

Asahiklin AK-134a Thermodynamic Properties

R-134a thermodynamic properties (temperature standard)-1

Temperature (°C)	Pressure (kPa)	Density (kg/m ³)		Specific volume (m ³ /kg)		Specific enthalpy (kJ/kg)			Specific entropy (kJ/kg/K)		Constant pressure specific heat (kJ/kgK)	
		Liquid	Steam	Liquid	Steam	Liquid	Steam	Latent heat	Liquid	Steam	Liquid	Steam
-60	15.91	1474	0.9268	0.00068	1.079	123.4	361.3	237.9	0.6846	1.801	1.223	0.6924
-58	18.09	1469	1.045	0.00068	0.9565	125.8	362.6	236.8	0.6961	1.797	1.226	0.6977
-56	20.52	1463	1.176	0.00068	0.8502	128.3	363.8	235.5	0.7074	1.792	1.229	0.7031
-54	23.21	1458	1.32	0.00069	0.7577	130.7	365.1	234.4	0.7187	1.788	1.232	0.7086
-52	26.18	1452	1.477	0.00069	0.6769	133.2	366.4	233.2	0.7299	1.784	1.235	0.7141
-50	29.45	1446	1.65	0.00069	0.6062	135.7	367.7	232	0.741	1.781	1.238	0.7197
-48	33.05	1441	1.838	0.00069	0.5441	138.2	368.9	230.7	0.7521	1.777	1.241	0.7254
-46	37	1435	2.043	0.0007	0.4896	140.6	370.2	229.6	0.7631	1.774	1.245	0.7311
-44	41.33	1429	2.266	0.0007	0.4414	143.1	371.5	228.4	0.774	1.77	1.248	0.737
-42	46.06	1423	2.507	0.0007	0.3988	145.6	372.7	227.1	0.7848	1.767	1.251	0.743
-40	51.21	1418	2.769	0.00071	0.3611	148.1	374	225.9	0.7956	1.764	1.255	0.749
-38	56.82	1412	3.053	0.00071	0.3276	150.7	375.3	224.6	0.8063	1.762	1.258	0.7552
-36	62.91	1406	3.359	0.00071	0.2977	153.2	376.5	223.3	0.817	1.759	1.262	0.7614
-34	69.51	1400	3.689	0.00071	0.2711	155.7	377.8	222.1	0.8276	1.756	1.265	0.7678
-32	76.66	1394	4.044	0.00072	0.2473	158.2	379.1	220.9	0.8381	1.754	1.269	0.7743
-30	84.38	1388	4.426	0.00072	0.2259	160.8	380.3	219.5	0.8486	1.751	1.273	0.7809
-28	92.7	1382	4.836	0.00072	0.2068	163.3	381.6	218.3	0.8591	1.749	1.277	0.7876
-26.07	101.325	1377	5.259	0.00073	0.1902	165.8	382.8	217	0.8691	1.747	1.281	0.7942
