

temperature [°C]	pressure [bar]	density [kg/m³]		enthalpy [kJ/kg]		entropy [J/kg*K]	
		liquid	vapour	liquid	vapour	liquid	vapour
-50,0	0,408	701,74	0,380	120,38	1537,7	0,5755	6,9268
-49,0	0,433	700,56	0,402	124,79	1539,3	0,5952	6,9058
-48,0	0,459	699,37	0,424	129,20	1541,0	0,6148	6,8851
-47,0	0,486	698,18	0,448	133,61	1542,6	0,6344	6,8647
-46,0	0,514	696,99	0,472	138,03	1544,2	0,6538	6,8445
-45,0	0,544	695,79	0,498	142,45	1545,8	0,6733	6,8245
-44,0	0,576	694,60	0,525	146,88	1547,5	0,6926	6,8047
-43,0	0,609	693,40	0,553	151,31	1549,1	0,7119	6,7851
-42,0	0,643	692,20	0,582	155,74	1550,7	0,7311	6,7657
-41,0	0,679	690,99	0,612	160,18	1552,2	0,7502	6,7466
-40,0	0,716	689,78	0,644	164,62	1553,8	0,7693	6,7276
-39,0	0,756	688,57	0,676	169,06	1555,4	0,7883	6,7089
-38,0	0,797	687,36	0,711	173,51	1556,9	0,8072	6,6903
-37,0	0,839	686,14	0,746	177,96	1558,5	0,8261	6,6720
-36,0	0,884	684,92	0,783	182,42	1560,0	0,8449	6,6538
-35,0	0,930	683,70	0,822	186,88	1561,5	0,8636	6,6358
-34,0	0,979	682,48	0,862	191,35	1563,0	0,8823	6,6180
-33,0	1,029	681,25	0,903	195,82	1564,5	0,9009	6,6004
-32,0	1,082	680,01	0,946	200,29	1566,0	0,9195	6,5829
-31,0	1,137	678,78	0,991	204,77	1567,5	0,9380	6,5657
-30,0	1,194	677,54	1,037	209,25	1569,0	0,9564	6,5486
-29,0	1,253	676,30	1,086	213,73	1570,5	0,9748	6,5317
-28,0	1,315	675,05	1,135	218,22	1571,9	0,9931	6,5149
-27,0	1,379	673,81	1,187	222,71	1573,3	1,0113	6,4983
-26,0	1,445	672,55	1,241	227,21	1574,8	1,0295	6,4819
-25,0	1,514	671,30	1,296	231,71	1576,2	1,0476	6,4656
-24,0	1,586	670,04	1,354	236,22	1577,6	1,0657	6,4495
-23,0	1,660	668,78	1,413	240,72	1579,0	1,0837	6,4335
-22,0	1,737	667,51	1,474	245,24	1580,4	1,1017	6,4177
-21,0	1,817	666,24	1,538	249,76	1581,7	1,1196	6,4020
-20,0	1,900	664,97	1,604	254,28	1583,1	1,1374	6,3865
-19,0	1,986	663,69	1,671	258,80	1584,4	1,1552	6,3711
-18,0	2,075	662,41	1,742	263,33	1585,8	1,1730	6,3559
-17,0	2,167	661,12	1,814	267,87	1587,1	1,1907	6,3408
-16,0	2,263	659,83	1,889	272,41	1588,4	1,2083	6,3258
-15,0	2,361	658,54	1,966	276,95	1589,7	1,2259	6,3110
-14,0	2,463	657,24	2,046	281,50	1591,0	1,2434	6,2963
-13,0	2,569	655,94	2,128	286,05	1592,2	1,2609	6,2817
-12,0	2,678	654,64	2,213	290,61	1593,5	1,2783	6,2673
-11,0	2,790	653,33	2,301	295,17	1594,7	1,2956	6,2529
-10,0	2,906	652,01	2,391	299,74	1595,9	1,3130	6,2387

