

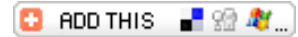
Resources, Tools and Basic Information for Engineering and Design of Technical Applications!

- [Home](#)
- [Acoustics](#)
- [Air Psychrometrics](#)
- [Basics](#)
- [Combustion](#)
- [Economics](#)
- [Electrical](#)
- [Environment](#)
- [Fluid Mechanics](#)
- [Gas and Compressed Air](#)
- [HVAC Systems](#)
  - [Air Condition Systems](#)
  - [Heating Systems](#)
  - [Noise and Sound in HVAC Systems](#)
  - [Ventilation Systems](#)
- [Hydraulics and Pneumatics](#)
- [Insulation](#)
- [Material Properties](#)
- [Mathematics](#)
- [Mechanics](#)
  - [Beams and Columns](#)
- [Miscellaneous](#)
- [Physiology](#)
- [Piping Systems](#)
  - [Corrosion in Pipe Lines](#)
  - [Design Strategy of Piping Systems](#)
  - [Dimensions of Pipes and Tubes](#)
  - [Fluid Flow and Pressure](#)

## Properties of Saturated Steam - Pressure in Bar

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

Sponsored Links										
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
(bar)	(°C)	(m <sup>3</sup> /kg)	(kg/m <sup>3</sup> )	(kJ/kg)	(kcal/kg)	(kJ/kg)	(kcal/kg)	(kJ/kg)	(kcal/kg)	(kJ/kg)
0.02	17.51	67.006	0.015	73.45	17.54	2533.64	605.15	2460.19	587.61	1.8644
0.03	24.10	45.667	0.022	101.00	24.12	2545.64	608.02	2444.65	583.89	1.8694
0.04	28.98	34.802	0.029	121.41	29.00	2554.51	610.13	2433.10	581.14	1.8736
0.05	32.90	28.194	0.035	137.77	32.91	2561.59	611.83	2423.82	578.92	1.8774
0.06	36.18	23.741	0.042	151.50	36.19	2567.51	613.24	2416.01	577.05	1.8808
0.07	39.02	20.531	0.049	163.38	39.02	2572.62	614.46	2409.24	575.44	1.8840
0.08	41.53	18.105	0.055	173.87	41.53	2577.11	615.53	2403.25	574.01	1.8871
0.09	43.79	16.204	0.062	183.28	43.78	2581.14	616.49	2397.85	572.72	1.8899
0.1	45.83	14.675	0.068	191.84	45.82	2584.78	617.36	2392.94	571.54	1.8927
0.2	60.09	7.650	0.131	251.46	60.06	2609.86	623.35	2358.40	563.30	1.9156
0.3	69.13	5.229	0.191	289.31	69.10	2625.43	627.07	2336.13	557.97	1.9343
0.4	75.89	3.993	0.250	317.65	75.87	2636.88	629.81	2319.23	553.94	1.9506
0.5	81.35	3.240	0.309	340.57	81.34	2645.99	631.98	2305.42	550.64	1.9654
0.6	85.95	2.732	0.366	359.93	85.97	2653.57	633.79	2293.64	547.83	1.9790
0.7	89.96	2.365	0.423	376.77	89.99	2660.07	635.35	2283.30	545.36	1.9919
0.8	93.51	2.087	0.479	391.73	93.56	2665.77	636.71	2274.05	543.15	2.0040
0.9	96.71	1.869	0.535	405.21	96.78	2670.85	637.92	2265.65	541.14	2.0156
1	99.63	1.694	0.590	417.51	99.72	2675.43	639.02	2257.92	539.30	2.0267
1.1	102.32	1.549	0.645	428.84	102.43	2679.61	640.01	2250.76	537.59	2.0373
1.2	104.81	1.428	0.700	439.36	104.94	2683.44	640.93	2244.08	535.99	2.0476
1.3	107.13	1.325	0.755	449.19	107.29	2686.98	641.77	2237.79	534.49	2.0576



[Free Industry Resources](#)

[Warehouse Management Today: Balancing Financial Pressures and Growing Demand](#)



[Decorative Arts](#)



[Professional Carwashing & Detailing®](#)



- - Heat Loss and Insulation of Pipe Lines
- - Pipe Lines and Valve Standards
- - Piping Codes and Standards
- - Pressure Ratings of Pipes and Tubes
- - Temperature Expansion of Pipe Lines
- **Process Control**
  - - Control Valves
  - - Documentation of Process Control Systems
  - - Fluid Flowmeters
  - - Risk, Reliability and Safety
  - - Temperature Measurement
- **Pumps**
- **Standards Organizations**
- **Steam and Condensate**
  - - Control Valves and Equipment in Steam Systems
  - - Flash Steam
  - - Heat Loss and Insulation of Steam Pipes
  - - Sizing Pipes in Steam and Condensate Systems
  - - Steam Thermodynamics
- **Thermodynamics**
- **Water Systems**

