



1.9 Technical tables

1.9.1 Pressure

bar	N/cm ²	MPa	Psi	bar	N/cm ²	MPa	Psi
0.1	1	0.01	1.45	14	140	1.4	203.00
0.2	2	0.02	2.90	15	150	1.5	217.50
0.3	3	0.03	4.35	16	160	1.6	232.00
0.4	4	0.04	5.80	17	170	1.7	246.50
0.5	5	0.05	7.25	18	180	1.8	261.00
0.6	6	0.06	8.70	19	190	1.9	275.50
0.7	7	0.07	10.15	20	200	2.0	390.00
0.8	8	0.08	11.60	21	210	2.1	304.50
0.9	9	0.09	13.05	22	220	2.2	316.00
1.0	10	0.10	14.50	23	230	2.3	333.50
1.5	15	0.15	21.75	24	240	2.4	348.00
2.0	20	0.20	29.00	25	250	2.5	362.50
2.5	25	0.25	36.25	26	260	2.6	377.00
3.0	30	0.30	43.50	27	270	2.7	391.50
3.5	35	0.35	50.75	28	280	2.8	406.00
4.0	40	0.40	58.00	29	290	2.9	420.50
4.5	45	0.45	65.25	30	300	3.0	435.00
5.0	50	0.50	72.50	35	350	3.5	507.50
5.5	55	0.55	79.75	40	400	4.0	580.00
6.0	60	0.60	87.00	45	450	4.5	652.50
6.5	65	0.65	94.25	50	500	5.0	725.00
7.0	70	0.70	101.50	55	550	5.5	797.50
7.5	75	0.75	108.75	60	600	6.0	870.00
8.0	80	0.80	116.00	65	650	6.5	942.50
8.5	85	0.85	123.25	70	700	7.0	1015.00
9.0	90	0.90	130.50	75	750	7.5	1087.50
9.5	95	0.95	137.75	80	800	8.0	1160.00
10.0	100	1.00	145.00	85	850	8.5	1232.50
11.0	110	1.10	159.50	90	900	9.0	1305.00
12.0	120	1.20	174.00	95	950	9.5	1377.50
13.0	130	1.30	188.50	100	1000	10.0	1450.00

1.9.2 Viscosity

Kinematic viscosity centistokes cSt (mm ² /s)	°Engler °E	Saybolt Universal Ssu	Redwood Seconds n°1 SRW n°1
1	1	---	---
2	1.1	32.7	31
3	1.2	36	33.5
4	1.3	39	36
5	1.4	42.5	38.5
7	1.5	49	44
10	1.8	59	52
15	2.3	77.5	68
20	2.9	98	86
25	3.4	119	105
30	4	140	120
35	4.7	164	145
40	5.3	186	165
50	6.6	232	205
60	8	278	245
70	9.2	324	286
80	10.5	370	327
90	12	415	370
100	13	465	410



