748
70	0.09641	285.96	312.95	1.1364	0.08382	285.56	312.41	1.1243	0.06641	284.75	311.32	1.1038
80	0.09960	294.82	322.71	1.1644	0.08674	294.46	322.22	1.1525	0.06873	293.73	321.23	1.1322
90	0.10275	303.83	332.60	1.1920	0.08953	303.50	332.15	1.1802	0.07102	302.84	331.25	1.1602
100	0.10587	312.98	342.62	1.2193	0.09229	312.68	342.21	1.1076	0.07327	321.07	341.38	1.1878
110	0.10897	322.27	352.78	1.2461	0.09503	322.00	352.40	1.2345	0.07550	321.44	351.64	1.2149
120	0.11205	332.71	363.08	1.2727	0.09774	331.45	362.73	1.2611	0.07771	330.94	362.03	1.2417
130									0.07991	340.58	372.54	1.2681
140									0.08208	350.35	383.18	1.2941
	<b>p= 0.50MPa (Tsat=15.74°C)</b>				<b>p= 0.60 MPa (Tsat=21.58°C)</b>				<b>p= 0.70 MPa (Tsat=26.72°C)</b>			
sat	0.04086	233.64	256.07	0.9117	0.03408	238.74	259.19	0.9097	0.02918	241.42	261.85	0.9080
20	0.04188	239.40	260.34	0.9264								
30	0.04416	248.20	270.28	0.9597	0.03581	246.41	267.89	0.9388	0.02979	244.51	265.37	0.9197
40	0.04633	256.99	280.16	0.9918	0.03774	255.45	278.09	0.9719	0.03157	253.83	275.93	0.9539
50	0.04842	265.83	290.04	1.0229	0.03958	264.48	288.23	1.0037	0.03324	263.08	286.35	0.9867
60	0.05043	274.73	299.95	1.0531	0.04134	273.54	298.38	1.1346	0.03182	272.32	296.69	1.0182
70	0.05240	283.72	309.92	1.0825	0.04304	282.66	308.48	1.0645	0.03634	281.57	307.01	1.0487
80	0.05432	292.80	319.96	1.1114	0.04469	291.86	318.67	1.0938	0.03781	290.88	317.35	1.0784
90	0.05620	302.00	330.10	1.1397	0.04631	301.14	328.93	1.1225	0.03924	300.27	327.74	1.1074
100	0.05805	311.31	340.33	1.1675	0.04790	310.53	339.27	1.1505	0.04064	309.74	338.19	1.1358
110	0.05988	320.74	350.68	1.1949	0.04946	320.03	349.70	1.1781	0.04201	319.31	348.71	1.1637
120	0.06168	330.30	341.14	1.2218	0.05099	329.64	360.24	1.2053	0.04335	328.98	359.33	1.1910
130	0.06347	339.98	371.72	1.2484	0.05251	339.38	370.99	1.2320	0.04468	338.76	370.04	1.2179
140	0.06524	349.79	382.42	1.2745	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

**proprietà termodinamiche dell'R134a surriscaldato (3/3)**

<b>t</b> °C	<b>v</b> m <sup>3</sup> kg <sup>-1</sup>	<b>u</b> kJ kg <sup>-1</sup>	<b>h</b> kJ kg <sup>-1</sup>	<b>s</b> kJ kg <sup>-1</sup> K <sup>-1</sup>	<b>v</b> m <sup>3</sup> kg <sup>-1</sup>	<b>u</b> kJ kg <sup>-1</sup>	<b>h</b> kJ kg <sup>-1</sup>	<b>s</b> kJ kg <sup>-1</sup> K <sup>-1</sup>	<b>v</b> m <sup>3</sup> kg <sup>-1</sup>	<b>u</b> kJ kg <sup>-1</sup>	<b>h</b> kJ kg <sup>-1</sup>	<b>s</b> kJ kg <sup>-1</sup> K <sup>-1</sup>
	<b>p= 0.8 MPa (Tsat=31.33°C)</b>				<b>p= 0.90 MPa (Tsat=35.53°C)</b>				<b>p= 1.00 MPa (Tsat=39.39°C)</b>			
sat	0.02547	243.78	264.15	0.9066	0.02255	245.88	266.18	0.9054	0.02020	247.77	267.97	0.9043
40	0.02691	252.13	273.66	0.9374	0.02325	250.32	271.25	0.9217	0.02029	248.39	268.68	0.9066
50	0.02846	261.62	284.39	0.9711	0.02472	260.09	282.34	0.9455	0.02171	258.48	280.19	0.9428
60	0.02992	271.04	294.98	1.0034	0.02609	269.72	293.21	0.9897	0.02301	268.35	291.36	0.9768
70	0.03131	280.45	305.50	1.0345	0.02738	279.30	303.94	1.0214	0.02123	278.11	302.34	1.0093
80	0.03264	289.89	316.00	1.0647	0.02861	288.87	314.62	1.0521	0.02538	287.82	313.20	1.0405
90	0.03393	299.37	326.52	1.0940	0.02980	298.46	325.28	1.0819	0.02649	297.53	324.01	1.0707
100	0.03519	308.93	337.08	1.1227	0.03095	308.11	335.96	1.1109	0.02755	307.27	334.82	1.1000
110	0.03642	318.57	347.71	1.1508	0.03207	317.82	346.68	1.1392	0.02858	317.06	345.65	1.1286
120	0.03762	328.31	358.40	1.1784	0.03316	327.62	357.47	1.1670	0.02959	326.93	356.52	1.1567
130	0.03881	338.14	369.19	1.2055	0.03423	337.52	368.33	1.1943	0.03058	336.88	367.46	1.1841
140	0.03997	348.09	380.07	1.2321	0.03529	347.51	379.27	1.2211	0.03154	346.92	378.46	1.2111
150	0.04113	358.15	391.05	1.2584	0.03633	357.61	390.31	1.2475	0.03250	357.06	389.56	1.2376
160	0.04227	368.32	402.14	1.2843	0.03736	367.82	401.44	1.2735	0.03344	367.31	400.74	1.2638
170	0.04340	378.61	413.33	1.3098	0.03838	378.14	412.68	1.2992	0.03436	377.66	412.02	1.2895
180	0.04452	389.02	424.63	1.3351	0.03939	388.57	424.02	1.3245	0.03528	388.12	423.40	1.3149
	<b>p= 1.20 MPa (Tsat=46.32°C)</b>				<b>p= 1.40 MPa (Tsat=52.43°C)</b>				<b>p= 1.60 MPa (Tsat=57.92°C)</b>			
sat	0.01663	251.03	270.99	0.9023	0.01405	253.74	273.40	0.9003	0.01208	256.00	275.33	0.8982
50	0.01712	259.33	275.52	0.9164								
60	0.01835	265.42	287.44	0.9527	0.01495	262.17	283.10	0.9297	0.01233	258.48	278.20	0.9059
70	0.01947	275.59	298.96	0.9868	0.01603	272.87	295.31	0.9658	0.01340	269.89	291.33	0.9457
80	0.02051	285.62	310.24	1.0192	0.01701	283.29	300.10	0.9997	0.01435	280.78	303.74	0.9813
90	0.02150	295.59	321.39	1.0503	0.01792	293.55	318.63	1.0319	0.01521	191.39	315.72	1.0148
100	0.02244	305.54	332.47	1.0804	0.01878	303.73	330.02	1.0628	0.01601	301.84	327.46	1.0467
110	0.02335	315.50	343.52	1.1096	0.01960	313.88	341.32	1.0927	0.01677	312.20	339.04	1.0773
120	0.02423	325.51	354.58	1.1381	0.02039	324.05	352.59	1.1218	0.01750	322.53	350.53	1.1069
130	0.02508	335.58	365.68	1.1660	0.02115	334.25	366.86	1.1501	0.01820	332.84	361.99	1.1357
140	0.02592	345.73	376.83	1.1933	0.02189	344.50	375.15	1.1777	0.01887	343.24	373.44	1.1638
150	0.02674	355.95	388.04	1.2201	0.02262	354.82	386.49	1.2048	0.01953	353.66	384.91	1.1912
160	0.02754	366.27	399.33	1.2465	0.02333	365.22	397.89	1.2315	0.02017	364.15	396.43	1.2181
170	0.02834	376.69	410.70	1.2724	0.02403	375.71	409.36	1.2576	0.02080	374.71	407.99	1.2445
180	0.02912	387.21	422.16	1.2980	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	406.90	443.11	1.3212
200					0.02608	407.73	444.24	1.3338	0.02263	406.90	443.11	1.3212



**proprietà dell'aria come gas ideale**

T [K]	h [kJ·kg <sup>-1</sup> ]	u [kJ·kg <sup>-1</sup> ]	s [kJ·kg <sup>-1</sup> ·K <sup>-1</sup> ]	T [K]	h [kJ·kg <sup>-1</sup> ]	u [kJ·kg <sup>-1</sup> ]	s [kJ·kg <sup>-1</sup> ·K <sup>-1</sup> ]	T [K]	h [kJ·kg <sup>-1</sup> ]	u [kJ·kg <sup>-1</sup> ]	s [kJ·kg <sup>-1</sup> ·K <sup>-1</sup> ]
200	199.97	142.56	1.29559	550	554.74	397.86	2.31809	1100	1161.07	845.33	3.07732
210	209.97	149.69	1.34444	560	565.17	404.42	2.33685	1120	1184.28	862.79	3.09825
220	219.97	156.82	1.39105	570	575.59	411.97	2.25531	1140	1207.57	880.35	3.11883
230	230.02	164.00	1.43557	580	586.04	419.55	2.37348	1160	1230.92	897.91	3.13916
240	240.02	171.13	1.47824	590	596.52	427.15	2.39140	1180	1254.34	915.57	3.15916
250	250.05	178.28	1.51917	600	607.02	434.78	2.40902	1200	1277.79	933.33	3.17888
260	260.09	185.45	1.55848	610	617.53	442.42	2.42644	1220	1301.31	951.09	3.19834
270	270.11	192.60	1.59634	620	628.07	450.09	2.44356	1240	1324.93	968.95	3.21751
280	280.13	199.75	1.63279	630	638.63	457.78	2.46048	1260	1348.55	986.90	3.23638
285	285.14	203.33	1.65055	640	649.22	465.50	2.47716	1280	1372.24	1004.76	3.25510
290	290.16	206.91	1.66802	650	659.84	473.25	2.49364	1300	1395.97	1022.82	3.27345
295	295.17	210.49	1.68515	660	670.47	481.01	2.50985	1320	1419.76	1040.88	3.29160
300	300.19	214.07	1.70203	670	681.14	488.81	2.52589	1340	1443.60	1058.94	3.30959
305	305.22	217.67	1.71865	680	691.82	496.62	2.54175	1360	1467.49	1077.10	3.32724
310	310.24	221.25	1.73498	690	702.52	504.45	2.55731	1380	1491.44	1095.26	3.34474
315	315.27	224.85	1.75106	700	713.27	512.33	2.57277	1400	1515.42	1113.52	3.36200
320	320.29	228.42	1.76690	710	724.04	520.23	2.58810	1420	1539.44	1131.77	3.37901
325	325.31	232.02	1.78249	720	734.82	528.14	2.60319	1440	1566.51	1150.13	3.39586
330	330.34	235.61	1.79783	730	745.62	536.07	2.61803	1460	1587.63	1168.49	3.41247
340	340.42	242.82	1.82790	740	756.44	544.02	2.63280	1480	1611.79	1186.95	3.42892
350	350.49	250.02	1.85708	750	767.29	551.99	2.64737	1500	1635.97	1205.41	3.44516
360	360.58	257.24	1.88543	760	778.18	560.01	2.66176	1520	1660.23	1223.87	3.46120
370	370.67	264.46	1.91313	770	789.11	568.07	2.67595	1540	1684.51	1242.43	3.47712
380	380.77	271.39	1.94001	780	800.03	576.12	2.69013	1560	1708.82	1260.99	3.49276
390	390.88	278.93	1.96633	790	810.99	584.21	2.60400	1580	1733.17	1279.65	3.50829
400	400.98	286.16	1.99194	800	821.95	592.30	2.71787	1600	1757.57	1298.30	3.52364
410	411.12	293.43	2.01399	820	843.98	608.59	2.74504	1620	1782.00	1316.96	3.53879
420	421.26	300.69	2.04142	840	866.08	624.95	2.77170	1640	1806.46	1335.72	3.55381
430	431.43	307.99	2.06533	860	888.27	641.40	2.79783	1660	1830.96	1354.48	3.56867
440	441.61	315.30	2.08870	880	910.56	657.95	2.82344	1680	1855.50	1373.24	3.58335
450	451.80	322.62	2.11161	900	932.93	674.58	2.84856	1700	1880.1	1382.7	3.5979
460	462.02	329.97	2.13407	920	955.38	671.28	2.87324	1750	1941.6	1439.8	3.6336
470	472.24	337.32	2.15604	940	977.92	708.08	2.89748	1800	2003.3	1487.2	3.6684
480	482.49	344.70	2.17760	960	1000.55	725.02	2.92128	1850	2065.3	1534.9	3.7023
490	492.74	352.08	2.19876	980	1023.25	741.98	2.94468	1900	2127.34	1582.6	3.7354
500	503.02	359.49	2.21952	1000	1046.04	758.94	2.96770	1950	2189.7	1630.6	3.7677
510	513.32	366.92	2.23993	1010	1058.89	774.10	2.99034	2000	2255.1	1678.7	3.7994
520	523.63	374.36	2.25997	1040	1091.85	793.36	3.01260	2050	2314.6	1726.8	3.8303
530	533.98	381.84	2.27967	1060	1114.86	810.62	3.03449	2100	2377.4	1775.3	3.8605
540	544.35	378.34	2.29906	1080	1137.89	827.88	3.05608	2150	2440.3	1826.8	3.8901

(Tratta da K. Wark. Thermodynamics, 4th ed., McGraw-Hill, New York, 1983. basata su J.H.Keenan e J.Kaye. "Gas Tables". Wiley, New York, 1945)