-26	101.7	1376	5.275	0.00073	0.1896	165.9	382.8	216.9	0.8694	1.747	1.281	0.7944
-24	111.3	1370	5.745	0.00073	0.1741	168.5	384.1	215.6	0.8798	1.745	1.285	0.8014
-22	121.6	1364	6.248	0.00073	0.1601	171.1	385.3	214.2	0.89	1.743	1.289	0.8085
-20	132.7	1358	6.784	0.00074	0.1474	173.6	386.6	213	0.9002	1.741	1.293	0.8158
-18	144.6	1352	7.357	0.00074	0.1359	176.2	387.8	211.6	0.9104	1.74	1.297	0.8232
-16	157.3	1346	7.967	0.00074	0.1255	178.8	389	210.2	0.9205	1.738	1.302	0.8307
-14	170.8	1340	8.617	0.00075	0.1161	181.4	390.2	208.8	0.9306	1.736	1.306	0.8385
-12	185.2	1333	9.307	0.00075	0.1074	184.1	391.5	207.4	0.9407	1.735	1.311	0.8463
-10	200.6	1327	10.04	0.00075	0.09959	186.7	392.7	206	0.9506	1.733	1.316	0.8544
-8	216.9	1321	10.82	0.00076	0.09242	189.3	393.9	204.6	0.9606	1.732	1.32	0.8626
-6	234.3	1314	11.65	0.00076	0.08587	192	395.1	203.1	0.9705	1.731	1.325	0.8709
-4	252.7	1308	12.52	0.00076	0.07987	194.6	396.3	201.7	0.9804	1.729	1.33	0.8795
-2	272.2	1301	13.45	0.00077	0.07436	197.3	397.4	200.1	0.9902	1.728	1.336	0.8883
0	292.8	1295	14.43	0.00077	0.06931	200	398.6	198.6	1	1.727	1.341	0.8972
2	314.6	1288	15.46	0.00078	0.06466	202.7	399.8	197.1	1.01	1.726	1.347	0.9064
4	337.7	1281	16.56	0.00078	0.06039	205.4	400.9	195.5	1.019	1.725	1.352	0.9158
6	362	1275	17.72	0.00078	0.05644	208.1	402.1	194	1.029	1.724	1.358	0.9254
8	387.6	1268	18.94	0.00079	0.0528	210.8	403.2	192.4	1.039	1.723	1.364	0.9353
10	414.6	1261	20.23	0.00079	0.04944	213.6	404.3	190.7	1.048	1.722	1.37	0.9455
12	443	1254	21.58	0.0008	0.04633	216.3	405.4	189.1	1.058	1.721	1.377	0.9559
14	472.9	1247	23.01	0.0008	0.04345	219.1	406.5	187.4	1.068	1.72	1.383	0.9666
16	504.3	1240	24.52	0.00081	0.04078	221.9	407.6	185.7	1.077	1.72	1.39	0.9776
18	537.2	1233	26.11	0.00081	0.0383	224.7	408.7	184	1.087	1.719	1.397	0.989