1.4	109.32	1.236	0.809	458.42	109.49	2690.28	642.56	2231.86	533.07	2.0673
1.5	111.37	1.159	0.863	467.13	111.57	2693.36	643.30	2226.23	531.73	2.0768
1.5	111.37	1.159	0.863	467.13	111.57	2693.36	643.30	2226.23	531.73	2.0768
1.6	113.32	1.091	0.916	475.38	113.54	2696.25	643.99	2220.87	530.45	2.0860
1.7	115.17	1.031	0.970	483.22	115.42	2698.97	644.64	2215.75	529.22	2.0950
1.8	116.93	0.977	1.023	490.70	117.20	2701.54	645.25	2210.84	528.05	2.1037
1.9	118.62	0.929	1.076	497.85	118.91	2703.98	645.83	2206.13	526.92	2.1124
2	120.23	0.885	1.129	504.71	120.55	2706.29	646.39	2201.59	525.84	2.1208
2.2	123.27	0.810	1.235	517.63	123.63	2710.60	647.42	2192.98	523.78	2.1372
2.4	126.09	0.746	1.340	529.64	126.50	2714.55	648.36	2184.91	521.86	2.1531
2.6	128.73	0.693	1.444	540.88	129.19	2718.17	649.22	2177.30	520.04	2.1685
2.8	131.20	0.646	1.548	551.45	131.71	2721.54	650.03	2170.08	518.32	2.1835
3	133.54	0.606	1.651	561.44	134.10	2724.66	650.77	2163.22	516.68	2.1981
3.5	138.87	0.524	1.908	584.28	139.55	2731.63	652.44	2147.35	512.89	2.2331
4	143.63	0.462	2.163	604.68	144.43	2737.63	653.87	2132.95	509.45	2.2664
4.5	147.92	0.414	2.417	623.17	148.84	2742.88	655.13	2119.71	506.29	2.2983
5	151.85	0.375	2.669	640.12	152.89	2747.54	656.24	2107.42	503.35	2.3289
5.5	155.47	0.342	2.920	655.81	156.64	2751.70	657.23	2095.90	500.60	2.3585
6	158.84	0.315	3.170	670.43	160.13	2755.46	658.13	2085.03	498.00	2.3873
6.5	161.99	0.292	3.419	684.14	163.40	2758.87	658.94	2074.73	495.54	2.4152
7	164.96	0.273	3.667	697.07	166.49	2761.98	659.69	2064.92	493.20	2.4424
7.5	167.76	0.255	3.915	709.30	169.41	2764.84	660.37	2055.53	490.96	2.4690
8	170.42	0.240	4.162	720.94	172.19	2767.46	661.00	2046.53	488.80	2.4951
8.5	172.94	0.227	4.409	732.03	174.84	2769.89	661.58	2037.86	486.73	2.5206
9	175.36	0.215	4.655	742.64	177.38	2772.13	662.11	2029.49	484.74	2.5456
9.5	177.67	0.204	4.901	752.82	179.81	2774.22	662.61	2021.40	482.80	2.5702
10	179.88	0.194	5.147	762.60	182.14	2776.16	663.07	2013.56	480.93	2.5944
11	184.06	0.177	5.638	781.11	186.57	2779.66	663.91	1998.55	477.35	2.6418
12	187.96	0.163	6.127	798.42	190.70	2782.73	664.64	1984.31	473.94	2.6878
13	191.60	0.151	6.617	814.68	194.58	2785.42	665.29	1970.73	470.70	2.7327
14	195.04	0.141	7.106	830.05	198.26	2787.79	665.85	1957.73	467.60	2.7767
15	198.28	0.132	7.596	844.64	201.74	2789.88	666.35	1945.24	464.61	2.8197
16	201.37	0.124	8.085	858.54	205.06	2791.73	666.79	1933.19	461.74	2.8620
17	204.30	0.117	8.575	871.82	208.23	2793.37	667.18	1921.55	458.95	2.9036



[Free Industry Resources](#)

[Warehouse Management Today: Balancing Financial Pressures and Growing Demand](#)



[Decorative Arts](#)



[Professional Carwashing & Detailing®](#)





• [Search this Site!](#)

• [Translate this Page!](#)

• [About Us!](#)

## [Free Industry Resources](#)

[Warehouse Management Today: Balancing Financial Pressures and Growing Demand](#)



## [Decorative Arts](#)



[Professional Carwashing & Detailing®](#)