<b>calori specifici medi impiegabili nell'intervallo 0 – 100°C</b> (da R.W. Haywood; Thermodynamic tables in S.I. Units; Cambridge University Press;1981)			
<b>sostanza</b>	$C_p$ <b>kJ·kg<sup>-1</sup>·K<sup>-1</sup></b>	$C_v$ <b>kJ·kg<sup>-1</sup>·K<sup>-1</sup></b>	<b>k</b>
anidride carbonica. CO <sub>2</sub>	0.865	0.676	1.28
aria	1.01	0.717	1.40
azoto. N <sub>2</sub>	1.04	0.743	1.40
idrogeno. H <sub>2</sub>	14.2	10.1	1.41
ossido di carbonio. CO	1.04	0.743	1.40
ossigeno. O <sub>2</sub>	0.917	0.656	1.40

<b>coefficienti sperimentali per il calcolo del calore specifico a pressione costante per gas ideale secondo la correlazione:</b> $c_p = a + bT + cT^2 + dT^3$ ; T[K]. $c_p$ [kJ·kg <sup>-1</sup> ·K <sup>-1</sup> ] (elaborata da R. C. Reid, J.M. Prausnitz e T.K. Sherwood. The properties of Gases and Liquids. Mc Graw Hill, 1977)				
<b>sostanza</b>	<b>a</b> <b>kJ·kg<sup>-1</sup>·K<sup>-1</sup></b>	<b>b</b> <b>kJ·kg<sup>-1</sup>·K<sup>-2</sup></b>	<b>c</b> <b>kJ·kg<sup>-1</sup>·K<sup>-3</sup></b>	<b>d</b> <b>kJ·kg<sup>-1</sup>·K<sup>-4</sup></b>
acqua. H <sub>2</sub> O	1.790	$1.068 \cdot 10^{-4}$	$5.859 \cdot 10^{-7}$	$-1.996 \cdot 10^{-10}$
ammoniaca. NH <sub>3</sub>	1.604	$1.399 \cdot 10^{-3}$	$1.003 \cdot 10^{-6}$	$-6.957 \cdot 10^{-10}$
anidride carbonica. CO <sub>2</sub>	$4.498 \cdot 10^{-1}$	$1.669 \cdot 10^{-3}$	$-1.273 \cdot 10^{-6}$	$3.898 \cdot 10^{-10}$
argon. Ar	$5.208 \cdot 10^{-1}$	$-8.039 \cdot 10^{-7}$	$-1.293 \cdot 10^{-6}$	0.000
azoto. N <sub>2</sub>	1.112	$-4.843 \cdot 10^{-4}$	$9.566 \cdot 10^{-7}$	$-4.170 \cdot 10^{-10}$
etano. C <sub>2</sub> H <sub>6</sub>	$1.799 \cdot 10^{-1}$	$5.923 \cdot 10^{-3}$	$-2.307 \cdot 10^{-6}$	$2.898 \cdot 10^{-10}$
Etilene. C <sub>2</sub> H <sub>4</sub>	$1.357 \cdot 10^{-1}$	$5.582 \cdot 10^{-3}$	$-2.976 \cdot 10^{-6}$	$6.256 \cdot 10^{-10}$
R-12. CCl <sub>2</sub> F <sub>2</sub>	$2.613 \cdot 10^{-1}$	$1.474 \cdot 10^{-3}$	$-1.248 \cdot 10^{-6}$	$3.591 \cdot 10^{-10}$
Idrogeno. H <sub>2</sub>	$1.347 \cdot 10$	$4.601 \cdot 10^{-3}$	$-6.850 \cdot 10^{-6}$	$3.793 \cdot 10^{-9}$
metano. CH <sub>4</sub>	1.200	$3.249 \cdot 10^{-3}$	$7.464 \cdot 10^{-7}$	$-7.054 \cdot 10^{-10}$
n-Butano. C <sub>4</sub> H <sub>10</sub>	$1.632 \cdot 10^{-1}$	$5.700 \cdot 10^{-3}$	$-1.907 \cdot 10^{-6}$	$-4.855 \cdot 10^{-11}$
ossido di azoto. NO	$9.780 \cdot 10^{-1}$	$-3.126 \cdot 10^{-5}$	$3.248 \cdot 10^{-7}$	$-1.395 \cdot 10^{-10}$
ossido di carbonio. CO	1.102	$-4.589 \cdot 10^{-4}$	$9.958 \cdot 10^{-7}$	$-4.539 \cdot 10^{-10}$
ossigeno. O <sub>2</sub>	$8.814 \cdot 10^{-1}$	$-1.154 \cdot 10^{-7}$	$5.475 \cdot 10^{-7}$	$-3.340 \cdot 10^{-10}$
propano. C <sub>3</sub> H <sub>8</sub>	$-9.580 \cdot 10^{-2}$	$6.946 \cdot 10^{-3}$	$-3.598 \cdot 10^{-6}$	$7.290 \cdot 10^{-10}$

<b>fattore acentrico di alcune sostanze</b> (elaborata da R. C. Reid, J.M. Prausnitz e T.K. Sherwood, The properties of Gases and Liquids, Mc Graw Hill, 1977)	
<b>sostanza</b>	<b>Ω</b>
acqua. H <sub>2</sub> O	0.344
ammoniaca. NH <sub>3</sub>	0.250
anidride carbonica. CO <sub>2</sub>	0.225
argon. Ar	-0.004
azoto. N <sub>2</sub>	0.040
etano. C <sub>2</sub> H <sub>6</sub>	0.098
Etilene. C <sub>2</sub> H <sub>4</sub>	0.085
R-12. CCl <sub>2</sub> F <sub>2</sub>	0.176
Idrogeno. H <sub>2</sub>	-0.22
metano. CH <sub>4</sub>	0.008
n-Butano. C <sub>4</sub> H <sub>10</sub>	0.193
ossido di azoto. NO	0.607
ossido di carbonio. CO	0.049
ossigeno. O <sub>2</sub>	0.021
propano. C <sub>3</sub> H <sub>8</sub>	0.132

<b>calori specifici di alcuni liquidi e solidi</b>		
<b>liquidi</b>	<b>stato</b>	<b>c (kJ·kg<sup>-1</sup>·K<sup>-1</sup>)</b>
ammoniaca	liquido saturo @ -20°C	4.52
	liquido saturo @ 10°C	4.67
	liquido saturo @ 50°C	5.10
alcol etilico	@ 1 atm 25°C	2.43
glicerina	@ 1 atm 10°C	2.32
	@ 1 atm 50°C	2.58
mercurio	@ 1 atm 10°C	0.138
	@ 1 atm 315°C	0.134
refrigerante R12	liquido saturo @ -20°C	0.90
	liquido saturo @ 20°C	0.96
acqua	@ 1 atm 0°C	4.217
	@ 1 atm 27°C	4.179
	@ 1 atm 100°C	4.218
<b>solidi</b>	<b>temperatura [K]</b>	<b>c (kJ·kg<sup>-1</sup>·K<sup>-1</sup>)</b>
alluminio	300	0.903
	300	0.385
rame	400	0.393
	200	1.56
	240	1.86
ghiaccio	273	2.11
	300	0.447
	300	0.129
piombo	300	0.129
argento	300	0.235

proprietà dei liquidi							
sostanza	dati di ebollizione a 1 atm		dati di congelamento		proprietà del liquido		
	punto normale di ebollizione °C	calore latente di vaporizzazione kJ·kg <sup>-1</sup>	punto di congelamento °C	calore latente di fusione kJ·kg <sup>-1</sup>	temperatura °C	densità kg·m <sup>-3</sup>	calore specifico kJ·kg <sup>-1</sup> ·°C <sup>-1</sup>
ammoniaca	-33.3	1357	-77.7	322.4	-33.3	682	4.43
					-20	665	4.52
					0	639	4.60
					25	602	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
salamoia (20% massa NaCl)	103.9		-17.4		20	1150	3.11
n-Butano	-0.5	385.2	-138.5	80.3	-0.5	601	2.31
carbonio. biossido di	-78.4	230.5 (a 0°C)	-56.6		0	296	0.59
etanolo	78.2	838.8	-114.2	109	25	783	2.46
glicole etilenico	198.1	800.1	-10.8	181.1	20	1109	2.84
alcol etilico	78.36	855	-156	108	20	789	2.84
glicerina	179.9	974	18.9	200.6	20	1261	2.32
elio	-268.9	22.8			-268.9	146.2	22.8
idrogeno	-252.8	445.7	-259.2	59.5	-252.8	70.7	10.0
isobutano	-11.7	367.1	-160	105.7	11.7	593.8	2.28
petrolio	204-293	251	-24.9		20	820	2.00
mercurio	256.7	294.7	-38.9	11.4	25	13560	0.139
metano	-161.5	510.4	-182.2	58.4	-161.5	423	3.49
					-100	301	5.79
metanolo	64.5	1100	-97.7	99.2	25	787	2.55
azoto	-195.8	198.6	-210	25.3	-195.8	809	2.06
					-160	596	2.97
ottano	124.8	306.3	-57.6	180.7	20	703	2.10
olio (leggero)					25	910	1.80
ossigeno	-183	212.7	-218.8	13.7	-183	1141	1.71
petrolio greggio		230-384			20	640	2.0
propano	-42.1	427.8	-187.7	80.0	-42.1	581	2.25
					0	529	2.53
					50	449	3.13
refrigerante-R134a	-26.1	216.8	-96.6		-50	1443	1.23
					-26.1	1374	1.27
					0	1294	1.34
					25	1206	1.42
acqua	100	2257	0.0	33.7	0	1000	4.23
					25	997	4.18
					50	988	4.18
					75	975	4.19
					100	958	4.22

**proprietà dei solidi metallici**

composizione	punto di fusione [K]	proprietà a 300 K				composizione	punto di fusione [K]	proprietà a 300 K			
		$\rho$ kg·dm <sup>-3</sup>	$c$ J·kg <sup>-1</sup> ·K <sup>-1</sup>	$k$ W·m <sup>-1</sup> ·K <sup>-1</sup>	$a \cdot 10^6$ m <sup>2</sup> ·s <sup>-1</sup>			$\rho$ kg·dm <sup>-3</sup>	$c$ J·kg <sup>-1</sup> ·K <sup>-1</sup>	$k$ W·m <sup>-1</sup> ·K <sup>-1</sup>	$a \cdot 10^6$ m <sup>2</sup> ·s <sup>-1</sup>
alluminio						acciaio al cromo					
puro	933	2.702	903	237	97.1	½Cr - ¼Mo - Si (0.18%C. 0.65% Cr. 0.23% Mo. 0.6% Si)	1670	7.822	444	37.7	10.9
lega 2024-T6 (4.5% Cu. 1.5%Mg.0.6%Mn)	775	2.77	875	177	73	1Cr - ½Mo (0.16% C. 1% Cr. 0.54% Mo. 0.39% Si)		7.858	442	42.3	12.2
lega 195. fusione(4.5% Cu)		2.790	883	168	68.2	1 Cr - V (0.2% C. 1.02%Cr.0.15% V)		7.836	443	48.9	14.1
						acciaio inossidabile					
berillio	1550	1.85	1825	200	59.2	AISI 304	1670	7.9	477	14.9	3.95
biscrento	545	9.78	122	7.86	6.59	AISI 316		8.238	468	13.4	3.48
boro	2573	2.5	1107	27	9.76	AISI 347		7.978	480	14.2	3.71
cadmio	594	8.65	231	96.8	48.4						
cromo	2118	7.16	449	93.7	29.1	ghisa		7.25	400	52	1.79
cobalto	1769	8.862	421	99.2	26.6						
rame						piombo	601	11.34	129	35.3	24.1
puro	1358	8.933	385	401	117	magnesio	923	1.74	1024	156	87.6
bronzo commerciale (90% Cu. 10%Al)	1293	8.8	420	52	14	molibdeno	2834	10.240	251	138	53.7
bronzo fosforoso (89% Cu. 11%Sn)	1104	8.78	355	54	17	nickel					
ottone giallo (70%Cu. 30%Zn)	1188	8.53	380	110	33.9	puro	1728	8.9	444	90.7	23
costantana (55%Cu. 45% Ni)	1493	8.92	384	23	6.71	nicromo (80% Ni. 20% Cr)	1672	8.4	420	12	3.4
						inconel X - 750 (73% Ni. 15% Cr. 637% Fe)	1665	8.5	439	11.7	3.1
germanio	1211	5.36	322	59.9	34.7						
oro	1336	19.3	129	317	127	niobio	2741	8.57	265	53.7	23.6
iridio	2720	22.5	130	147	50.3	palladio	1827	12.02	244	71.8	24.5
ferro						platino					
puro	1810	7.87	447	80.2	23.1	puro	2045	21.45	133	71.6	25.1
armco (puro al 99.75%)		7.87	447	72.7	20.7	lega 60%Pt - 40%Rh	1800	16.63	162	47	17.4
carbonio semplice (Mn≤1%. Si≤0.1%)		7.854	434	60.5	17.7						
AISI 1010		7.832	434	63.9	18.8	renio	3453	21.1	136	47.9	16.7
carbonio-silicio (Mn≤1%. 0.1%≤Si≤0.6%)		7.817	446	50.9	14.9	rodio	2236	12.45	243	150	39.6
carbonio-manganese-silicio (1%<Mn≤1.65%. .1<Si≤0.6%)		8.131	434	41	11.6	silicio	1685	2.33	712	148	89.2
						tantalo	3269	16.6	140	57.5	24.7
						torio	2023	11.7	118	54	39.1