1.9.3 Temperatures

°C	K	°F	°C	K	°F	°C	K	°F	°C	K	°F
-50	223	-58.0	1	274	33.8	51	324	123.8	105	378	221.0
-49	224	-56.2	2	275	35.6	52	325	125.6	110	383	230.0
-48	225	-54.4	3	276	37.4	53	326	127.4	115	388	239.0
-47	226	-52.6	4	277	39.2	54	327	129.2	120	393	248.0
-46	227	-50.8	5	278	41.0	55	328	131.9	125	398	257.0
-45	228	-49.0	6	279	42.8	56	329	132.8	130	403	266.0
-44	229	-47.2	7	280	44.6	57	330	134.6	135	408	275.0
-43	230	-45.4	8	281	46.4	58	331	136.4	140	413	284.0
-42	231	-43.6	9	282	48.2	59	332	138.2	145	418	293.0
-41	232	-41.8	10	283	50.0	60	333	140.0	150	423	303.0
-40	233	-40.0	11	284	51.8	61	334	141.8	155	428	311.0
-39	234	-38.2	12	285	53.6	62	335	143.6	160	433	320.0
-38	235	-36.4	13	286	55.4	63	336	145.4	165	438	329.0
-37	236	-34.6	14	287	57.2	64	337	147.2	170	443	338.0
-36	237	-32.8	15	288	59.0	65	338	149.0	175	448	347.0
-35	238	-31.0	16	289	60.8	66	339	150.8	180	453	356.0
-34	239	-29.2	17	290	62.6	67	340	152.6	185	458	365.0
-33	240	-27.4	18	291	64.4	68	341	154.4	190	463	374.0
-32	241	-25.6	19	292	66.2	69	342	156.2	195	468	383.0
-31	242	-23.8	20	293	68.0	70	343	158.0	200	473	392.0
-30	243	-22.0	21	294	69.8	71	344	159.8	205	478	401.0
-29	244	-20.2	22	295	71.6	72	345	161.6	210	483	410.0
-28	245	-18.4	23	296	73.4	73	346	163.4	215	488	419.0
-27	246	-16.6	24	297	75.2	74	347	165.2	220	493	428.0
-26	247	-14.8	25	298	77.0	75	348	167.0	225	498	437.0
-25	248	-13.0	26	299	78.8	76	349	168.8	230	503	446.0
-24	249	-11.2	27	300	80.6	77	350	170.6	235	508	455.0
-23	250	-9.4	28	301	82.4	78	351	172.4	240	513	464.0
-22	251	-7.6	29	302	84.2	79	352	174.2	245	518	473.0
-21	252	-5.8	30	303	86.0	80	353	176.0	250	523	482.0
-20	253	-4.0	31	304	87.8	81	354	177.8	255	528	491.0
-19	254	-2.2	32	305	89.6	82	355	179.6	260	533	500.0
-18	255	-0.4	33	306	91.4	83	356	181.4	265	538	509.0
-17	256	1.4	34	307	93.2	84	357	183.2	270	543	518.0
-16	257	3.2	35	308	95.0	85	358	185.0	275	548	527.0
-15	258	5.0	36	309	96.8	86	359	186.8	280	553	536.0
-14	259	6.8	37	310	98.6	87	360	188.6	285	558	545.0
-13	260	8.6	38	311	100.4	88	361	190.4	290	563	554.0
-12	261	10.4	39	312	102.2	89	362	192.2	295	568	563.0
-11	262	12.2	40	313	104.0	90	363	194.0	300	573	572.0
-10	263	14.0	41	314	105.8	91	364	195.8	310	583	590.0
-9	264	15.8	42	315	107.6	92	365	197.6	320	593	608.0
-8	265	17.6	43	316	109.4	93	366	199.4	330	603	626.0
-7	266	19.4	44	317	111.2	94	367	201.2	340	613	644.0
-6	267	21.2	45	318	113.0	95	368	203.0	350	623	662.0
-5	268	23.0	46	319	114.8	96	369	204.8	360	633	680.0
-4	269	24.8	47	320	116.6	97	370	206.6	370	643	698.0
-3	270	26.6	48	321	118.4	98	371	208.4	380	653	716.0
-2	271	28.4	49	322	120.2	99	372	210.2	390	663	734.0
-1	272	30.2	50	323	122.0	100	373	212.0	400	673	752.0
0	273	32.0									

1

1.9.4 Steam

Relative pressure (bar)	Absolute pressure (bar)	Temperature (°C)	Steam specific volume (m ³ /kg)
---	0.050	32.88	28.192
---	0.500	81.33	3.240
0.00	1.013	100.00	1.673
0.10	1.113	102.66	1.533
0.20	1.213	105.10	1.414
0.35	1.363	108.50	1.268
0.50	1.513	111.61	1.149
0.70	1.713	115.40	1.024
1.00	2.013	120.42	0.881
1.50	2.513	127.62	0.714
2.00	3.013	133.69	0.603
2.50	3.513	139.02	0.522
3.00	4.013	143.75	0.461
3.50	4.513	148.02	0.413
4.00	5.013	151.96	0.374
4.50	5.513	155.55	0.342
5.00	6.013	158.92	0.315
6.00	7.013	165.04	0.272
7.00	8.013	170.50	0.240
8.00	9.013	175.43	0.215
9.00	10.013	179.97	0.194
10.00	11.013	184.13	0.177