18	207.11	0.110	9.065	884.55	211.27	2794.81	667.53	1910.27	456.26	2.9445
19	209.79	0.105	9.556	896.78	214.19	2796.09	667.83	1899.31	453.64	2.9849
20	212.37	0.100	10.047	908.56	217.01	2797.21	668.10	1888.65	451.10	3.0248
21	214.85	0.095	10.539	919.93	219.72	2798.18	668.33	1878.25	448.61	3.0643
22	217.24	0.091	11.032	930.92	222.35	2799.03	668.54	1868.11	446.19	3.1034
23	219.55	0.087	11.525	941.57	224.89	2799.77	668.71	1858.20	443.82	3.1421
24	221.78	0.083	12.020	951.90	227.36	2800.39	668.86	1848.49	441.50	3.1805
25	223.94	0.080	12.515	961.93	229.75	2800.91	668.99	1838.98	439.23	3.2187
26	226.03	0.077	13.012	971.69	232.08	2801.35	669.09	1829.66	437.01	3.2567
27	228.06	0.074	13.509	981.19	234.35	2801.69	669.17	1820.50	434.82	3.2944
28	230.04	0.071	14.008	990.46	236.57	2801.96	669.24	1811.50	432.67	3.3320
29	231.96	0.069	14.508	999.50	238.73	2802.15	669.28	1802.65	430.56	3.3695
30	233.84	0.067	15.009	1008.33	240.84	2802.27	669.31	1793.94	428.48	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°C, and 417.51 kJ of energy are required to heat 1 kg of water from 0°C to its evaporating temperature of 100°C.

Therefore the specific enthalpy of water at 0 bar g (absolute 1 bar) and 100°C is 417.51 kJ/kg, as shown in the table.

Another 2 257.92 kJ of energy are required to evaporate 1 kg of water at 100°C into 1 kg of steam at 100°C. Therefore at 0 bar g (absolute 1 bar) the specific enthalpy of evaporation is 2 257.19 kJ/kg, as shown in the table.

Total specific enthalpy for steam:

$$h_s = 417.51 + 2\,257.92$$

$$= \underline{2\,675.43 \text{ kJ/kg}}$$

### 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 to the table.



transferred in the same volume actually increases with steam pressure.

Sponsored Links

## Related Topics

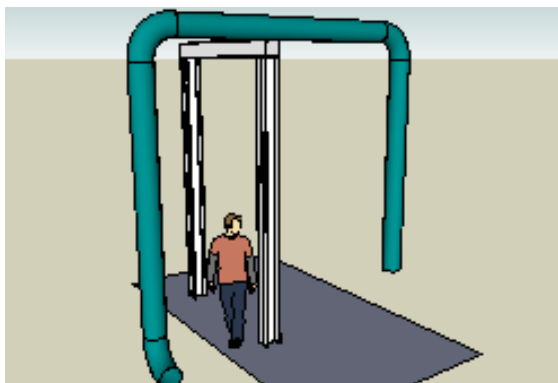
- [Steam Thermodynamics](#) The thermodynamics of steam and condensate systems
- [Steam and Condensate](#) Steam & condensate properties - capacities, pipe sizing, systems configuration and more

## Related Documents

- [Properties of Saturated Steam - SI Units](#) A Saturated Steam Table with steam properties as specific volume, density, specific enthalpy and specific entropy
- [Steam and Vapor Enthalpy](#) Introduction and definition of vapor and steam enthalpy. Specific enthalpy of saturated liquid, saturated vapor and superheated vapor
- [Properties of Saturated Steam - Imperial Units](#) A steam table with sensible, latent and total heat, and specific volume at different gauge pressures and temperatures
- [Vapor Pressure](#) Saturation pressure - exerted by escaping molecules
- [Control Valves and Cavitation](#) Control valves and cavitation, application ratio and multi stage control valves
- [Latent Heat Flow](#) Latent heat is the heat that when supplied to, or removed from air, there is a change in the moisture content of the air, but the temperature of the air is not changed
- [Enthalpy of Wet Steam](#) Wet steam, dryness fraction and enthalpy
- [Specific Volume of Wet Steam](#) Wet steam an specific volume
- [Steam Pipe Pressure drop Calculator](#) Calculate pressure drop in steam distribution pipe lines
- [Enthalpy of Superheated Steam](#) A table with the enthalpy of steam superheated to temperatures above the boiling point with corresponding temperatures

Sponsored Links

## SketchUp Engineering ToolBox - Online 3D modeling!



Free [SketchUp Engineering ToolBox](#) - enabled for use with the amazing, fun and free [Google SketchUp](#).

## Search the ToolBox



Web The Engineering ToolBox

© The Engineering ToolBox 2005

8 6 27