<b>proprietà di solidi non metallici @ 20°C</b>				
	$\rho$ kg·m <sup>-3</sup>	$c_p$ kJ·kg <sup>-1</sup> ·K <sup>-1</sup>	$k$ W·m <sup>-1</sup> ·K <sup>-1</sup>	$a$ m <sup>2</sup> ·s <sup>-1</sup>
<b>solidi non metallici</b>				
ghiaccio (a 0°C)	920	1.93	2.20	1.2 10 <sup>-6</sup>
neve	200	1.93	0.12	3.1 10 <sup>-6</sup>
roccia calcarea	2700	0.80	2.90	1.3 10 <sup>-6</sup>
terreno ghiaioso	2000	1.84	0.52	1.4 10 <sup>-6</sup>
terreno argilloso	1500	0.88	1.40	1.1 10 <sup>-6</sup>
vetro	2700	0.80	0.76	3.5 10 <sup>-6</sup>
<b>materiali da costruzione</b>				
acciaio, profilati	7800	0.55	52	1.21 10 <sup>-6</sup>
asfalto	2100	0.92	0.70	3.62 10 <sup>-6</sup>
calcestruzzo	2400	0.78	1.91	1.02 10 <sup>-6</sup>
calcestruzzo alleggerito	1000	0.78	0.31	3.97 10 <sup>-6</sup>
ghiaia grossa	1700	0.80	1.20	8.82 10 <sup>-6</sup>
intonaco di calce e gesso	1400	0.83	0.70	6.02 10 <sup>-6</sup>
laterizio, mattoni pieni	1800	1.00	0.72	4.00 10 <sup>-6</sup>
laterizio, mattoni forati	1000	1.00	0.36	3.60 10 <sup>-6</sup>
legno di abete	450	1.38	0.12	1.93 10 <sup>-6</sup>
legno di quercia	850	1.25	0.22	2.07 10 <sup>-6</sup>
malta di calce e cemento	1800	0.83	0.90	6.02 10 <sup>-6</sup>
malta di cemento	2000	0.83	1.40	8.43 10 <sup>-6</sup>
sabbia secca	1700	0.80	0.60	4.41 10 <sup>-6</sup>
<b>materiali isolanti</b>				
fibra di vetro in feltri	14	0.83	0.044	4.22 10 <sup>-6</sup>
fibra di vetro in coppelle	30	1.02	0.040	1.31 10 <sup>-6</sup>
polistirene estruso	35	1.21	0.035	8.26 10 <sup>-6</sup>
polistirene espanso	30	1.21	0.040	1.10 10 <sup>-6</sup>
poliuretano in lastre	32	1.05	0.032	9.52 10 <sup>-6</sup>
vermiculite espansa in granuli	80	0.83	0.077	1.16 10 <sup>-6</sup>

proprietà termofisiche dell'aria a pressione atmosferica								
t	$\rho$	$c_p$	k	a	$\mu$	$\nu$	Pr	$g\beta/\nu^2$
°C	kg·m <sup>-3</sup>	kJ·kg <sup>-1</sup> ·K <sup>-1</sup>	W·m <sup>-1</sup> ·K <sup>-1</sup>	m <sup>2</sup> ·s <sup>-1</sup>	kg·m <sup>-1</sup> ·s <sup>-1</sup>	m <sup>2</sup> ·s <sup>-1</sup>		m <sup>-3</sup> ·K <sup>-1</sup>
-150	2.991	1.023	0.0114	3.73 10 <sup>-6</sup>	8.61 10 <sup>-6</sup>	2.88 10 <sup>-6</sup>	0.772	9.62 10 <sup>9</sup>
-100	2.063	1.010	0.0158	7.58 10 <sup>-6</sup>	1.17 10 <sup>-6</sup>	5.67 10 <sup>-6</sup>	0.748	1.76 10 <sup>9</sup>
-50	1.583	1.007	0.0200	1.26 10 <sup>-5</sup>	1.45 10 <sup>-6</sup>	9.16 10 <sup>-6</sup>	0.729	5.24 10 <sup>8</sup>
-20	1.380	1.006	0.0226	1.62 10 <sup>-5</sup>	1.61 10 <sup>-5</sup>	1.17 10 <sup>-5</sup>	0.719	2.84 10 <sup>8</sup>
-10	1.333	1.006	0.0234	1.74 10 <sup>-5</sup>	1.66 10 <sup>-5</sup>	1.25 10 <sup>-5</sup>	0.716	2.40 10 <sup>8</sup>
0	1.287	1.006	0.0242	1.87 10 <sup>-5</sup>	1.71 10 <sup>-5</sup>	1.33 10 <sup>-5</sup>	0.713	2.03 10 <sup>9</sup>
10	1.240	1.007	0.0250	2.00 10 <sup>-5</sup>	1.76 10 <sup>-5</sup>	1.42 10 <sup>-5</sup>	0.711	1.72 10 <sup>9</sup>
20	1.193	1.007	0.0258	2.14 10 <sup>-5</sup>	1.81 10 <sup>-5</sup>	1.52 10 <sup>-5</sup>	0.709	1.45 10 <sup>9</sup>
30	1.151	1.007	0.0265	2.29 10 <sup>-5</sup>	1.86 10 <sup>-5</sup>	1.62 10 <sup>-5</sup>	0.706	1.24 10 <sup>9</sup>
40	1.118	1.008	0.0273	2.42 10 <sup>-5</sup>	1.91 10 <sup>-5</sup>	1.71 10 <sup>-5</sup>	0.705	1.08 10 <sup>9</sup>
50	1.084	1.008	0.0280	2.56 10 <sup>-5</sup>	1.96 10 <sup>-5</sup>	1.80 10 <sup>-5</sup>	0.704	9.33 10 <sup>7</sup>
60	1.051	1.008	0.0288	2.71 10 <sup>-5</sup>	2.00 10 <sup>-5</sup>	1.90 10 <sup>-5</sup>	0.702	8.12 10 <sup>7</sup>
70	1.018	1.009	0.0295	2.87 10 <sup>-5</sup>	2.05 10 <sup>-5</sup>	2.01 10 <sup>-5</sup>	0.701	7.05 10 <sup>7</sup>
80	0.987	1.009	0.0302	3.04 10 <sup>-5</sup>	2.10 10 <sup>-5</sup>	2.12 10 <sup>-5</sup>	0.699	6.16 10 <sup>7</sup>
90	0.962	1.010	0.0310	3.19 10 <sup>-5</sup>	2.14 10 <sup>-5</sup>	2.22 10 <sup>-5</sup>	0.697	5.46 10 <sup>7</sup>
100	0.938	1.011	0.0318	3.35 10 <sup>-5</sup>	2.18 10 <sup>-5</sup>	2.33 10 <sup>-5</sup>	0.695	4.85 10 <sup>7</sup>
150	0.826	1.017	0.0354	4.22 10 <sup>-5</sup>	2.40 10 <sup>-5</sup>	2.90 10 <sup>-5</sup>	0.688	2.76 10 <sup>7</sup>
200	0.738	1.025	0.0389	5.14 10 <sup>-5</sup>	2.60 10 <sup>-5</sup>	3.52 10 <sup>-5</sup>	0.685	1.67 10 <sup>7</sup>
300	0.609	1.045	0.0453	7.12 10 <sup>-5</sup>	2.97 10 <sup>-5</sup>	4.87 10 <sup>-5</sup>	0.684	7.21 10 <sup>6</sup>
500	0.451	1.093	0.0560	1.14 10 <sup>-4</sup>	3.62 10 <sup>-5</sup>	8.02 10 <sup>-5</sup>	0.706	1.97 10 <sup>6</sup>
750	0.341	1.145	0.0678	1.74 10 <sup>-4</sup>	4.30 10 <sup>-5</sup>	1.26 10 <sup>-4</sup>	0.726	6.02 10 <sup>5</sup>
1000	0.274	1.185	0.0805	2.48 10 <sup>-4</sup>	4.90 10 <sup>-5</sup>	1.79 10 <sup>-4</sup>	0.721	2.41 10 <sup>5</sup>
1500	0.197	1.281	0.1181	4.69 10 <sup>-4</sup>	6.3 10 <sup>-5</sup>	3.20 10 <sup>-4</sup>	0.683	1.70 10 <sup>4</sup>
2000	0.153	1.462	0.1710	7.63 10 <sup>-4</sup>	7.59 10 <sup>-5</sup>	4.95 10 <sup>-4</sup>	0.649	1.76 10 <sup>4</sup>
2500	0.125	2.245	0.3662	1.30 10 <sup>-3</sup>	8.93 10 <sup>-5</sup>	7.14 10 <sup>-4</sup>	0.547	6.93 10 <sup>3</sup>

proprietà termofisiche dell'acqua									
t	p	ρ	c <sub>p</sub>	k	a	μ	v	Pr	gβ/v <sup>2</sup>
°C	kPa	kg m <sup>-3</sup>	kJ kg <sup>-1</sup> K <sup>-1</sup>	W m <sup>-1</sup> K <sup>-1</sup>	m <sup>2</sup> s <sup>-1</sup>	kg m <sup>-1</sup> s <sup>-1</sup>	m <sup>2</sup>	-	m <sup>-3</sup> K <sup>-1</sup>
<b>liquido saturo</b>									
0	0.611	1000	4.217	0.569	1.35 10 <sup>-7</sup>	1.75 10 <sup>-3</sup>	1.75 10 <sup>-6</sup>	12.97	-2.18 10 <sup>8</sup>
10	1.240	1000	4.192	0.587	1.40 10 <sup>-7</sup>	1.30 10 <sup>-3</sup>	1.30 10 <sup>-4</sup>	9.27	5.18 10 <sup>8</sup>
20	2.358	998	4.182	0.603	1.44 10 <sup>-7</sup>	1.00 10 <sup>-3</sup>	1.01 10 <sup>-4</sup>	6.96	2.01 10 <sup>9</sup>
30	4.275	996	4.178	0.617	1.48 10 <sup>-7</sup>	8.01 10 <sup>-4</sup>	8.04 10 <sup>-7</sup>	5.42	4.61 10 <sup>9</sup>
40	7.425	992	4.179	0.632	1.52 10 <sup>-7</sup>	6.55 10 <sup>-4</sup>	6.60 10 <sup>-7</sup>	4.33	8.69 10 <sup>9</sup>
50	12.41	988	4.181	0.643	1.56 10 <sup>-7</sup>	5.46 10 <sup>-4</sup>	5.53 10 <sup>-7</sup>	3.55	1.47 10 <sup>10</sup>
60	20.01	983	4.189	0.654	1.59 10 <sup>-7</sup>	4.66 10 <sup>-4</sup>	4.74 10 <sup>-7</sup>	2.99	2.28 10 <sup>10</sup>
70	31.28	978	4.190	0.665	1.62 10 <sup>-7</sup>	4.01 10 <sup>-4</sup>	4.10 10 <sup>-7</sup>	2.52	3.42 10 <sup>10</sup>
80	47.53	972	4.198	0.670	1.64 10 <sup>-7</sup>	3.51 10 <sup>-4</sup>	3.61 10 <sup>-7</sup>	2.20	4.83 10 <sup>10</sup>
90	70.31	965	4.207	0.676	1.67 10 <sup>-7</sup>	3.13 10 <sup>-4</sup>	3.24 10 <sup>-7</sup>	1.95	6.57 10 <sup>10</sup>
100	101.3	958	4.217	0.680	1.68 10 <sup>-7</sup>	2.79 10 <sup>-4</sup>	2.91 10 <sup>-7</sup>	1.73	8.67 10 <sup>10</sup>
120	200.2	943	4.244	0.687	1.72 10 <sup>-7</sup>	2.31 10 <sup>-4</sup>	2.45 10 <sup>-7</sup>	1.43	1.41 10 <sup>11</sup>
140	363.8	926	4.286	0.688	1.73 10 <sup>-7</sup>	1.95 10 <sup>-4</sup>	2.11 10 <sup>-7</sup>	1.22	2.14 10 <sup>11</sup>
160	621.4	907	4.340	0.684	1.74 10 <sup>-7</sup>	1.70 10 <sup>-4</sup>	1.87 10 <sup>-7</sup>	1.08	3.02 10 <sup>11</sup>
180	1007	887	4.413	0.676	1.73 10 <sup>-7</sup>	1.49 10 <sup>-4</sup>	1.68 10 <sup>-7</sup>	0.97	4.28 10 <sup>11</sup>
200	1561	865	4.496	0.665	1.71 10 <sup>-7</sup>	1.34 10 <sup>-4</sup>	1.55 10 <sup>-7</sup>	0.90	5.73 10 <sup>11</sup>
<b>vapore saturo secco</b>									
0	0.611	0.0048	1.854	0.0182	2.03 10 <sup>-3</sup>	8.02 10 <sup>-6</sup>	1.65 10 <sup>-3</sup>	0.82	1.31 10 <sup>4</sup>
10	1.240	0.0090	1.860	0.0188	1.12 10 <sup>-3</sup>	8.42 10 <sup>-6</sup>	9.33 10 <sup>-4</sup>	0.83	3.98 10 <sup>4</sup>
20	2.358	0.0171	1.867	0.0194	6.09 10 <sup>-4</sup>	8.82 10 <sup>-6</sup>	5.16 10 <sup>-5</sup>	0.85	1.26 10 <sup>5</sup>
30	4.275	0.0301	1.875	0.0199	3.53 10 <sup>-4</sup>	9.22 10 <sup>-6</sup>	3.06 10 <sup>-5</sup>	0.87	3.45 10 <sup>5</sup>
40	7.425	0.0507	1.886	0.0206	2.15 10 <sup>-4</sup>	9.62 10 <sup>-6</sup>	1.90 10 <sup>-5</sup>	0.88	8.72 10 <sup>5</sup>
50	12.41	0.0824	1.900	0.0212	1.35 10 <sup>-4</sup>	1.00 10 <sup>-5</sup>	1.22 10 <sup>-5</sup>	0.90	2.05 10 <sup>6</sup>
60	20.01	0.129	1.917	0.0219	8.82 10 <sup>-5</sup>	1.04 10 <sup>-5</sup>	8.05 10 <sup>-5</sup>	0.91	4.54 10 <sup>6</sup>
70	31.28	0.197	1.937	0.0225	5.89 10 <sup>-5</sup>	1.08 10 <sup>-5</sup>	5.49 10 <sup>-5</sup>	0.93	9.49 10 <sup>6</sup>
80	47.53	0.292	1.963	0.0232	4.05 10 <sup>-5</sup>	1.12 10 <sup>-5</sup>	3.85 10 <sup>-5</sup>	0.95	1.88 10 <sup>7</sup>
90	70.31	0.422	1.993	0.0240	2.85 10 <sup>-5</sup>	1.16 10 <sup>-5</sup>	2.76 10 <sup>-5</sup>	0.97	3.55 10 <sup>7</sup>
100	101.3	0.596	2.029	0.0248	2.05 10 <sup>-5</sup>	1.20 10 <sup>-5</sup>	2.02 10 <sup>-5</sup>	0.98	6.46 10 <sup>7</sup>
120	200.2	1.109	2.121	0.0266	1.13 10 <sup>-5</sup>	1.28 10 <sup>-5</sup>	1.15 10 <sup>-5</sup>	1.02	1.87 10 <sup>8</sup>
140	363.8	1.951	2.243	0.0287	6.56 10 <sup>-6</sup>	1.35 10 <sup>-5</sup>	6.94 10 <sup>-6</sup>	1.06	4.93 10 <sup>7</sup>
160	621.4	3.237	2.398	0.0308	3.97 10 <sup>-6</sup>	1.43 10 <sup>-5</sup>	4.40 10 <sup>-6</sup>	1.11	1.17 10 <sup>9</sup>
180	1007	5.126	2.598	0.0336	2.52 10 <sup>-6</sup>	1.50 10 <sup>-5</sup>	2.92 10 <sup>-6</sup>	1.16	2.54 10 <sup>9</sup>
200	1561	7.805	2.837	0.0369	1.67 10 <sup>-6</sup>	1.57 10 <sup>-5</sup>	2.01 10 <sup>-6</sup>	1.20	5.16 10 <sup>9</sup>
220	2327	11.46	3.154	0.0408	1.13 10 <sup>-6</sup>	1.63 10 <sup>-5</sup>	1.43 10 <sup>-6</sup>	1.26	9.79 10 <sup>9</sup>
240	3356	16.73	3.542	0.0456	7.69 10 <sup>-7</sup>	1.71 10 <sup>-5</sup>	1.02 10 <sup>-6</sup>	1.33	1.84 10 <sup>10</sup>
260	4704	23.64	4.058	0.0517	5.39 10 <sup>-7</sup>	1.78 10 <sup>-5</sup>	7.55 10 <sup>-7</sup>	1.40	3.23 10 <sup>10</sup>
280	6431	33.13	4.782	0.0600	3.79 10 <sup>-7</sup>	1.88 10 <sup>-5</sup>	5.66 10 <sup>-7</sup>	1.50	5.53 10 <sup>10</sup>
300	8605	46.09	5.900	0.0767	2.82 10 <sup>-7</sup>	1.99 10 <sup>-5</sup>	4.32 10 <sup>-7</sup>	1.53	9.16 10 <sup>10</sup>
320	11310	64.60	7.791	0.0869	1.73 10 <sup>-7</sup>	2.19 10 <sup>-5</sup>	3.39 10 <sup>-7</sup>	1.96	1.44 10 <sup>11</sup>
340	14420	92.26	12.45	0.1070	9.27 10 <sup>-8</sup>	2.47 10 <sup>-5</sup>	2.67 10 <sup>-7</sup>	2.88	2.24 10 <sup>11</sup>
360	18680	144.2	25.56	0.1370	3.71 10 <sup>-8</sup>	2.93 10 <sup>-5</sup>	2.03 10 <sup>-7</sup>	5.46	3.76 10 <sup>11</sup>
365	19830	165.8	36.67	0.1500	2.46 10 <sup>-8</sup>	3.13 10 <sup>-5</sup>	1.89 10 <sup>-7</sup>	7.65	4.32 10 <sup>11</sup>
370	21060	202.3	-	0.1700	-	3.52 10 <sup>-5</sup>	1.74 10 <sup>-7</sup>	-	5.05 10 <sup>11</sup>