1.9.5 Specific gravity

Liquid substances			Gases and vapors at 20°C and 1atm *		
Liquid	Temp. (°C)	Specific gravity (Kg/dm ³)	Gases and vapors	Specific gravity	
				Relative density to air	(Kg/m ³)
Acetone	25	0,787	Acetylene (ethyne)	0,90	1,085
Acetylene, liquid	70°F	0,38	Air	1,00	1,205
Alcohol, ethyl (ethanol)	25	0,787	Alcohol vapor	1,60	1,929
Alcohol, methyl (methanol)	25	0,791	Ammonia	0,59	0,711
Alcohol, propyl	25	0,802	Argon	1,38	1,663
Ammonia (aqua)	25	0,826	Benzene	2,70	3,249
Aniline	25	1,022	Butane	2,01	2,417
Benzene	25	0,876	Isobutene	1,94	2,338
Benzil	25	1,084	Carbon dioxide	1,52	1,830
Bromine	25	3,12	Carbon monoxide	0,97	1,165
Butane, liquid	25	0,601	Chlorine	2,49	2,996
Caustic soda 9% - NaOH	15	1,10	Cyclobutane	1,94	2,335
Caustic soda 18% - NaOH	15	1,20	Cyclopentane	2,42	2,919
Caustic soda 27% - NaOH	15	1,30	Cyclopropane	1,45	1,748
Caustic soda 47% - NaOH	15	1,50	Deuterium	0,07	0,084
Chloroform	25	1,469	Ethane	1,04	1,251
Ethane	-89	0,572	Ether vapor	2,59	3,116
Ether	25	0,716	Ethyl Chloride	2,23	2,687
Ethylene glycol	25	1,1	Ethylene (Ethene)	0,97	1,167
Formaldehyde	45	0,815	Fluorine	1,31	1,579
Freon R-11	25	1,48	Helium	0,14	0,166
Freon R-12	25	1,315	Heptanes	3,46	4,168
Freon R-22	25	1,197	Hexane	2,97	3,582
Fuel oil	60°F	0,893	Hydrogen	0,07	0,084
Gasoline, Vehicle	60°F	0,739	Hydrogen chloride	1,27	1,528
Hydrochloric acid 10%	15	1,05	Hydrogen sulfide	1,18	1,417
Hydrochloric acid 20%	15	1,10	Hydrofluoric acid	2,37	2,856
Hydrochloric acid 30%	15	1,15	Hydrochloric acid	1,26	1,520
Hydrochloric acid 40%	15	1,20	Illuminating gas	0,40	0,482
Kerosene	60°F	0,82	Isobutane	2,01	2,422
Mercury	25	13,633	Isopentane	2,48	2,988
Milk	15	1,035	Mercury vapor	6,94	8,363
Naphtha	15	0,667	Methane	0,55	0,667
Nitric acid 17%	15	1,10	Natural Gas (typical)	0,7 - 0,5	0,844 - 0,723
Nitric acid 25%	15	1,15	Neon	0,70	0,840
Nitric acid 47%	15	1,30	Nitrogen	0,97	1,165
Nitric acid 94%	15	1,50	Nitrous oxide	1,53	1,844
Octane	25	0,701	Octane	3,94	4,753
Olive Oil	15	0,703	Oxygen	1,10	1,331
Oxygen	-183	1,14	Ozone	1,66	2,000
Potassium Hydroxide 21%	15	1,2	Pentane	2,49	2,997
Potassium Hydroxide 49%	15	1,5	Propane	1,52	1,834
Propane	25	0,495	Propene (Propylene)	1,45	1,750
Sulphuric acid 27%	15	1,20	R-12	4,17	5,030
Sulphuric acid 50%	15	1,40	R-134A	3,52	4,244
Sulphuric acid 87%	15	1,80	Sulfur Dioxide	2,26	2,728
Sulphuric acid, pure	15	1,89	Water vapor	0,62	0,749
Turpentine	25	0,871	Xenon	4,53	5,459
Water, pure	4	1			
Water, sea	77°F	1,025			

*) NTP - Normal Temperature and Pressure - is defined as air at 20°C and 1 atm

Specific gravity is the ratio between the density (mass per unit volume) of the actual gas and the density of air, specific gravity has no dimension. The density of air at NTP is 1.205 kg/m3.