R-134a thermodynamic properties (temperature standard)-2

Temperature (°C)	Pressure (kPa)	Density (kg/m³)		Specific volume (m³/kg)		Specific enthalpy (kJ/kg)			Specific entropy (kJ/kg/K)		Constant pressure specific heat (kJ/kgK)	
		Liquid	Steam	Liquid	Steam	Liquid	Steam	Latent heat	Liquid	Steam	Liquid	Steam
20	571.7	1225	27.78	0.00082	0.036	227.5	409.7	182.2	1.096	1.718	1.405	1.001
22	607.9	1218	29.54	0.00082	0.03385	230.3	410.8	180.5	1.106	1.717	1.413	1.013
24	645.8	1210	31.39	0.00083	0.03186	233.1	411.8	178.7	1.115	1.717	1.421	1.025
26	685.4	1203	33.34	0.00083	0.03	236	412.8	176.8	1.125	1.716	1.429	1.038
28	726.9	1195	35.38	0.00084	0.02826	238.8	413.8	175	1.134	1.715	1.437	1.052
30	770.2	1187	37.54	0.00084	0.02664	241.7	414.8	173.1	1.144	1.714	1.446	1.065
32	815.4	1180	39.8	0.00085	0.02513	244.6	415.8	171.2	1.153	1.714	1.456	1.08
34	862.6	1172	42.18	0.00085	0.02371	247.5	416.7	169.2	1.162	1.713	1.466	1.095
36	911.8	1163	44.68	0.00086	0.02238	250.5	417.6	167.1	1.172	1.712	1.476	1.111
38	963.2	1155	47.32	0.00087	0.02113	253.4	418.5	165.1	1.181	1.712	1.487	1.127
40	1017	1147	50.09	0.00087	0.01997	256.4	419.4	163	1.19	1.711	1.498	1.145
42	1072	1138	53	0.00088	0.01887	259.4	420.3	160.9	1.2	1.71	1.51	1.163
44	1130	1129	56.06	0.00089	0.01784	262.4	421.1	158.7	1.209	1.71	1.523	1.182
46	1190	1121	59.29	0.00089	0.01687	265.5	421.9	156.4	1.219	1.709	1.537	1.202
48	1253	1112	62.69	0.0009	0.01595	268.5	422.7	154.2	1.228	1.708	1.551	1.223
50	1318	1102	66.27	0.00091	0.01509	271.6	423.4	151.8	1.237	1.707	1.566	1.246
52	1385	1093	70.05	0.00092	0.01428	274.7	424.1	149.4	1.247	1.706	1.582	1.27
54	1455	1083	74.03	0.00092	0.01351	277.9	424.8	146.9	1.256	1.705	1.6	1.296
56	1528	1073	78.24	0.00093	0.01278	281.1	425.5	144.4	1.266	1.705	1.618	1.324
58	1604	1063	82.68	0.00094	0.01209	284.3	426.1	141.8	1.275	1.704	1.638	1.354
60	1682	1053	87.38	0.00095	0.01144	287.5	426.6	139.1	1.285	1.702	1.66	1.387
62	1763	1042	92.36	0.00096	0.01083	290.8	427.1	136.3	1.294	1.701	1.684	1.422
64	1847	1031	97.64	0.00097	0.01024	294.1	427.6	133.5	1.304	1.7	1.71	1.461
66	1934	1020	103.2	0.00098	0.00969	297.4	428	130.6	1.314	1.699	1.738	1.504
68	2024	1008	109.2	0.00099	0.00916	300.8	428.4	127.6	1.323	1.697	1.769	1.552
70	2117	996.2	115.6	0.001	0.00865	304.3	428.6	124.3	1.333	1.696	1.804	1.605
72	2213	983.8	122.4	0.00102	0.00817	307.8	428.9	121.1	1.343	1.694	1.843	1.665
74	2313	970.8	129.7	0.00103	0.00771	311.3	429	117.7	1.353	1.692	1.887	1.734
76	2416	957.3	137.5	0.00104	0.00727	314.9	429	114.1	1.363	1.69	1.938	1.812
78	2523	943.1	145.9	0.00106	0.00685	318.6	429	110.4	1.373	1.688	1.996	1.904
80	2633	928.2	155.1	0.00108	0.00645	322.4	428.8	106.4	1.384	1.685	2.065	2.012
82	2747	912.6	165	0.0011	0.00606	326.2	428.5	102.3	1.394	1.682	2.147	2.143
84	2865	895.9	176	0.00112	0.00568	330.2	428.1	97.9	1.405	1.679	2.247	2.303
86	2987	878.1	188	0.00114	0.00532	334.3	427.4	93.1	1.416	1.675	2.373	2.504
88	3114	858.9	201.5	0.00116	0.00496	338.5	426.6	88.1	1.427	1.671	2.536	2.766
90	3244	837.8	216.8	0.00119	0.00461	342.9	425.4	82.5	1.439	1.666	2.756	3.121
92	3379	814.4	234.3	0.00123	0.00427	347.6	423.9	76.3	1.451	1.66	3.072	3.63
94	3519	787.8	255.1	0.00127	0.00392	352.6	421.9	69.3	1.465	1.653	3.567	4.426
96	3664	756.1	280.7	0.00132	0.00356	358.1	419.2	61.1	1.479	1.644	4.46	5.848
98	3815	715.5	315.1	0.0014	0.00317	364.5	415.1	50.6	1.496	1.632	6.574	9.14
100	3972	651.2	373	0.00154	0.00268	373.3	407.7	34.4	1.519	1.611	17.59	25.35

R-134a thermodynamic properties (pressure standard)