temperature [°C]	pressure [bar]	density [kg/m³]		enthalpy [kJ/kg]		entropy [J/kg*K]	
		liquid	vapour	liquid	vapour	liquid	vapour
-9,0	3,027	650,70	2,484	304,31	1597,2	1,3302	6,2246
-8,0	3,151	649,37	2,580	308,88	1598,4	1,3474	6,2107
-7,0	3,278	648,05	2,678	313,46	1599,5	1,3646	6,1968
-6,0	3,410	646,72	2,780	318,05	1600,7	1,3817	6,1831
-5,0	3,547	645,38	2,885	322,64	1601,9	1,3988	6,1694
-4,0	3,687	644,04	2,993	327,24	1603,0	1,4158	6,1559
-3,0	3,832	642,70	3,104	331,84	1604,2	1,4328	6,1425
-2,0	3,981	641,35	3,218	336,45	1605,3	1,4498	6,1292
-1,0	4,134	640,00	3,335	341,06	1606,4	1,4666	6,1159
0,0	4,293	638,64	3,456	345,67	1607,4	1,4835	6,1028
1,0	4,455	637,28	3,580	350,30	1608,5	1,5003	6,0898
2,0	4,623	635,91	3,708	354,93	1609,6	1,5170	6,0769
3,0	4,796	634,53	3,840	359,56	1610,6	1,5338	6,0641
4,0	4,973	633,16	3,975	364,20	1611,6	1,5504	6,0513
5,0	5,156	631,77	4,113	368,85	1612,6	1,5671	6,0387
6,0	5,343	630,39	4,256	373,50	1613,6	1,5836	6,0261
7,0	5,536	628,99	4,402	378,16	1614,6	1,6002	6,0137
8,0	5,735	627,60	4,553	382,82	1615,5	1,6167	6,0013
9,0	5,939	626,19	4,707	387,49	1616,5	1,6332	5,9890
10,0	6,148	624,78	4,866	392,17	1617,4	1,6496	5,9768
11,0	6,363	623,37	5,029	396,85	1618,3	1,6660	5,9646
12,0	6,584	621,95	5,196	401,54	1619,2	1,6823	5,9526
13,0	6,811	620,53	5,367	406,24	1620,1	1,6987	5,9406
14,0	7,043	619,10	5,543	410,94	1620,9	1,7149	5,9287
15,0	7,282	617,66	5,724	415,65	1621,7	1,7312	5,9168
16,0	7,527	616,22	5,909	420,37	1622,6	1,7474	5,9050
17,0	7,778	614,77	6,099	425,10	1623,3	1,7636	5,8933
18,0	8,036	613,31	6,294	429,83	1624,1	1,7797	5,8817
19,0	8,300	611,85	6,493	434,57	1624,9	1,7958	5,8701
20,0	8,570	610,39	6,698	439,32	1625,6	1,8119	5,8586
21,0	8,848	608,91	6,908	444,07	1626,3	1,8279	5,8472
22,0	9,132	607,44	7,123	448,84	1627,0	1,8439	5,8358
23,0	9,423	605,95	7,344	453,61	1627,7	1,8599	5,8244
24,0	9,722	604,46	7,569	458,39	1628,4	1,8758	5,8131
25,0	10,03	602,96	7,801	463,17	1629,0	1,8918	5,8019
26,0	10,34	601,45	8,038	467,97	1629,6	1,9076	5,7908
27,0	10,66	599,94	8,281	472,78	1630,2	1,9235	5,7796
28,0	10,99	598,42	8,530	477,59	1630,8	1,9393	5,7686
29,0	11,32	596,90	8,785	482,41	1631,3	1,9551	5,7575
30,0	11,67	595,36	9,046	487,25	1631,8	1,9709	5,7466