<b>proprietà termofisiche dell'R134a</b>									
<b>t</b>	<b>p</b>	<b>ρ</b>	<b>c<sub>p</sub></b>	<b>k</b>	<b>a</b>	<b>μ</b>	<b>v</b>	<b>Pr</b>	<b>gβ/v<sup>2</sup></b>
°C	kPa	kg m <sup>-3</sup>	kJ kg <sup>-1</sup> K <sup>-1</sup>	W m <sup>-1</sup> K <sup>-1</sup>	m <sup>2</sup> s <sup>-1</sup>	kg m <sup>-1</sup> s <sup>-1</sup>	m <sup>2</sup>	-	m <sup>-3</sup> K <sup>-1</sup>
<b>liquido saturo</b>									
-40	51.21	1418	1.255	0.1106	6.21 10 <sup>-8</sup>	4.72 10 <sup>-4</sup>	3.33 10 <sup>-7</sup>	5.36	1.87 10 <sup>11</sup>
-30	84.38	1388	1.273	0.1058	5.99 10 <sup>-8</sup>	4.06 10 <sup>-4</sup>	2.93 10 <sup>-7</sup>	4.89	2.47 10 <sup>11</sup>
-20	132.7	1358	1.293	0.1011	5.76 10 <sup>-8</sup>	3.53 10 <sup>-4</sup>	2.60 10 <sup>-7</sup>	4.51	3.21 10 <sup>11</sup>
-10	200.6	1327	1.316	0.0965	5.53 10 <sup>-8</sup>	3.09 10 <sup>-4</sup>	2.33 10 <sup>-7</sup>	4.21	4.37 10 <sup>11</sup>
0	292.8	1295	1.341	0.0920	5.30 10 <sup>-8</sup>	2.71 10 <sup>-4</sup>	2.09 10 <sup>-7</sup>	3.95	5.53 10 <sup>11</sup>
10	414.6	1261	1.370	0.0876	5.07 10 <sup>-8</sup>	2.39 10 <sup>-4</sup>	1.89 10 <sup>-7</sup>	3.73	7.38 10 <sup>11</sup>
20	571.7	1225	1.405	0.0833	4.84 10 <sup>-8</sup>	2.11 10 <sup>-4</sup>	1.72 10 <sup>-7</sup>	3.55	9.74 10 <sup>11</sup>
30	770.2	1187	1.446	0.0790	4.60 10 <sup>-8</sup>	1.86 10 <sup>-4</sup>	1.57 10 <sup>-7</sup>	3.40	1.35 10 <sup>12</sup>
40	1017	1147	1.498	0.0747	4.35 10 <sup>-8</sup>	1.63 10 <sup>-4</sup>	1.42 10 <sup>-7</sup>	3.28	1.77 10 <sup>12</sup>
50	1318	1102	1.566	0.0704	4.08 10 <sup>-8</sup>	1.43 10 <sup>-4</sup>	1.30 10 <sup>-7</sup>	3.18	2.43 10 <sup>12</sup>
60	1682	1053	1.660	0.0661	3.78 10 <sup>-8</sup>	1.24 10 <sup>-4</sup>	1.18 10 <sup>-7</sup>	3.12	3.35 10 <sup>12</sup>
70	2117	996	1.804	0.0617	3.43 10 <sup>-8</sup>	1.06 10 <sup>-4</sup>	1.07 10 <sup>-7</sup>	3.11	5.14 10 <sup>12</sup>
80	2633	928	2.065	0.0572	2.98 10 <sup>-8</sup>	8.90 10 <sup>-5</sup>	9.59 10 <sup>-8</sup>	3.22	8.25 10 <sup>12</sup>
<b>vapore saturo secco</b>									
-40	51.21	2.769	0.749	0.0082	3.94 10 <sup>-6</sup>	9.12 10 <sup>-6</sup>	3.29 10 <sup>-6</sup>	0.84	3.88 10 <sup>9</sup>
-30	84.38	4.426	0.781	0.0090	2.60 10 <sup>-6</sup>	9.53 10 <sup>-6</sup>	2.15 10 <sup>-6</sup>	0.83	8.72 10 <sup>9</sup>
-20	132.7	6.784	0.816	0.0098	1.77 10 <sup>-6</sup>	9.93 10 <sup>-6</sup>	1.46 10 <sup>-6</sup>	0.82	1.81 10 <sup>10</sup>
-10	200.6	10.04	0.854	0.0107	1.24 10 <sup>-6</sup>	1.03 10 <sup>-5</sup>	1.03 10 <sup>-6</sup>	0.83	3.52 10 <sup>10</sup>
0	292.8	14.43	0.897	0.0115	8.89 10 <sup>-7</sup>	1.07 10 <sup>-5</sup>	7.44 10 <sup>-7</sup>	0.84	6.50 10 <sup>10</sup>
10	414.6	20.23	0.946	0.0124	6.48 10 <sup>-7</sup>	1.12 10 <sup>-5</sup>	5.5 1 10 <sup>-7</sup>	0.85	1.14 10 <sup>11</sup>
20	571.7	27.78	1.001	0.0133	4.79 10 <sup>-7</sup>	1.16 10 <sup>-5</sup>	4.17 10 <sup>-7</sup>	0.87	1.93 10 <sup>11</sup>
30	770.2	37.54	1.065	0.0143	3.58 10 <sup>-7</sup>	1.20 10 <sup>-5</sup>	3.21 10 <sup>-7</sup>	0.89	3.15 10 <sup>11</sup>
40	1017	50.09	1.145	0.0154	2.69 10 <sup>-7</sup>	1.26 10 <sup>-5</sup>	2.51 10 <sup>-7</sup>	0.93	4.99 10 <sup>11</sup>
50	1318	66.27	1.246	0.0167	2.02 10 <sup>-7</sup>	1.31 10 <sup>-5</sup>	1.98 10 <sup>-7</sup>	0.98	7.75 10 <sup>11</sup>
60	1682	87.38	1.387	0.0183	1.51 10 <sup>-7</sup>	1.38 10 <sup>-5</sup>	1.58 10 <sup>-7</sup>	1.04	1.18 10 <sup>12</sup>
70	2117	115.6	1.605	0.0205	1.10 10 <sup>-7</sup>	1.47 10 <sup>-5</sup>	1.27 10 <sup>-7</sup>	1.15	1.78 10 <sup>12</sup>
80	2633	155.1	2.012	0.0237	7.60 10 <sup>-8</sup>	1.58 10 <sup>-5</sup>	1.02 10 <sup>-7</sup>	1.34	2.66 10 <sup>12</sup>

emissività di alcune superfici (a) metalli					
materiale	temperatura [K]	emissività $\epsilon$	materiale	temperatura [K]	emissività $\epsilon$
alluminio			magnesio. lucido	300-500	0.07-0.13
lucido	300-900	0.04-0.06			
foglio commerciale	400	0.09	mercurio	300-400	0.09-0.12
molto ossidato	400-800	0.20-0.33	molibdeno		
anodizzato	300	0.8	lucido	300-2000	0.05-0.21
			ossidato	600-800	0.80-0.82
bismuto. brillante	350	0.34	nichel		
ottone			lucido	500-1200	0.07-0.17
molto lucido	500-650	0.03-0.04	ossidato	450-100	0.37-0.57
lucido	350	0.09			
piastra appannata	300-600	0.22	platino. lucido	500-1500	0.06-0.18
ossidato	450-800	0.6	argento. lucido	300-1000	0.02-0.07
cromo. lucido	300-1400	0.08-0.40	acciaio inossidabile		
rame			lucido	300-1000	0.17-0.30
molto lucido	300	0.02	leggermente ossidato	600-1000	0.30-0.40
lucido	300-500	0.04-0.05	molto ossidato	600-1000	0.70-0.80
foglio commerciale	300	0.15	acciaio		
ossidato	600-1000	0.5-0.8	lamierino lucido	300-500	0.08-0.14
ossidato nero	300	0.78	lamierino commerciale	500-1200	0.20-0.32
oro			molto ossidato	300	0.81
molto lucido	300-1000	0.03-0.06			
foglio brillante	300	0.07	stagno. lucido	300	0.05
ferro			tungsteno		
molto lucido	300-500	0.05-0.07	lucido	300-2500	0.03-0.29
ghisa	300	0.44	filamento	3500	0.39
ferro battuto	300-500	0.28	zinco		
arrugginito	300	0.61	lucido	300-800	0.02-0.05
ossidato	500-900	0.64-0.78	ossidato	300	0.25
piombo					
lucido	300-500	0.06-0.08			
non ossidato ruvido	300	0.43			
ossidato	300	0.63			

<b>emissività di alcune superfici (b) non metalli</b>					
<b>materiale</b>	<b>temperatura [K]</b>	<b>emissività <math>\epsilon</math></b>	<b>materiale</b>	<b>temperatura [K]</b>	<b>emissività <math>\epsilon</math></b>
allumina	800-1400	0.65-0.45	carta bianca	300	0.90
ossido di alluminio	600-1500	0.69-0.41	intonaco bianco	300	0.93
amianto	300	0.96	porcellana vetrata	300	0.92
pavimento di asfalto	300	0.85-0.93	quarzo grezzo. fuso	300	0.93
laterizio			gomma		
comune	300	0.93-0.96	soffice	300	0.86
argilla refrattaria	1200	0.75	dura	300	0.93
filamento al carbonio	2000	0.53	sabbia	300	0.90
stoffa	300	0.75-0.90	carburo di silicio	600-1500	0.87-0.85
calcestruzzo	300	0.88-0.94	pelle umana	300	0.95
vetro			neve	273	0.80-0.90
da finestra	300	0.90-0.95	terreno. terrestre	300	0.93-0.96
pyrex	300-1200	0.82-0.62	nero fumo	300-500	0.95
pyroceramico	300-1500	0.85-0.57	teflon	300-500	0.85-0.92
			acqua. profonda	273-373	0.95-0.96
ghiaccio	273	0.95-0.99	legno		
ossido di magnesio	400-800	0.69-0.55	faggio	300	0.94
muratura	300	0.80	quercia	300	0.90
vernici					
alluminio	300	0.40-0.50			
nera. laccatura. lucida	300	0.88			
olii. tutti i colori	300	0.92-0.96			
acrilico bianco	300	0.90			
smalto bianco	300	0.90			
fondo rosso	300	0.93			

## TABELLE DI CONVERSIONE DELLE UNITA' DI MISURA

• accelerazione.....	1
• angoli.....	1
• area.....	1
• calore (grandezze termiche).....	1
• coppia o momento torcente.....	1
• coppia o momento torcente per unità di lunghezza.....	1
• densità.....	2
• elettricità e magnetismo.....	2
• energia.....	3
• forza.....	3
• forza per unità di lunghezza.....	3
• luce.....	3
• lunghezza.....	3
• massa.....	4
• massa per unità di area.....	4
• massa per unità di lunghezza.....	4
• portata in massa.....	4
• portata in volume.....	4
• potenza.....	5
• potenza per unità di area.....	5
• temperatura.....	5
• tempo.....	6
• velocità.....	6
• viscosità.....	6
• volume.....	6
• multipli e sottomultipli.....	7

