

The Saturated Steam Table with properties as boiling point, specific volume, density, specific enthalpy, specific heat and latent heat of vaporization

Absolute pressure	Boiling point	Specific volume (steam)	Density (steam)	Specific enthalpy of liquid water (sensible heat)		Specific enthalpy of steam (total heat)		Latent heat of vaporization		Specific heat
				(kJ/kg)	(kcal/kg)	(kJ/kg)	(kcal/kg)	(kJ/kg)	(kcal/kg)	
0,020	17,510	67,006	0,015	73,450	17,540	2533,640	605,150	2460,190	587,610	1,8644
0,030	24,100	45,667	0,022	101,000	24,120	2545,640	608,020	2444,650	583,890	1,8694
0,040	28,980	34,802	0,029	121,410	29,000	2554,510	610,130	2433,100	581,140	1,8736
0,050	32,900	28,194	0,035	137,770	32,910	2561,590	611,830	2423,820	578,920	1,8774
0,060	36,180	23,741	0,042	151,500	36,190	2567,510	613,240	2416,010	577,050	1,8808
0,070	39,020	20,531	0,049	163,380	39,020	2572,620	614,460	2409,240	575,440	1,8840
0,080	41,530	18,105	0,055	173,870	41,530	2577,110	615,530	2403,250	574,010	1,8871
0,090	43,790	16,204	0,062	183,280	43,780	2581,140	616,490	2397,850	572,720	1,8899
0,100	45,830	14,675	0,068	191,840	45,820	2584,780	617,360	2392,940	571,540	1,8927
0,200	60,090	7,650	0,131	251,460	60,060	2609,860	623,350	2358,400	563,300	1,9156
0,300	69,130	5,229	0,191	289,310	69,100	2625,430	627,070	2336,130	557,970	1,9343
0,400	75,890	3,993	0,250	317,650	75,870	2636,880	629,810	2319,230	553,940	1,9506
0,500	81,350	3,240	0,309	340,570	81,340	2645,990	631,980	2305,420	550,640	1,9654
0,600	85,950	2,732	0,366	359,930	85,970	2653,570	633,790	2293,640	547,830	1,9790
0,700	89,960	2,365	0,423	376,770	89,990	2660,070	635,350	2283,300	545,360	1,9919
0,800	93,510	2,087	0,479	391,730	93,560	2665,770	636,710	2274,050	543,150	2,0040
0,900	96,710	1,869	0,535	405,210	96,780	2670,850	637,920	2265,650	541,140	2,0156
1,000	99,630	1,694	0,590	417,510	99,720	2675,430	639,020	2257,920	539,300	2,0267
1,100	102,320	1,549	0,645	428,840	102,430	2679,610	640,010	2250,760	537,590	2,0373
1,200	104,810	1,428	0,700	439,360	104,940	2683,440	640,930	2244,080	535,990	2,0476
1,300	107,130	1,325	0,755	449,190	107,290	2686,980	641,770	2237,790	534,490	2,0576
1,400	109,320	1,236	0,809	458,420	109,490	2690,280	642,560	2231,860	533,070	2,0673
1,500	111,370	1,159	0,863	467,130	111,570	2693,360	643,300	2226,230	531,730	2,0768
1,500	111,370	1,159	0,863	467,130	111,570	2693,360	643,300	2226,230	531,730	2,0768
1,600	113,320	1,091	0,916	475,380	113,540	2696,250	643,990	2220,870	530,450	2,0860
1,700	115,170	1,031	0,970	483,220	115,420	2698,970	644,640	2215,750	529,220	2,0950

Absolute pressure	Boiling point	Specific volume (steam)	Density (steam)	Specific enthalpy of liquid water (sensible heat)		Specific enthalpy of steam (total heat)		Latent heat of vaporization		Specific heat
				(kJ/kg)	(kcal/kg)	(kJ/kg)	(kcal/kg)	(kJ/kg)	(kcal/kg)	
1,900	118,620	0,929	1,076	497,850	118,910	2703,980	645,830	2206,130	526,920	2,1124
2,000	120,230	0,885	1,129	504,710	120,550	2706,290	646,390	2201,590	525,840	2,1208
2,200	123,270	0,810	1,235	517,630	123,630	2710,600	647,420	2192,980	523,780	2,1372
2,400	126,090	0,746	1,340	529,640	126,500	2714,550	648,360	2184,910	521,860	2,1531
2,600	128,730	0,693	1,444	540,880	129,190	2718,170	649,220	2177,300	520,040	2,1685
2,800	131,200	0,646	1,548	551,450	131,710	2721,540	650,030	2170,080	518,320	2,1835
3,000	133,540	0,606	1,651	561,440	134,100	2724,660	650,770	2163,220	516,680	2,1981
3,500	138,870	0,524	1,908	584,280	139,550	2731,630	652,440	2147,350	512,890	2,2331
4,000	143,630	0,462	2,163	604,680	144,430	2737,630	653,870	2132,950	509,450	2,2664
4,500	147,920	0,414	2,417	623,170	148,840	2742,880	655,130	2119,710	506,290	2,2983
5,000	151,850	0,375	2,669	640,120	152,890	2747,540	656,240	2107,420	503,350	2,3289
5,500	155,470	0,342	2,920	655,810	156,640	2751,700	657,230	2095,900	500,600	2,3585
6,000	158,840	0,315	3,170	670,430	160,130	2755,460	658,130	2085,030	498,000	2,3873
6,500	161,990	0,292	3,419	684,140	163,400	2758,870	658,940	2074,730	495,540	2,4152
7,000	164,960	0,273	3,667	697,070	166,490	2761,980	659,690	2064,920	493,200	2,4424
7,500	167,760	0,255	3,915	709,300	169,410	2764,840	660,370	2055,530	490,960	2,4690
8,000	170,420	0,240	4,162	720,940	172,190	2767,460	661,000	2046,530	488,800	2,4951
8,500	172,940	0,227	4,409	732,030	174,840	2769,890	661,580	2037,860	486,730	2,5206
9,000	175,360	0,215	4,655	742,640	177,380	2772,130	662,110	2029,490	484,740	2,5456
9,500	177,670	0,204	4,901	752,820	179,810	2774,220	662,610	2021,400	482,800	2,5702
10,000	179,880	0,194	5,147	762,600	182,140	2776,160	663,070	2013,560	480,930	2,5944
11,000	184,060	0,177	5,638	781,110	186,570	2779,660	663,910	1998,550	477,350	2,6418
12,000	187,960	0,163	6,127	798,420	190,700	2782,730	664,640	1984,310	473,940	2,6878
13,000	191,600	0,151	6,617	814,680	194,580	2785,420	665,290	1970,730	470,700	2,7327
14,000	195,040	0,141	7,106	830,050	198,260	2787,790	665,850	1957,730	467,600	2,7767
15,000	198,280	0,132	7,596	844,640	201,740	2789,880	666,350	1945,240	464,610	2,8197
16,000	201,370	0,124	8,085	858,540	205,060	2791,730	666,790	1933,190	461,740	2,8620
17,000	204,300	0,117	8,575	871,820	208,230	2793,370	667,180	1921,550	458,950	2,9036
18,000	207,110	0,110	9,065	884,550	211,270	2794,810	667,530	1910,270	456,260	2,9445