temperature [°C]	pressure [bar]	density [kg/m ³]		enthalpy [kJ/kg]		entropy [J/kg*K]	
		liquid	vapour	liquid	vapour	liquid	vapour
31,0	12,02	593,82	9,313	492,09	1632,3	1,9867	5,7356
32,0	12,38	592,28	9,587	496,94	1632,8	2,0024	5,7247
33,0	12,74	590,72	9,867	501,80	1633,3	2,0181	5,7139
34,0	13,12	589,16	10,15	506,67	1633,7	2,0338	5,7031
35,0	13,50	587,59	10,45	511,56	1634,1	2,0494	5,6923
36,0	13,89	586,01	10,75	516,45	1634,5	2,0651	5,6816
37,0	14,29	584,42	11,06	521,35	1634,9	2,0807	5,6709
38,0	14,70	582,83	11,37	526,26	1635,2	2,0963	5,6602
39,0	15,12	581,22	11,69	531,19	1635,5	2,1118	5,6496
40,0	15,55	579,61	12,02	536,12	1635,8	2,1274	5,6390
41,0	15,98	577,99	12,36	541,07	1636,0	2,1429	5,6284
42,0	16,43	576,36	12,71	546,03	1636,3	2,1584	5,6178
43,0	16,88	574,72	13,06	551,00	1636,5	2,1739	5,6073
44,0	17,34	573,07	13,42	555,98	1636,6	2,1894	5,5968
45,0	17,82	571,42	13,79	560,97	1636,8	2,2049	5,5863
46,0	18,30	569,75	14,17	565,98	1636,9	2,2203	5,5759
47,0	18,79	568,08	14,56	571,00	1637,0	2,2357	5,5654
48,0	19,30	566,39	14,95	576,03	1637,1	2,2512	5,5550
49,0	19,81	564,69	15,36	581,08	1637,1	2,2666	5,5446
50,0	20,33	562,99	15,78	586,14	1637,1	2,2820	5,5342
51,0	20,86	561,27	16,20	591,21	1637,1	2,2973	5,5238
52,0	21,41	559,54	16,63	596,30	1637,0	2,3127	5,5134
53,0	21,96	557,81	17,08	601,40	1636,9	2,3281	5,5030
54,0	22,53	556,06	17,53	606,52	1636,8	2,3434	5,4927
55,0	23,10	554,30	18,00	611,65	1636,6	2,3588	5,4823
56,0	23,69	552,52	18,47	616,80	1636,4	2,3741	5,4719
57,0	24,28	550,74	18,96	621,96	1636,2	2,3895	5,4616
58,0	24,89	548,94	19,46	627,14	1636,0	2,4048	5,4512
59,0	25,51	547,14	19,96	632,33	1635,7	2,4201	5,4408
60,0	26,15	545,32	20,48	637,55	1635,3	2,4354	5,4305
61,0	26,79	543,48	21,02	642,78	1635,0	2,4507	5,4201
62,0	27,44	541,63	21,56	648,02	1634,6	2,4661	5,4097
63,0	28,11	539,77	22,12	653,29	1634,1	2,4814	5,3993
64,0	28,79	537,90	22,69	658,57	1633,7	2,4967	5,3889
65,0	29,48	536,01	23,27	663,88	1633,2	2,5120	5,3785
66,0	30,18	534,11	23,87	669,20	1632,6	2,5274	5,3680
67,0	30,90	532,19	24,48	674,54	1632,0	2,5427	5,3575
68,0	31,63	530,26	25,11	679,90	1631,4	2,5580	5,3471
69,0	32,37	528,31	25,75	685,29	1630,7	2,5734	5,3365
70,0	33,13	526,34	26,40	690,69	1630,0	2,5887	5,3260

temperature [°C]	pressure [bar]	density [kg/m³]		enthalpy [kJ/kg]		entropy [J/kg*K]	
		liquid	vapour	liquid	vapour	liquid	vapour
71,0	33,89	524,36	27,08	696,12	1629,2	2,6041	5,3154
72,0	34,67	522,36	27,76	701,57	1628,4	2,6195	5,3048
73,0	35,47	520,35	28,47	707,04	1627,6	2,6349	5,2942
74,0	36,28	518,31	29,19	712,53	1626,7	2,6503	5,2835
75,0	37,10	516,26	29,92	718,05	1625,7	2,6657	5,2728
76,0	37,93	514,19	30,68	723,60	1624,7	2,6811	5,2621
77,0	38,78	512,10	31,45	729,17	1623,7	2,6966	5,2513
78,0	39,64	509,99	32,25	734,77	1622,6	2,7121	5,2404
79,0	40,52	507,86	33,06	740,39	1621,4	2,7276	5,2295
80,0	41,41	505,71	33,89	746,04	1620,2	2,7431	5,2185
81,0	42,32	503,53	34,75	751,73	1619,0	2,7587	5,2075
82,0	43,24	501,34	35,62	757,44	1617,7	2,7743	5,1964
83,0	44,18	499,12	36,52	763,18	1616,3	2,7899	5,1853
84,0	45,13	496,87	37,44	768,95	1614,9	2,8055	5,1741
85,0	46,10	494,60	38,38	774,76	1613,4	2,8212	5,1628
86,0	47,08	492,31	39,35	780,60	1611,8	2,8369	5,1514
87,0	48,08	489,99	40,35	786,48	1610,2	2,8527	5,1400
88,0	49,09	487,64	41,37	792,39	1608,6	2,8685	5,1285
89,0	50,12	485,26	42,42	798,34	1606,8	2,8844	5,1168
90,0	51,16	482,85	43,49	804,33	1605,0	2,9003	5,1051
91,0	52,23	480,41	44,60	810,36	1603,1	2,9163	5,0933
92,0	53,31	477,94	45,74	816,43	1601,1	2,9323	5,0813
93,0	54,40	475,43	46,91	822,54	1599,1	2,9484	5,0693
94,0	55,51	472,89	48,11	828,70	1597,0	2,9646	5,0571
95,0	56,64	470,31	49,35	834,91	1594,8	2,9808	5,0448
96,0	57,79	467,70	50,62	841,17	1592,5	2,9971	5,0324
97,0	58,95	465,04	51,93	847,48	1590,1	3,0135	5,0198
98,0	60,13	462,34	53,28	853,84	1587,6	3,0300	5,0071
99,0	61,33	459,60	54,68	860,26	1585,1	3,0466	4,9942
100,0	62,55	456,81	56,11	866,74	1582,4	3,0633	4,9812
101,0	63,79	453,97	57,59	873,28	1579,6	3,0800	4,9679
102,0	65,04	451,08	59,13	879,89	1576,8	3,0969	4,9545
103,0	66,32	448,14	60,71	886,57	1573,8	3,1140	4,9409
104,0	67,61	445,14	62,34	893,32	1570,7	3,1311	4,9270
105,0	68,92	442,08	64,04	900,14	1567,4	3,1484	4,9130
106,0	70,25	438,96	65,79	907,05	1564,0	3,1658	4,8987
107,0	71,60	435,77	67,60	914,04	1560,5	3,1835	4,8841
108,0	72,97	432,50	69,49	921,13	1556,9	3,2012	4,8692
109,0	74,36	429,16	71,45	928,31	1553,1	3,2192	4,8540
110,0	75,78	425,74	73,48	935,60	1549,1	3,2374	4,8385