Pressure (kPa)	Temperature (°C)	Density (kg/m ³)		Specific volume (m ³ /kg)		Specific enthalpy (kJ/kg)			Specific entropy (kJ/kg/K)		Constant pressure specific heat (kJ/kgK)	
		Liquid	Steam	Liquid	Steam	Liquid	Steam	Latent heat	Liquid	Steam	Liquid	Steam
20	-56.41	1464	1.148	0.00068	0.8708	127.8	363.6	235.8	0.7051	1.793	1.228	0.702
40	-44.6	1431	2.197	0.0007	0.4551	142.4	371.1	228.7	0.7707	1.771	1.247	0.7352
60	-36.93	1409	3.213	0.00071	0.3112	152	375.9	223.9	0.812	1.76	1.26	0.7585
80	-31.12	1392	4.21	0.00072	0.2376	159.4	379.6	220.2	0.8428	1.753	1.271	0.7772
100	-26.36	1378	5.193	0.00073	0.1926	165.4	382.6	217.2	0.8676	1.747	1.28	0.7932
101.325	-26.07	1377	5.258	0.00073	0.1902	165.8	382.8	217	0.869	1.747	1.281	0.7942
150	-17.13	1349	7.617	0.00074	0.1313	177.4	388.3	210.9	0.9148	1.739	1.299	0.8265
200	-10.08	1327	10.01	0.00075	0.09988	186.6	392.6	206	0.9503	1.733	1.315	0.854
250	-4.28	1309	12.39	0.00076	0.08069	194.3	396.1	201.8	0.979	1.73	1.33	0.8783
300	0.67	1293	14.77	0.00077	0.0677	200.9	399	198.1	1.003	1.727	1.343	0.9003
350	5.03	1278	17.15	0.00078	0.05832	206.8	401.5	194.7	1.024	1.724	1.355	0.9207
400	8.93	1265	19.53	0.00079	0.05121	212.1	403.7	191.6	1.043	1.723	1.367	0.94
450	12.48	1252	21.92	0.0008	0.04562	217	405.7	188.7	1.06	1.721	1.378	0.9584
500	15.73	1241	24.32	0.00081	0.04112	221.5	407.5	186	1.076	1.72	1.389	0.9761
550	18.75	1230	26.73	0.00081	0.03741	225.7	409.1	183.4	1.09	1.719	1.4	0.9933
600	21.57	1220	29.15	0.00082	0.0343	229.7	410.6	180.9	1.104	1.717	1.411	1.01
650	24.22	1210	31.6	0.00083	0.03165	233.4	411.9	178.5	1.116	1.717	1.421	1.027
700	26.71	1200	34.05	0.00083	0.02937	237	413.2	176.2	1.128	1.716	1.432	1.043
750	29.08	1191	36.53	0.00084	0.02737	240.4	414.4	174	1.139	1.715	1.442	1.059
800	31.33	1182	39.03	0.00085	0.02562	243.6	415.5	171.9	1.15	1.714	1.453	1.075
850	33.47	1174	41.54	0.00085	0.02407	246.8	416.5	169.7	1.16	1.713	1.463	1.091
900	35.53	1165	44.08	0.00086	0.02269	249.8	417.4	167.6	1.169	1.713	1.474	1.107
950	37.5	1157	46.64	0.00086	0.02144	252.7	418.3	165.6	1.179	1.712	1.484	1.123
1000	39.39	1149	49.22	0.00087	0.02032	255.5	419.2	163.7	1.188	1.711	1.495	1.139
1200	46.31	1119	59.81	0.00089	0.01672	265.9	422	156.1	1.22	1.709	1.539	1.205
1400	52.42	1091	70.87	0.00092	0.01411	275.4	424.3	148.9	1.249	1.706	1.586	1.276
1600	57.91	1064	82.46	0.00094	0.01213	284.1	426	141.9	1.275	1.704	1.637	1.353
1800	62.9	1037	94.68	0.00096	0.01056	292.3	427.4	135.1	1.299	1.701	1.695	1.439
2000	67.48	1011	107.6	0.00099	0.00929	300	428.3	128.3	1.321	1.698	1.761	1.539
2200	71.73	985.5	121.4	0.00101	0.00824	307.3	428.8	121.5	1.342	1.694	1.837	1.657
2400	75.69	959.4	136.2	0.00104	0.00734	314.4	429	114.6	1.362	1.69	1.929	1.799
2600	79.41	932.7	152.3	0.00107	0.00657	321.3	428.9	107.6	1.381	1.686	2.043	1.978
2800	82.9	905.2	169.8	0.0011	0.00589	328	428.3	100.3	1.399	1.681	2.19	2.21
3000	86.2	876.2	189.3	0.00114	0.00528	334.7	427.3	92.6	1.417	1.675	2.388	2.527
3200	89.33	845.1	211.4	0.00118	0.00473	341.4	425.8	84.4	1.435	1.668	2.674	2.989
3400	92.3	810.7	237.2	0.00123	0.00422	348.3	423.7	75.4	1.453	1.659	3.132	3.726
3600	95.12	770.8	268.7	0.0013	0.00372	355.6	420.5	64.9	1.472	1.649	3.992	5.105
3800	97.8	720.2	311.1	0.00139	0.00321	363.8	415.6	51.8	1.494	1.634	6.243	8.632
4000	100.3	632.9	390.2	0.00158	0.00256	375.6	405.4	29.8	1.525	1.605	26.33	37.63