

**Table Thermodynamique R 413A**

	Liquide	Vapeur	Liquide	Vapeur	Liquide	Vapeur	Liquide	Vapeur
Temperature	Pression	Pression	Densité	Densité	Enthalpie	Enthalpie	Entropie	Entropie
(°C)	(bar abs)	(bar abs)	(Kg/M <sup>3</sup> )	(Kg/M <sup>3</sup> )	(KJ/Kg)	(KJ/Kg)	(KJ/Kg-K)	(KJ/Kg-K)
-60	0.27094	0.17564	1426.9	1.0434	123.37	348.85	0.68494	1.7528
-59	0.28646	0.18734	1424.2	1.1084	124.59	349.5	0.69064	1.7508
-58	0.3027	0.19968	1421.4	1.1766	125.81	350.15	0.69631	1.7488
-57	0.3197	0.21268	1418.6	1.2482	127.03	350.79	0.70197	1.7468
-56	0.33748	0.22637	1415.8	1.3233	128.26	351.44	0.70761	1.7449
-55	0.35606	0.24077	1413.1	1.4019	129.48	352.09	0.71324	1.743
-54	0.37548	0.25592	1410.3	1.4844	130.71	352.74	0.71884	1.7411
-53	0.39576	0.27183	1407.5	1.5707	131.94	353.39	0.72443	1.7393
-52	0.41694	0.28855	1404.7	1.6609	133.17	354.04	0.73	1.7376
-51	0.43904	0.30609	1401.9	1.7553	134.4	354.68	0.73555	1.7359
-50	0.46208	0.3245	1399	1.854	135.63	355.33	0.74108	1.7342
-49	0.48611	0.34379	1396.2	1.9571	136.87	355.98	0.7466	1.7326
-48	0.51116	0.36401	1393.4	2.0647	138.11	356.63	0.7521	1.731
-47	0.53724	0.38519	1390.6	2.1771	139.35	357.28	0.75758	1.7295
-46	0.5644	0.40735	1387.7	2.2942	140.59	357.93	0.76305	1.728
-45	0.59267	0.43053	1384.9	2.4164	141.83	358.58	0.7685	1.7265
-44	0.62208	0.45476	1382	2.5437	143.07	359.23	0.77393	1.725
-43	0.65266	0.48009	1379.2	2.6763	144.32	359.88	0.77935	1.7236
-42	0.68446	0.50654	1376.3	2.8143	145.57	360.53	0.78475	1.7223
-41	0.7175	0.53415	1373.4	2.958	146.82	361.17	0.79014	1.7209
-40	0.75181	0.56296	1370.5	3.1074	148.07	361.82	0.79551	1.7196
-39	0.78745	0.59301	1367.6	3.2628	149.33	362.47	0.80087	1.7184
-38	0.82443	0.62433	1364.7	3.4244	150.58	363.12	0.80621	1.7171
-37	0.8628	0.65695	1361.8	3.5922	151.84	363.76	0.81154	1.7159
-36	0.9026	0.69093	1358.9	3.7664	153.1	364.41	0.81685	1.7148
-35	0.94386	0.7263	1356	3.9473	154.36	365.05	0.82215	1.7136
-34	0.98662	0.7631	1353.1	4.1351	155.63	365.7	0.82744	1.7125
-33	1.0309	0.80137	1350.1	4.3298	156.89	366.34	0.83271	1.7114
-32	1.0768	0.84115	1347.2	4.5318	158.16	366.99	0.83796	1.7104
-31	1.1243	0.88249	1344.2	4.7411	159.43	367.63	0.84321	1.7093
-30	1.1735	0.92542	1341.3	4.9581	160.71	368.27	0.84844	1.7083
-29	1.2244	0.96999	1338.3	5.1828	161.98	368.91	0.85365	1.7074
-28	1.277	1.0162	1335.3	5.4154	163.26	369.55	0.85886	1.7064
-27	1.3314	1.0642	1332.3	5.6563	164.54	370.19	0.86405	1.7055
-26	1.3876	1.114	1329.3	5.9056	165.82	370.83	0.86923	1.7046
-25	1.4457	1.1655	1326.3	6.1634	167.1	371.47	0.87439	1.7037
-24	1.5057	1.219	1323.3	6.4301	168.39	372.11	0.87955	1.7028
-23	1.5677	1.2743	1320.3	6.7058	169.68	372.74	0.88469	1.702
-22	1.6317	1.3316	1317.2	6.9908	170.97	373.37	0.88982	1.7012
-21	1.6977	1.3909	1314.2	7.2853	172.26	374.01	0.89494	1.7004
-20	1.7658	1.4523	1311.1	7.5894	173.56	374.64	0.90004	1.6997
-19	1.836	1.5157	1308	7.9036	174.85	375.27	0.90514	1.6989
-18	1.9085	1.5813	1304.9	8.2279	176.15	375.9	0.91022	1.6982
-17	1.9832	1.6491	1301.8	8.5626	177.46	376.53	0.91529	1.6975
-16	2.0601	1.7192	1298.7	8.908	178.76	377.15	0.92036	1.6968