(materiale didattico a diffusione interna e distribuzione gratuita)





per convertire da:	a:	moltiplicare per:	per convertire da:	a:	moltiplicare per:
<b>DENSITA'</b>					
grain/gal (U.S. liquid)	kg m <sup>-3</sup>	1.711 806 E-02	EMU of electric potential	volt (V)	1.000 000·E-08
g/cm <sup>3</sup>	kg m <sup>-3</sup>	1.000 000·E+03	EMU of inductance	henry (H)	1.000 000·E-09
oz (avoirdupois)/gal (U.K. liquid)	kg m <sup>-3</sup>	6.236 021 E+00	EMU of resistance	ohm (Ω)	1.000 000·E-09
oz (avoirdupois)/gal (U.S. liquid)	kg m <sup>-3</sup>	7.489 152 E+00	ESU of capacitance	farad (F)	1.112 650·E-12
oz (avoirdupois)/in <sup>3</sup>	kg m <sup>-3</sup>	1.729 994 E+03	ESU of current	ampere (A)	3.335 6·E-10
lb/ft <sup>3</sup>	kg m <sup>-3</sup>	1.601 846 E+01	ESU of electric potential	volt (V)	2.997 9·E+02
lb/in. <sup>3</sup>	kg m <sup>-3</sup>	2.767 990 E+04	ESU of inductance	henry (H)	8.987 554·E+11
lb/gal (U.K. liquid)	kg m <sup>-3</sup>	9.977 633 E+01	ESU of resistance	ohm (Ω)	8.987 554·E+11
lb/gal (U.S. liquid)	kg m <sup>-3</sup>	1.198 264 E+02	faraday (based on carbon-12)	coulomb ( C)	9.648 70·E+04
lb/yd <sup>3</sup>	kg m <sup>-3</sup>	5.932 764 E-01	faraday (chemical)	coulomb ( C)	9.649 57·E+04
slug/ft <sup>3</sup>	kg m <sup>-3</sup>	5.153 788 E+02	faraday (physical)	coulomb ( C)	9.652 19·E+04
ton (long)/yd <sup>3</sup>	kg m <sup>-3</sup>	1.328 939 E+03	gamma	tesla (T)	1.000 000·E-09
ton (short)/yd <sup>3</sup>	kg m <sup>-3</sup>	1.186 553 E+03	gauss	tesla (T)	1.000 000·E-04
			gilbert	ampere (A)	7.957 747·E-01
			maxwell	weber (Wb)	1.000 000·E-08
			mho	siemens (S)	1.000 000·E+00
			oersted	ampere per metro (A·m <sup>-1</sup> )	7.957 747·E+01
			ohm centimetre	ohm metro (Ω·m)	1.000 000·E-02
			ohm circular-mil per foot	ohm metro (Ω·m)	1.662 426·E-09
			statampere	ampere (A)	3.335 640·E-10
			statcoulomb	coulomb ( C)	3.335 640·E-10
			statfarad	farad (F)	1.112 650·E-12
			statfarad	farad (F)	1.112 650·E-12
			stathenry	henry (H)	8.987 554·E+11
			statmho	siemens (S)	1.112 650·E-12
			statohm	ohm (Ω)	8.987 554·E+11
			statvolt	volt (V)	2.997 925·E+02
			unit pole	weber (Wb)	1.256 637·E-07
			EMU: electrostatic cgs unit		
			ESU: electromagnetic cgs unit		
<b>ELETTRICITA' E MAGNETISMO</b>					
abampere	ampere (A)	1.000 000·E+01			
abcoulomb	coulomb ( C)	1.000 000·E+01			
abfarad	farad (F)	1.000 000·E+09			
abhenry	henry (H)	1.000 000·E-09			
abmho	siemens (S)	1.000 000·E+09			
abohm	ohm (Ω)	1.000 000·E-09			
abvolt	volt (V)	1.000 000·E-08			
ampere ora	coulomb ( C)	3.600 000·E+03			
EMU of capacitance	farad (F)	1.000 000·E+09			
EMU of current	ampere (A)	1.000 000·E+01			

per convertire da:	a:	moltiplicare per:	per convertire da:	a:	moltiplicare per:
<b>ENERGIA</b>			<b>FORZA PER UNITA' DI LUNGHEZZA</b>		
British Thermal Unit, BTU (IT)	Joule (J)	1.055 056·E+03	lb <sub>f</sub> /ft	N·m <sup>-1</sup>	1.459 390·E+01
BTU (39 F)	J	1.059 67·E+03	lb <sub>f</sub> /in.	N·m <sup>-1</sup>	1.751 268·E+02
BTU (59 F)	J	1.054 80·E+30			
BTUlese (60 F)	J	1.054 68·E+03	<b>LUCE</b>		
caloria (IT)	J	4.186 800·E+00	cd/in <sup>2</sup>	cd·m <sup>-2</sup>	1.550 003 E+03
calorie (15°C)	J	4.185 80·E+00	footcandle	lux (lx)	1.076 391 E+01
caloria (20°C)	J	4.181 90·E+00	footlambert	cd·m <sup>-2</sup>	3.426 259 E+00
caloria, kilogrammo (IT)	J	4.186 800·E+03	lambert	cd·m <sup>-2</sup>	3.183 099 E+03
electronvolt	J	1.602 19·E-19			
erg	J	1.000 000·E-07	<b>LUNGHEZZA</b>		
ft·lb <sub>f</sub>	J	1.355 818·E+00	angstrom	metri (m)	1.000 000·E -10
ft·poundal	J	4.214 011·E-02	chain	m	2.011 684·E+01
kilocaloria (IT)	J	4.186 800·E+03	fathom	m	1.828 804·E+00
kWh	J	3.600 000·E+06	foot (piede)	m	3.084 000·E-01
therm	J	1.055 056·E+08	foot (U.S. survey)	m	3.084 006·E-01
W·h	J	3.600 000·E+03	inch (pollice)	m	2.540 000·E-02
W·s	J	1.000 000·E+00	light year (anno luce)	m	9.460 55·E+15
			microinch	m	2.540 000·E-08
IT: International Table			micron	m	1.000 000·E-06
			mil	m	2.540 000·E-05
<b>FORZA</b>			mile, miglio (international nautical)	m	1.852 000·E+03
dyne	Newton (N)	1.000 000·E-05	mile, miglio (U.S. nautical)	m	1.852 000·E+03
kilogrammo forza	N	9.806 650·E+00	mile, miglio (international)	m	1.609 344·E+03
kilopond	N	9.806 650·E+00	mile, miglio (U.S. statute)	m	1.609 347·E+03
kip (1000 lb <sub>f</sub> )	N	4.448 222·E+03	rod	m	5.029 210·E+00
ounce-force	N	2.780 139·E-01	yard	m	9.144 000·E-01
pound-force (lb <sub>f</sub> )	N	4.448 222·E+00			
poundal	N	1.382 550·E-01			
ton-force (2000 lb <sub>f</sub> )	N	8.896 444·E+03			

per convertire da:	a:	moltiplicare per:	per convertire da:	a:	moltiplicare per:
<b>MASSA</b>			<b>PORTATA IN MASSA</b>		
grain	kilogrammo (kg)	6.479 891 E-05	perm (0°C)	kg Pa <sup>-1</sup> s <sup>-1</sup> m <sup>-2</sup>	5.721 35 E-11
gram	kg	1.000 000 E-03	perm (23°C)	kg Pa <sup>-1</sup> s <sup>-1</sup> m <sup>-2</sup>	5.745 25 E-11
hundred weight (long)	kg	5.080 235 E+01	perm.in.	kg Pa <sup>-1</sup> s <sup>-1</sup> m <sup>-1</sup>	1.453 22 E-12
hundred weight (short)	kg	4.535 924 E+01	lb/h	kg s <sup>-1</sup>	1.259 979 E-04
ounce, oncia (avoirdupois)	kg	2.834 952 E-02	lb/min	kg s <sup>-1</sup>	7.559 873 E-03
ounce (troy or apothecary)	kg	3.110 348 E-02	lb/s	kg s <sup>-1</sup>	4.535 924 E-01
pound, libbra (avoirdupois)	kg	4.535 924 E-01	lb/hp*h	kg J <sup>-1</sup>	1.689 659 E-07
pound (troy or apothecary)	kg	3.732 417 E-01	ton (short)/h	kg s <sup>-1</sup>	2.519 958 E-01
slug	kg	1.459 390 E+01	<b>PORTATA IN VOLUME</b>		
ton (long, 2240 lb)	kg	1.016 047 E+03	ft <sup>3</sup> /min	m <sup>3</sup> s <sup>-1</sup>	4.719 474 E-04
ton (metric)	kg	1.000 000 E+03	ft <sup>3</sup> /s	m <sup>3</sup> s <sup>-1</sup>	2.831 685 E-02
ton (short, 2000lb)	kg	9.071 847 E+02	gallon (U.S. liquid)/hp*h	m <sup>3</sup> J <sup>-1</sup>	1.410 089 E-09
tonne	kg	1.000 000 E+03	in <sup>3</sup> /min	m <sup>3</sup> s <sup>-1</sup>	2.731 177 E-07
			yd <sup>3</sup> /min	m <sup>3</sup> s <sup>-1</sup>	1.274 258 E-02
			gallon (U.S. liquid) per day	m <sup>3</sup> s <sup>-1</sup>	4.381 264 E-08
			gallon (U.S. liquid) per minute	m <sup>3</sup> s <sup>-1</sup>	6.309 020 E-05
<b>MASSA PER UNITA' DI AREA</b>					
oz/ft <sup>2</sup>	kg m <sup>-2</sup>	3.051 517 E-01			
oz/yd <sup>2</sup>	kg m <sup>-2</sup>	3.390 575 E-02			
lb/ft <sup>2</sup>	kg m <sup>-2</sup>	4.882 428 E+00			
<b>MASSA PER UNITA' DI LUNGHEZZA</b>					
lb/ft	kg m <sup>-1</sup>	1.488 164 E+00			
lb/in	kg m <sup>-1</sup>	1.785 797 E+01			



per convertire da:	a:	moltiplicare per:	per convertire da:	a:	moltiplicare per:
<b>POTENZA</b>					
BTU (IT)/h	Watt (W)	2.930 711·E-01	cm di mercurio (0°C)	Pa	1.333 22 E+03
BTU (IT)/min	W	1.758 427·E+01	cm di colonna d'acqua (4°C)	Pa	9.806 38 E+01
BTU (IT)/s	W	1.055 056·E+03	dyne/cm <sup>2</sup>	Pa	1.000 000 E-01
cal (IT)/s	W	4.186 800·E+00	foot of water (39.2°F)	Pa	2.988 98 E+03
erg/s	W	1.000 000·E-07	gf/cm <sup>2</sup>	Pa	9.806 650 E+01
ft*lb <sub>f</sub> /h	W	3.766 161·E-04	inch of mercury (32°F)	Pa	3.386 38 E+03
ft*lb <sub>f</sub> /min	W	2.259 697·E-02	inch of mercury (60°F)	Pa	3.376 85 E+03
ft*lb <sub>f</sub> /s	W	1.355 818·E+00	inch of water (39.2°F)	Pa	2.490 82 E+02
cavalli (550 ft*lb <sub>f</sub> /s)	W	7.456 999·E+02	inch of water (60°F)	Pa	2.488 4 E+02
cavalli (boiler)	W	9.809 50·E+03	kg <sub>f</sub> /cm <sup>2</sup>	Pa	9.806 650 E+04
cavalli (elettrico)	W	7.460 000·E+02	kg <sub>f</sub> /m <sup>2</sup>	Pa	9.806 650 E+00
kilocalorie (IT)/h	W	1.163 000·E+00	kg/mm <sup>2</sup>	Pa	9.806 650 E+06
ton (refrigerazione)	W	3.516 853·E+03	kip/in <sup>2</sup> (ksi)	Pa	6.894 757 E+06
<b>POTENZA PER UNITA' DI AREA</b>			millibar	Pa	1.000 000 E+02
erg/(cm <sup>2</sup> *s)	W·m <sup>-2</sup>	1.000 000·E-03	mm di mercurio (0°C)	Pa	1.333 22 E+02
W/cm <sup>2</sup>	W·m <sup>-2</sup>	1.000 000·E+04	poundal/ft <sup>2</sup>	Pa	1.488 164 E+00
W/in <sup>2</sup>	W·m <sup>-2</sup>	1.550 003·E+03	lb <sub>f</sub> /ft <sup>2</sup>	Pa	4.788 026 E+01
			lb <sub>f</sub> /in <sup>2</sup> (psi)	Pa	6.894 757 E+03
			psi	Pa	6.894 757 E+03
			torr (mm Hg 0°C)	Pa	1.333 22 E+02
			<b>TEMPERATURA</b>		
			gradi Celsius	kelvin (K)	T <sub>K</sub> = t <sub>C</sub> +273.15
			gradi Fahrenheit	°C	T <sub>C</sub> = (t <sub>F</sub> -32)/1.8
			gradi Fahrenheit	K	T <sub>K</sub> = (t <sub>F</sub> +459.67)/1.8
			rankine	K	T <sub>K</sub> = T <sub>R</sub> /1.8
			kelvin	°C	t <sub>C</sub> = T <sub>K</sub> -273.15
<b>PRESSIONE</b>					
atmosfera (standard)	Pascal (Pa)	1.013 250 E+05			
atmosfera (tecnica= 1 kg <sub>f</sub> /cm <sup>2</sup> )	Pa	9.806 650 E+04			
bar	Pa	1.000 000 E+05			