temperature [°C]	pressure [bar]	density [kg/m³]		enthalpy [kJ/kg]		entropy [J/kg*K]	
		liquid	vapour	liquid	vapour	liquid	vapour
111,0	77,21	422,22	75,60	943,00	1544,9	3,2558	4,8227
112,0	78,66	418,61	77,81	950,52	1540,6	3,2745	4,8065
113,0	80,14	414,90	80,11	958,17	1536,0	3,2934	4,7898
114,0	81,63	411,08	82,53	965,96	1531,2	3,3126	4,7727
115,0	83,15	407,13	85,05	973,91	1526,2	3,3321	4,7551
116,0	84,69	403,06	87,70	982,02	1520,9	3,3520	4,7369
117,0	86,26	398,83	90,50	990,31	1515,4	3,3723	4,7181
118,0	87,84	394,45	93,44	998,81	1509,5	3,3930	4,6987
119,0	89,45	389,89	96,56	1007,5	1503,3	3,4142	4,6784
120,0	91,09	385,13	99,87	1016,5	1496,7	3,4360	4,6573
121,0	92,75	380,14	103,4	1025,8	1489,6	3,4584	4,6353
122,0	94,43	374,90	107,2	1035,3	1482,0	3,4816	4,6120
123,0	96,14	369,35	111,3	1045,3	1473,9	3,5055	4,5875
124,0	97,88	363,46	115,7	1055,7	1465,1	3,5305	4,5614
125,0	99,64	357,15	120,5	1066,6	1455,4	3,5568	4,5334
126,0	101,4	350,32	125,8	1078,1	1444,8	3,5845	4,5031
127,0	103,3	342,84	131,8	1090,5	1432,9	3,6141	4,4698
128,0	105,1	334,48	138,7	1104,0	1419,3	3,6463	4,4325
129,0	107,0	324,91	146,8	1118,9	1403,5	3,6821	4,3897
130,0	108,9	313,44	156,7	1136,2	1384,1	3,7236	4,3384
131,0	110,8	298,51	170,1	1157,8	1358,3	3,7754	4,2716
132,0	112,8	274,14	193,0	1191,3	1315,7	3,8565	4,1637

Calculated by Refprop version 10.0

A guarantee, warranty or liability for the accuracy, completeness and timeliness of the content and information provided cannot be assumed.

revised 10.01.2020

TEGA – Technische Gase und Gasetechnik GmbH
 Werner-von-Siemens-Straße 18
 97076 Würzburg | Germany
 www.tega.de

Telefon +49 931 2093-0
 Telefax +49 931 2093-101
 Email: info@tega.de

Geschäftsführer: Dr. Jürgen Zöllner
 Sitz: Würzburg - Registergericht: Würzburg, HRB 21
 USt-IdNr.: DE 811145437

Deutsche Bank Würzburg

IBAN: DE707907001600202804 00
 BIC: DEUTDEMM790