Absolute pressure (bar)	Boiling point (°C)	Specific volume (steam) (m³/kg)	Density (steam) (kg/m³)	Specific enthalpy of liquid water (sensible heat)		Specific enthalpy of steam (total heat)		Latent heat of vaporization		Specific heat (kJ/kg,K)
				(kJ/kg)	(kcal/kg)	(kJ/kg)	(kcal/kg)	(kJ/kg)	(kcal/kg)	
20,000	212,370	0,100	10,047	908,560	217,010	2797,210	668,100	1888,650	451,100	3,0248
21,000	214,850	0,095	10,539	919,930	219,720	2798,180	668,330	1878,250	448,610	3,0643
22,000	217,240	0,091	11,032	930,920	222,350	2799,030	668,540	1868,110	446,190	3,1034
23,000	219,550	0,087	11,525	941,570	224,890	2799,770	668,710	1858,200	443,820	3,1421
24,000	221,780	0,083	12,020	951,900	227,360	2800,390	668,860	1848,490	441,500	3,1805
25,000	223,940	0,080	12,515	961,930	229,750	2800,910	668,990	1838,980	439,230	3,2187
26,000	226,030	0,077	13,012	971,690	232,080	2801,350	669,090	1829,660	437,010	3,2567
27,000	228,060	0,074	13,509	981,190	234,350	2801,690	669,170	1820,500	434,820	3,2944
28,000	230,040	0,071	14,008	990,460	236,570	2801,960	669,240	1811,500	432,670	3,3320
29,000	231,960	0,069	14,508	999,500	238,730	2802,150	669,280	1802,650	430,560	3,3695
30,000	233,840	0,067	15,009	1008,330	240,840	2802,270	669,310	1793,940	428,480	3,4069

Example - Boiling Water at 100°C, 0 bar Atmospheric Pressure

At atmospheric pressure (0 bar g, absolute 1 bar), water boils at 100 oC, and 417,51 kJ of energy are required to heat 1 kg of water from 0 oC to its evaporating temperature of 100 oC,

Therefore the specific enthalpy of water at 0 bar g (absolute 1 bar) and 100 oC is 417,51 kJ/kg, as shown in the table,

Another 2257,92 kJ of energy are required to evaporate 1 kg of water at 100 oC into 1 kg of steam at 100 oC,

Therefore at 0 bar g (absolute 1 bar) the specific enthalpy of evaporation is 2257,19 kJ/kg, as shown in the table,

Total specific enthalpy for steam:

$$h_s = (417,51 \text{ kJ/kg}) + (2257,92 \text{ kJ/kg})$$

$$= 2675,43 \text{ kJ/kg}$$

Example - Boiling Water at 170°C, 7 bar Atmospheric Pressure

Steam at atmospheric pressure is of a limited practical use because it cannot be conveyed under its own pressure along a steam pipe to the point of use,

At 7 bar g (absolute 8 bar), the saturation temperature of water is 170,42 °C, More heat energy is required to raise its temperature to saturation point at 7 bar g than would be needed if the water were at atmospheric pressure, The table gives a value of 720,94 kJ to raise 1 kg of water from 0°C to its saturation temperature of 170 °C,

The heat energy (enthalpy of evaporation) needed by the water at 7 bar g to change it into steam is actually less than the heat energy required at atmospheric pressure, This is because the specific enthalpy of evaporation decreases as the steam pressure increases, The evaporation heat is 2046,53 kJ/kg according the table,

Note! Because the specific volume also decreases with increasing pressure, the amount of heat energy transferred in the same volume actually increases with steam pressure,