per convertire da:	a:	moltiplicare per:	per convertire da:	a:	moltiplicare per:
			$\text{lb}_f \cdot \text{s} / \text{in}^2$	Pa s	6.894 757 E+03
<b>TEMPO</b>			rhe	$\text{Pa}^{-1} \text{ s}^{-1}$	1.000 000 E+01
giorno	secondi (s)	8.640 000 E+04	slug/ft*s	Pa s	4.788 026 E+01
giorno siderale	s	8.616 409 E+04	stokes	$\text{m}^{-2} \text{ s}^{-1}$	1.000 000 E-04
ora	s	3.600 000 E+03			
ora siderale	s	3.590 170 E+03	<b>VOLUME</b>		
minuto	s	6.000 000 E+01	acre-foot	$\text{m}^3$	1.233 489 E+03
minuto siderale	s	5.983 617 E+01	barrel (oil, 42 gal)	$\text{m}^3$	1.589 873 E-01
secondo siderale	s	9.972 696 E-01	board foot	$\text{m}^3$	2.359 737 E-03
anno (365 giorni)	s	3.153 600 E+07	bushel (U.S.)	$\text{m}^3$	3.523 907 E-02
anno (siderale)	s	3.155 815 E+07	cup	$\text{m}^3$	2.365 882 E-04
anno (tropicale)	s	3.155 693 E+07	fluid ounce (U.S.)	$\text{m}^3$	2.957 353 E-05
			$\text{ft}^3$	$\text{m}^3$	2.831 685 E-02
<b>VELOCITA'</b>			gallon (Canadian liquid)	$\text{m}^3$	4.546 090 E-03
ft/h	$\text{m s}^{-1}$	8.466 667 E-05	gallon (U.K. liquid)	$\text{m}^3$	4.546 092 E-03
ft/min	$\text{m s}^{-1}$	5.080 000 E-03	gallon (U.S. dry)	$\text{m}^3$	4.404 884 E-03
ft/s	$\text{m s}^{-1}$	3.048 000 E-01	gallon (U.S. liquid)	$\text{m}^3$	3.785 412 E-03
in/s	$\text{m s}^{-1}$	2.540 000 E-02	gill (U.K.)	$\text{m}^3$	1.420 654 E-04
km/h	$\text{m s}^{-1}$	2.777 778 E-01	gill (U.S.)	$\text{m}^3$	1.182 941 E-04
knot, nodo (international)	$\text{m s}^{-1}$	5.144 444 E-01	$\text{in}^3$	$\text{m}^3$	1.638 706 E-05
mi/h (international)	$\text{m s}^{-1}$	4.470 400 E-01	litro	$\text{m}^3$	1.000 000 E-03
mi/min (international)	$\text{m s}^{-1}$	2.682 240 E+01	ounce, oncia (U.K. fluid)	$\text{m}^3$	2.841 307 E-05
mi/s (international)	$\text{m s}^{-1}$	1.609 344 E+03	ounce (U.S. fluid)	$\text{m}^3$	2.957 353 E-05
			peck (U.S.)	$\text{m}^3$	8.809 768 E-03
<b>VISCOSITA'</b>			pinta (U.S. dry)	$\text{m}^3$	5.506 105 E-04
centipoise	Pa s	1.000 000 E-03	pinta (U.S. liquid)	$\text{m}^3$	4.731 765 E-04
centistokes	$\text{m}^2 \text{ s}^{-1}$	1.000 000 E-06	quart (U.S. dry)	$\text{m}^3$	1.101 221 E-03
$\text{ft}^2/\text{s}$	$\text{m}^2 \text{ s}^{-1}$	9.290 304 E-02	quart (U.S. liquid)	$\text{m}^3$	9.463 529 E-04
poise	Pa s	1.000 000 E-01	stere	$\text{m}^3$	1.000 000 E+00
poundal*s/ft <sup>2</sup>	Pa s	1.488 164 E+00	tablespoon (cucchiaino da tavola)	$\text{m}^3$	1.478 676 E-05
lb/ft*h	Pa s	4.133 789 E-04	teaspoon (cucchiaino da te)	$\text{m}^3$	4.928 922 E-06
lb/ft*s	Pa s	1.488 164 E+00	ton (register)	$\text{m}^3$	2.831 685 E+00
$\text{lb}_f \cdot \text{s} / \text{ft}^2$	Pa s	4.788 026 E+01	yd <sup>3</sup>	$\text{m}^3$	7.645 549 E-01

Yotta	Y	$1 \cdot 10^{24}$
Zetta	Z	$1 \cdot 10^{21}$
Exa	E	$1 \cdot 10^{18}$
Peta	P	$1 \cdot 10^{15}$
Tera	T	$1 \cdot 10^{12}$
Giga	G	$1 \cdot 10^9$
Mega	M	$1 \cdot 10^6$
Kilo	k	$1 \cdot 10^3$
Hecto	h	$1 \cdot 10^2$
Deca	da	$1 \cdot 10^1$
		$1 \cdot 10^0$
Deci	d	$1 \cdot 10^{-1}$
Centi	c	$1 \cdot 10^{-2}$
Milli	m	$1 \cdot 10^{-3}$
Micro	μ	$1 \cdot 10^{-6}$
Nano	n	$1 \cdot 10^{-9}$
Pico	p	$1 \cdot 10^{-12}$
Femto	f	$1 \cdot 10^{-15}$
Atto	a	$1 \cdot 10^{-18}$
Zepto	z	$1 \cdot 10^{-21}$
Yocto	y	$1 \cdot 10^{-24}$

## PIANI TERMODINAMICI

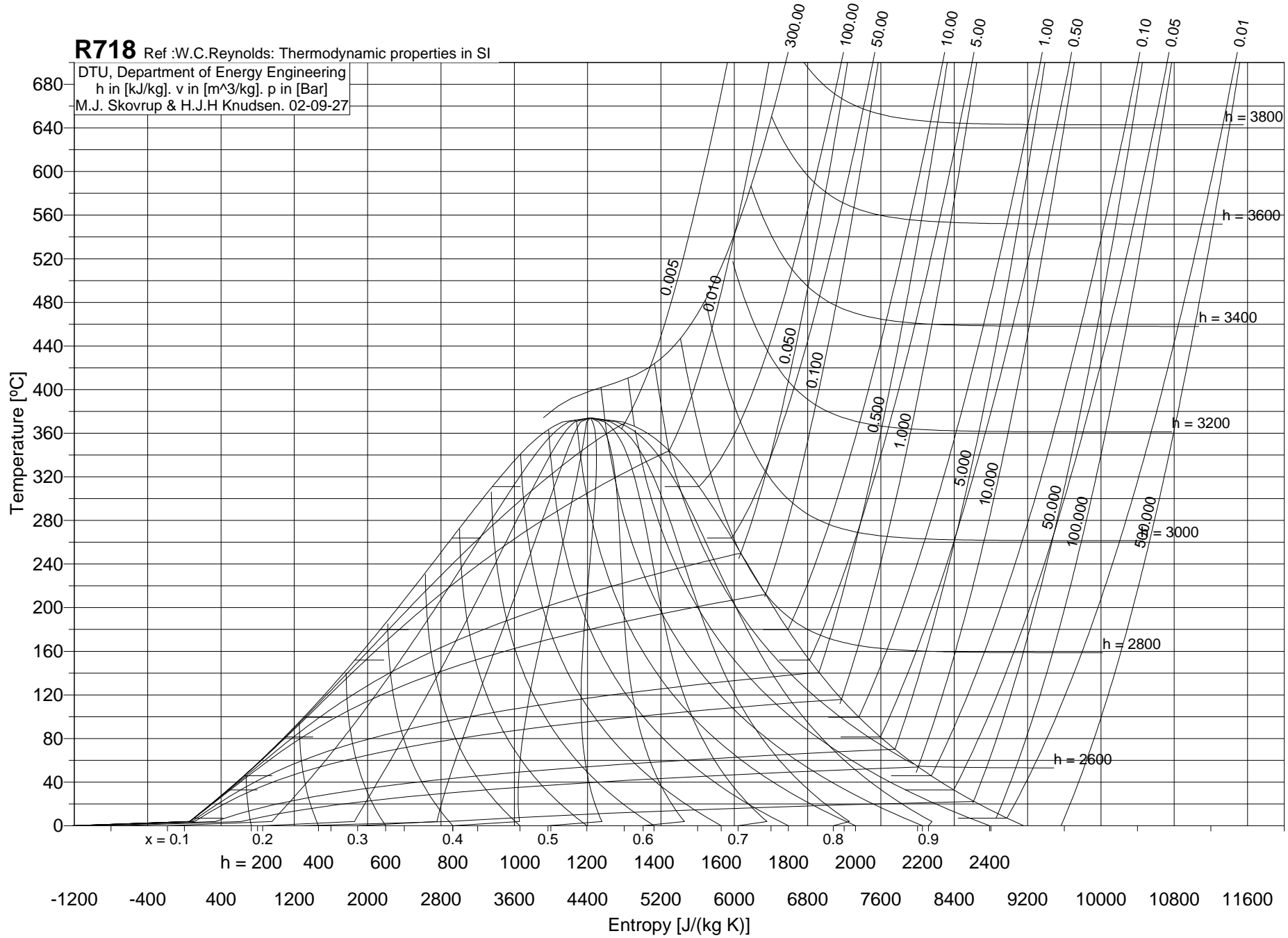
- piano T-s per l'acqua (R718)..... 1
- piano h-s per l'acqua (R718)..... 2
- piano T-s per l'aria (R729), fondo scala 1000°C..... 3
- piano T-s per l'aria (R729), fondo scala 200°C..... 4
- piano T-s per l'aria (R729), fondo scala 50°C..... 5
- piano T-s per l'R134a..... 6
- piano p-h per l'R134a..... 7
- piano T-s per l'anidride carbonica (R744)..... 8
- piano p-h per l'anidride carbonica (R744)..... 9
- piano p-h per l'ammoniaca (R717)..... 10
- diagramma psicrometrico..... 11

(materiale didattico a diffusione interna e distribuzione gratuita)



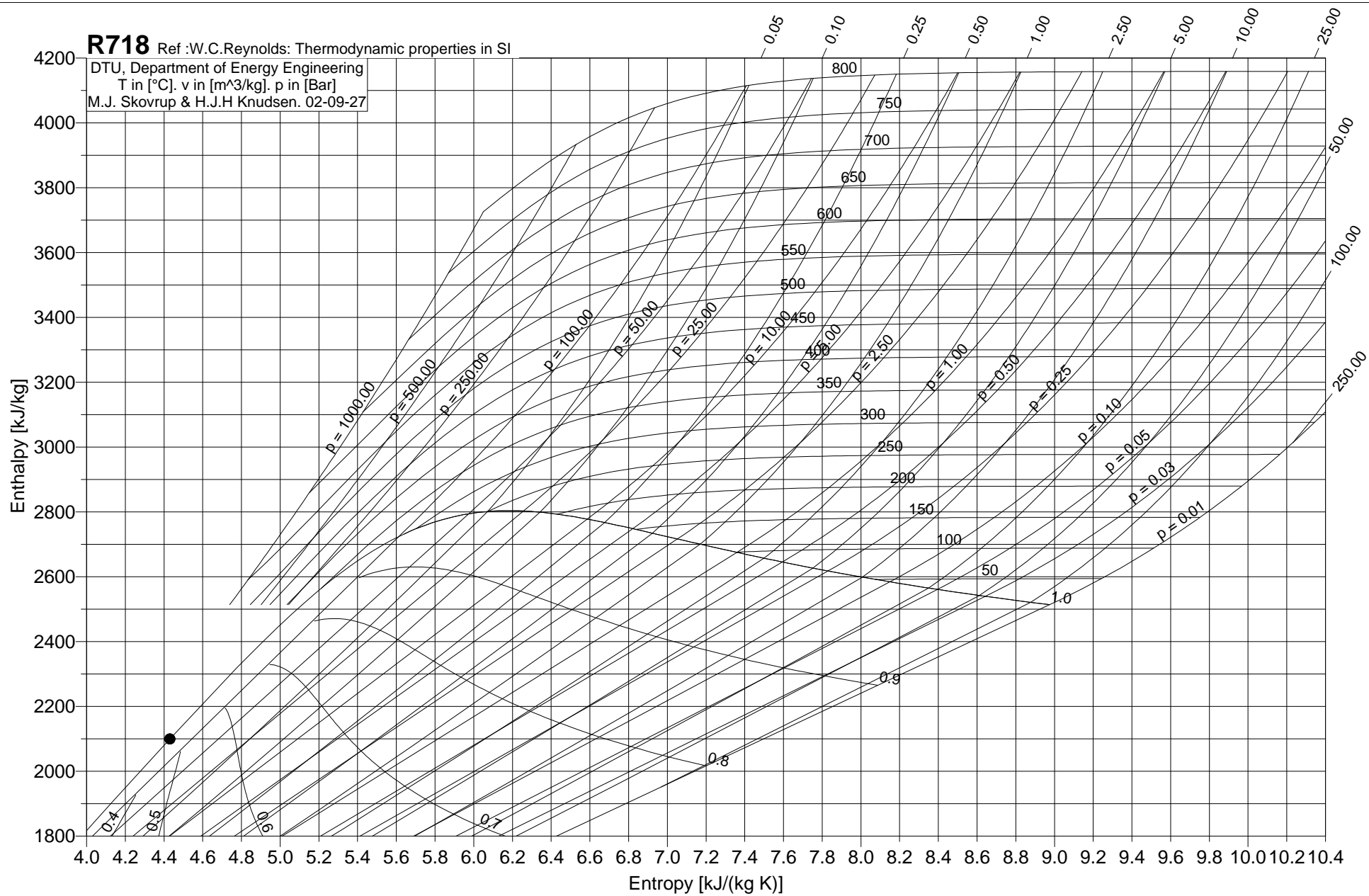
**R718** Ref :W.C.Reynolds: Thermodynamic properties in SI

DTU, Department of Energy Engineering  
h in [kJ/kg]. v in [m<sup>3</sup>/kg]. p in [Bar]  
M.J. Skovrup & H.J.H Knudsen. 02-09-27



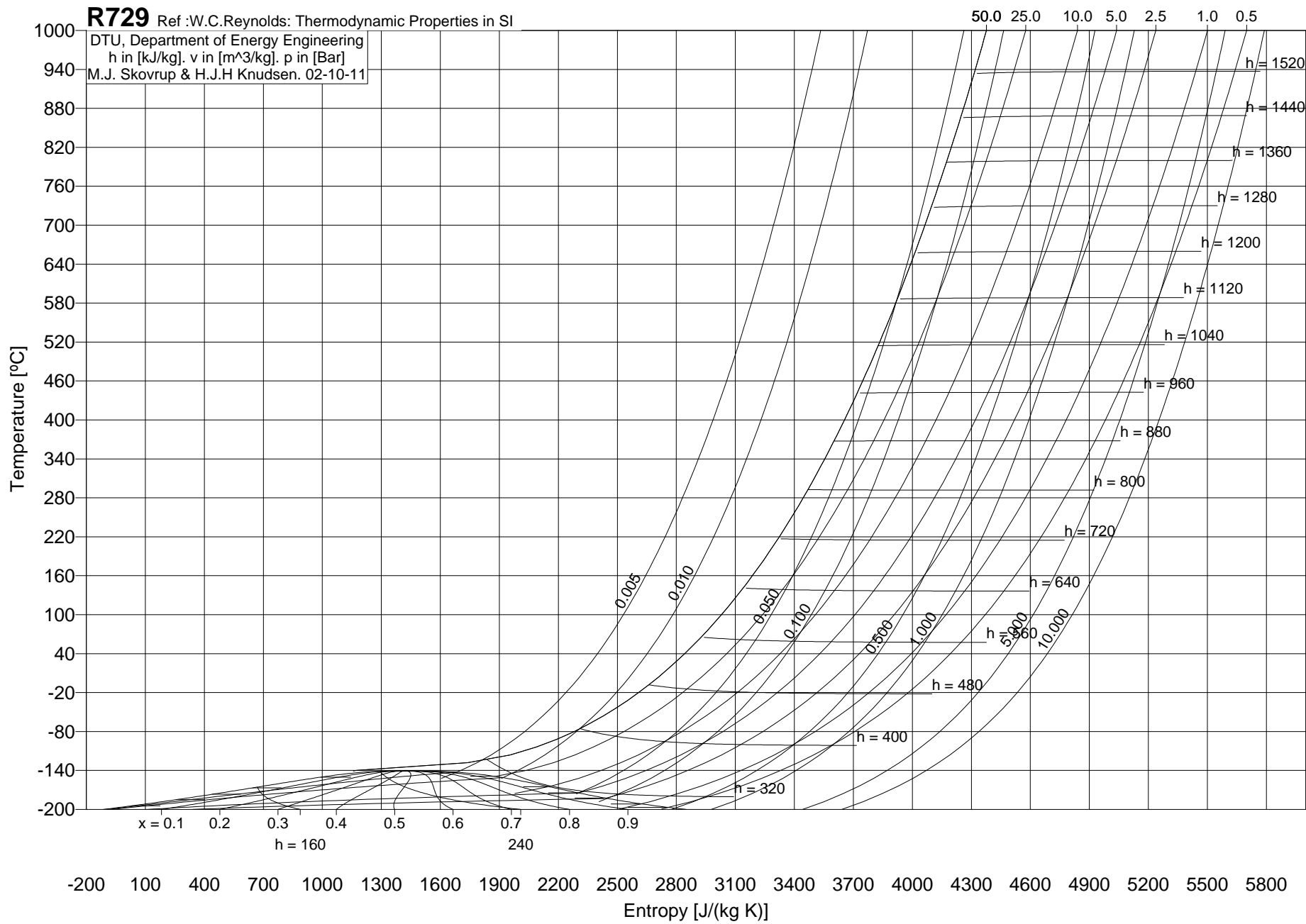
# R718 Ref :W.C.Reynolds: Thermodynamic properties in SI

DTU, Department of Energy Engineering  
T in [°C]. v in [m<sup>3</sup>/kg]. p in [Bar]  
M.J. Skovrup & H.J.H Knudsen. 02-09-27



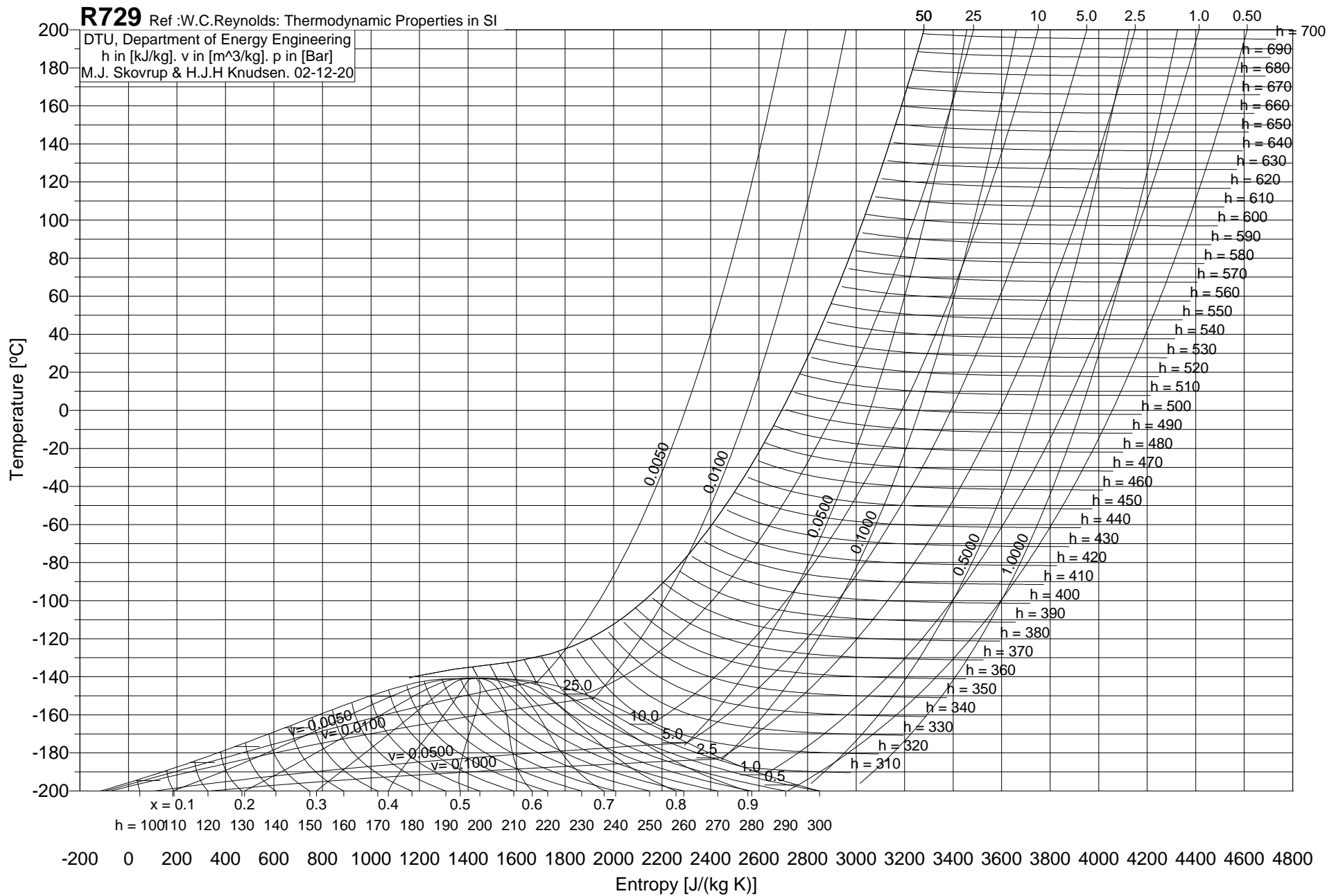
# R729 Ref :W.C.Reynolds: Thermodynamic Properties in SI

DTU, Department of Energy Engineering  
h in [kJ/kg], v in [m<sup>3</sup>/kg], p in [Bar]  
M.J. Skovrup & H.J.H Knudsen. 02-10-11



# R729 Ref :W.C.Reynolds: Thermodynamic Properties in SI

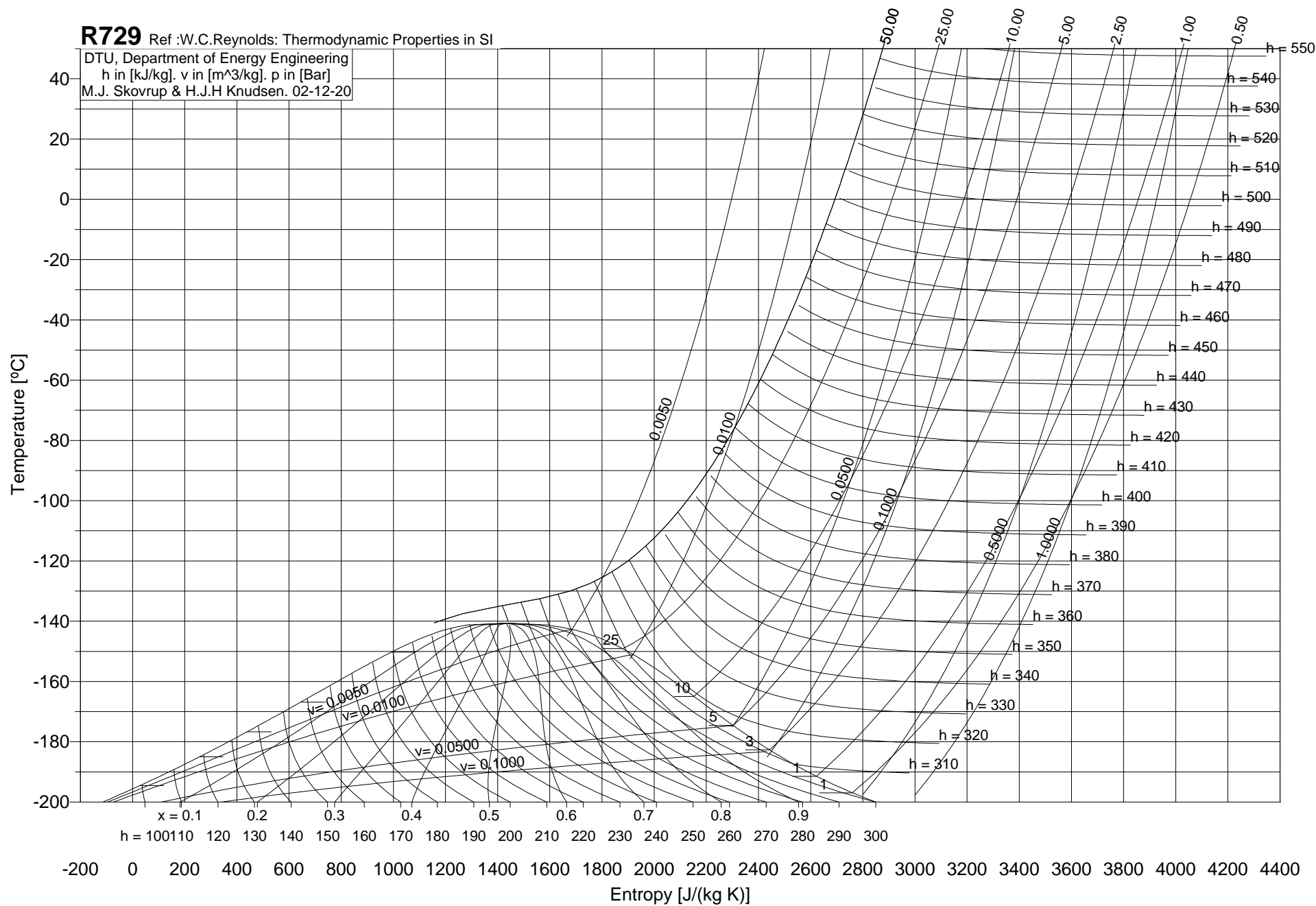
DTU, Department of Energy Engineering  
h in [kJ/kg]. v in [m<sup>3</sup>/kg]. p in [Bar]  
M.J. Skovrup & H.J.H Knudsen. 02-12-20





**R729** Ref :W.C.Reynolds: Thermodynamic Properties in SI

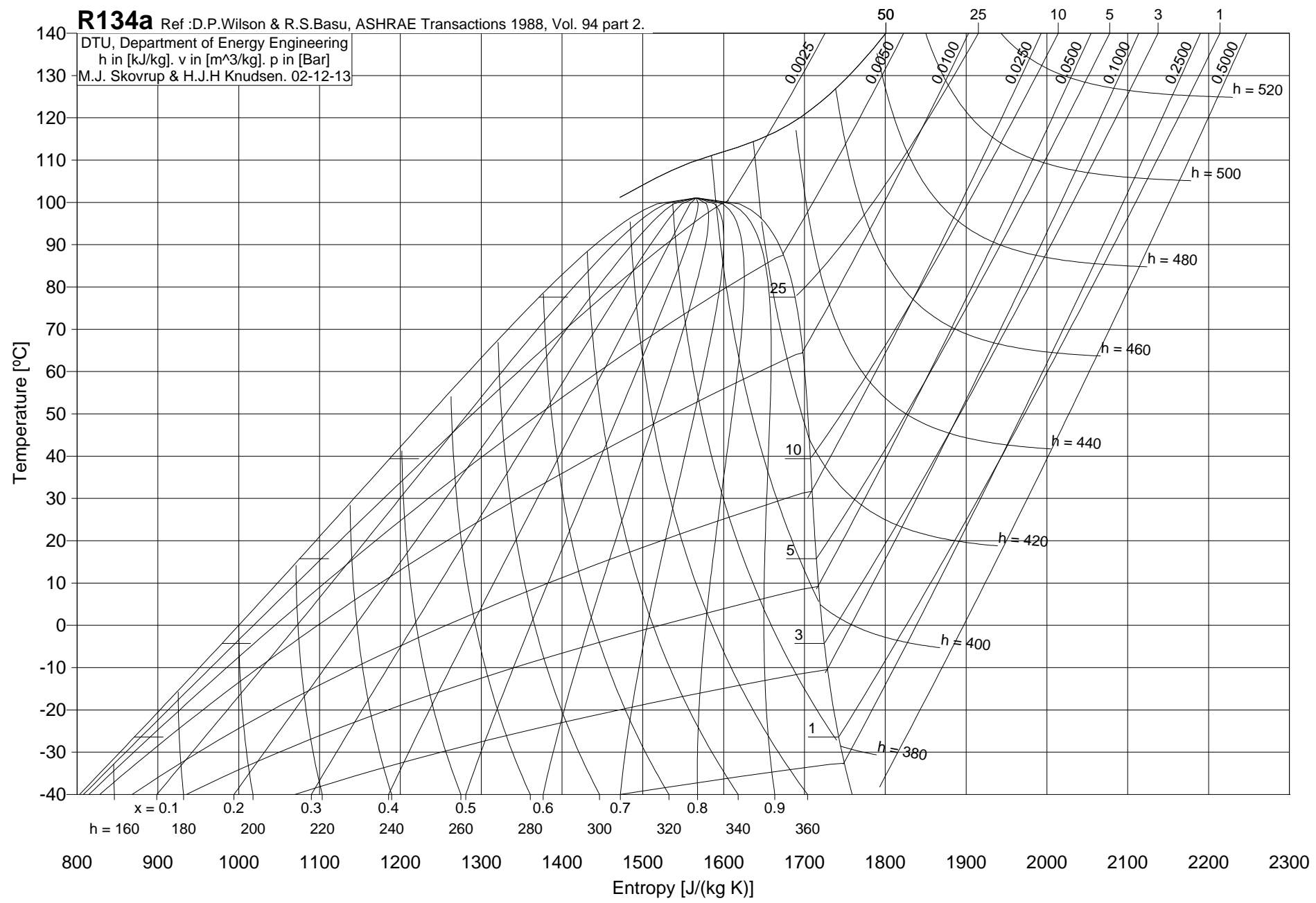
DTU, Department of Energy Engineering  
h in [kJ/kg]. v in [m<sup>3</sup>/kg]. p in [Bar]  
M.J. Skovrup & H.J.H Knudsen. 02-12-20



# R134a

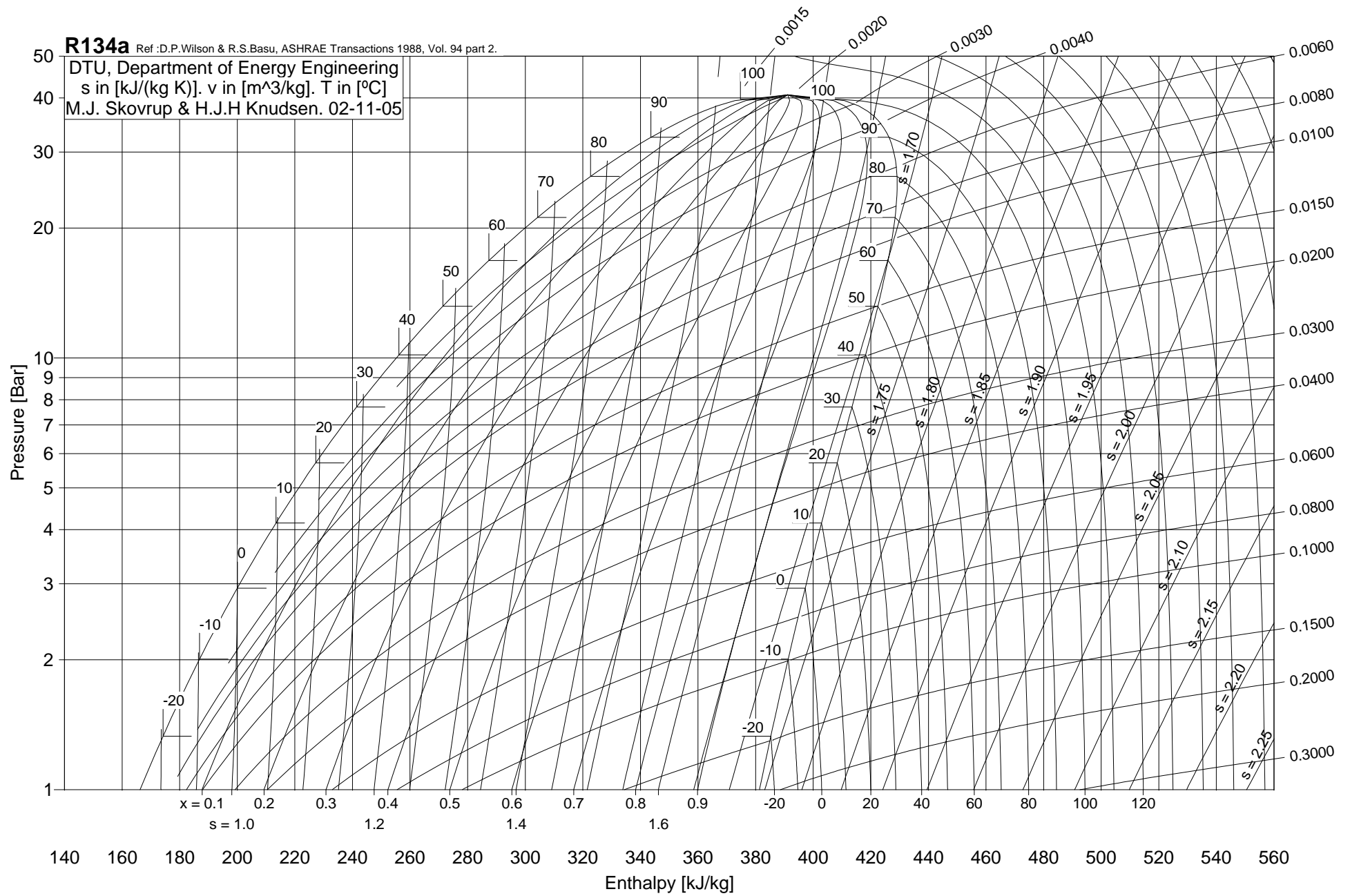
DTU, Department of Energy Engineering  
h in [kJ/kg]. v in [m<sup>3</sup>/kg]. p in [Bar]  
M.J. Skovrup & H.J.H Knudsen. 02-12-13

Ref :D.P.Wilson & R.S.Basu, ASHRAE Transactions 1988, Vol. 94 part 2.



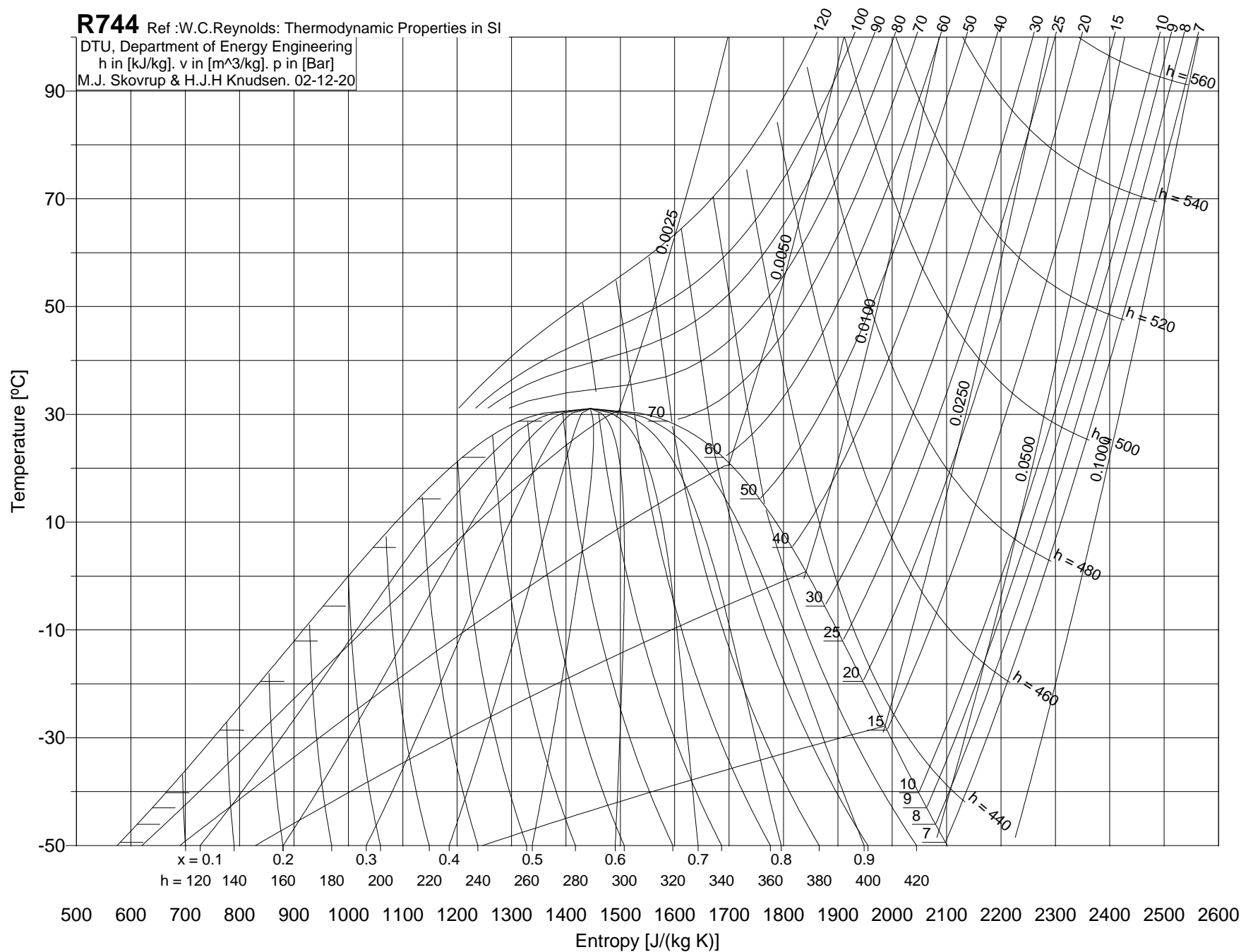
**R134a** Ref :D.P.Wilson & R.S.Basu, ASHRAE Transactions 1988, Vol. 94 part 2.

DTU, Department of Energy Engineering  
s in [kJ/(kg K)]. v in [m<sup>3</sup>/kg]. T in [°C]  
M.J. Skovrup & H.J.H Knudsen. 02-11-05

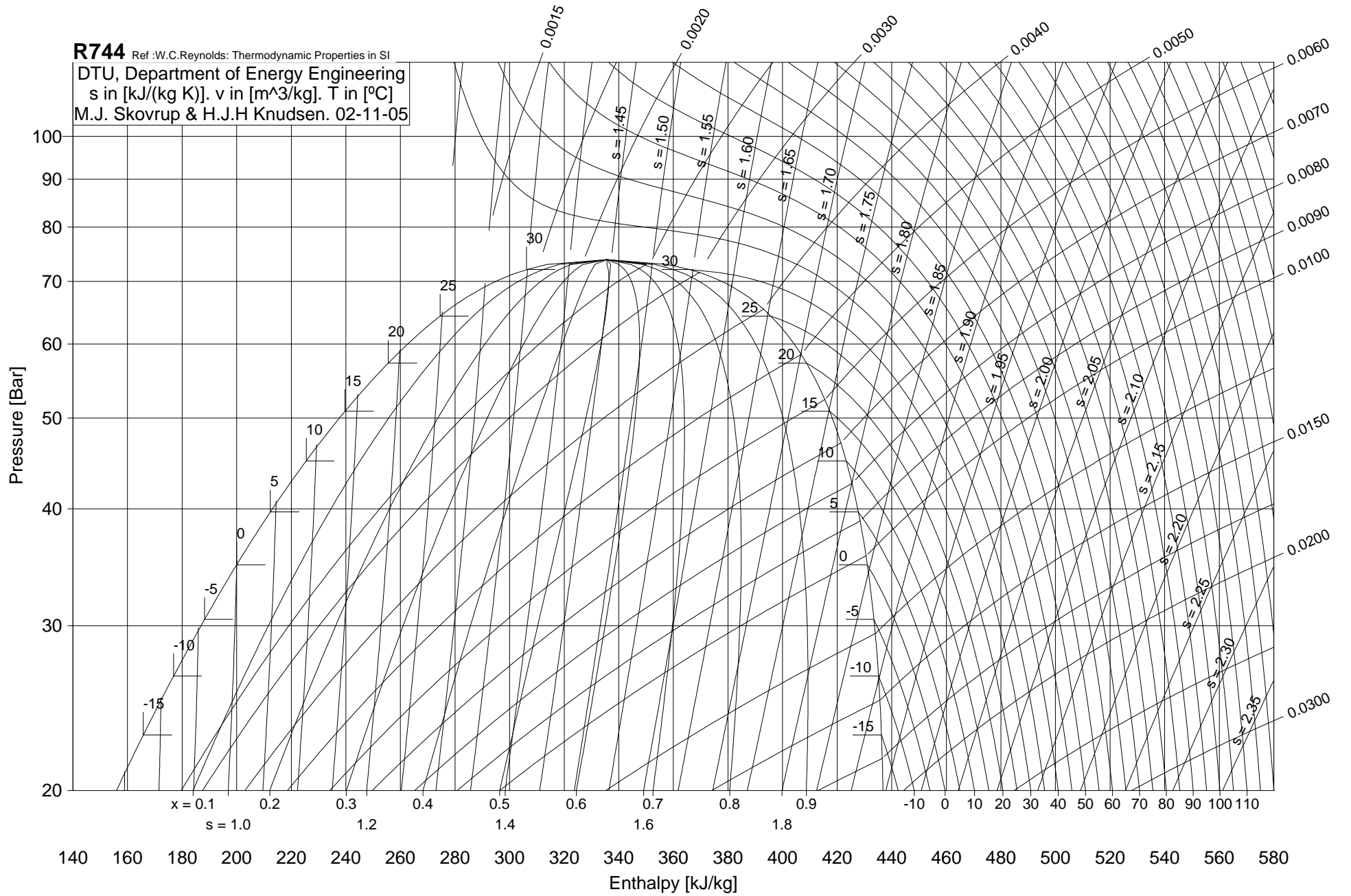


**R744** Ref :W.C.Reynolds: Thermodynamic Properties in SI

DTU, Department of Energy Engineering  
h in [kJ/kg], v in [m<sup>3</sup>/kg], p in [Bar]  
M.J. Skovrup & H.J.H Knudsen. 02-12-20



**R744** Ref.: W.C.Reynolds: Thermodynamic Properties in SI  
DTU, Department of Energy Engineering  
s in [kJ/(kg K)]. v in [m<sup>3</sup>/kg]. T in [°C]  
M.J. Skovrup & H.J.H Knudsen. 02-11-05



# R717

Ref :R.Döring. Klima+Kälte ingenieur Ki-Extra 5, 1978

DTU, Department of Energy Engineering  
s in [kJ/(kg K)]. v in [m<sup>3</sup>/kg]. T in [°C]  
M.J. Skovrup & H.J.H Knudsen. 02-09-27