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(°C)	(bar abs)	(bar abs)	(Kg/M <sup>3</sup> )	(Kg/M <sup>3</sup> )	(KJ/Kg)	(KJ/Kg)	(KJ/Kg-K)	(KJ/Kg-K)
-15	2.1394	1.7915	1295.6	9.2643	180.07	377.78	0.92541	1.6961
-14	2.2211	1.8662	1292.5	9.6318	181.38	378.4	0.93045	1.6955
-13	2.3051	1.9433	1289.3	10.011	182.69	379.02	0.93548	1.6949
-12	2.3917	2.0228	1286.2	10.401	184.01	379.64	0.9405	1.6942
-11	2.4808	2.1049	1283	10.804	185.32	380.26	0.94551	1.6936
-10	2.5724	2.1895	1279.8	11.219	186.64	380.88	0.95051	1.6931
-9	2.6667	2.2767	1276.6	11.646	187.97	381.49	0.9555	1.6925
-8	2.7636	2.3665	1273.4	12.087	189.29	382.1	0.96048	1.692
-7	2.8633	2.4591	1270.2	12.54	190.62	382.71	0.96545	1.6914
-6	2.9657	2.5545	1267	13.007	191.95	383.32	0.97041	1.6909
-5	3.071	2.6527	1263.7	13.487	193.29	383.93	0.97536	1.6904
-4	3.1792	2.7538	1260.5	13.982	194.62	384.53	0.98031	1.6899
-3	3.2902	2.8578	1257.2	14.49	195.96	385.14	0.98524	1.6894
-2	3.4043	2.9648	1253.9	15.014	197.31	385.74	0.99017	1.689
-1	3.5214	3.0748	1250.6	15.552	198.65	386.34	0.99509	1.6885
0	3.6416	3.188	1247.2	16.106	200	386.93	1	1.6881
1	3.765	3.3043	1243.9	16.675	201.35	387.53	1.0049	1.6877
2	3.8915	3.4238	1240.5	17.261	202.71	388.12	1.0098	1.6873
3	4.0214	3.5466	1237.2	17.863	204.06	388.71	1.0147	1.6869
4	4.1545	3.6728	1233.8	18.481	205.42	389.29	1.0196	1.6865
5	4.291	3.8024	1230.4	19.117	206.79	389.88	1.0244	1.6861
6	4.4309	3.9354	1226.9	19.77	208.16	390.46	1.0293	1.6857
7	4.5743	4.0719	1223.5	20.441	209.53	391.03	1.0342	1.6854
8	4.7213	4.212	1220	21.131	210.9	391.61	1.039	1.685
9	4.8718	4.3558	1216.5	21.839	212.28	392.18	1.0439	1.6847
10	5.026	4.5032	1213	22.566	213.66	392.75	1.0487	1.6843
11	5.1839	4.6544	1209.5	23.313	215.04	393.32	1.0535	1.684
12	5.3456	4.8095	1206	24.08	216.43	393.88	1.0584	1.6837
13	5.5111	4.9684	1202.4	24.868	217.82	394.44	1.0632	1.6834
14	5.6805	5.1312	1198.8	25.677	219.22	395	1.068	1.6831
15	5.8539	5.2981	1195.2	26.506	220.61	395.55	1.0728	1.6828
16	6.0313	5.4691	1191.6	27.358	222.02	396.1	1.0776	1.6825
17	6.2127	5.6441	1187.9	28.233	223.42	396.65	1.0824	1.6822
18	6.3983	5.8234	1184.2	29.13	224.83	397.19	1.0872	1.6819
19	6.5881	6.007	1180.5	30.051	226.24	397.73	1.092	1.6816
20	6.7821	6.1949	1176.8	30.997	227.66	398.27	1.0968	1.6814
21	6.9805	6.3871	1173.1	31.967	229.08	398.8	1.1016	1.6811
22	7.1832	6.5839	1169.3	32.962	230.51	399.33	1.1064	1.6808
23	7.3904	6.7852	1165.5	33.983	231.94	399.85	1.1111	1.6806
24	7.6021	6.991	1161.6	35.031	233.37	400.37	1.1159	1.6803
25	7.8184	7.2016	1157.8	36.106	234.81	400.89	1.1207	1.68
26	8.0393	7.4169	1153.9	37.209	236.26	401.4	1.1254	1.6798
27	8.2649	7.6369	1150	38.34	237.7	401.91	1.1302	1.6795
28	8.4953	7.8619	1146	39.501	239.15	402.41	1.135	1.6793
29	8.7305	8.0918	1142.1	40.692	240.61	402.9	1.1397	1.679

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30	8.9706	8.3267	1138	41.914	242.07	403.4	1.1445	1.6788
31	9.2157	8.5666	1134	43.168	243.54	403.88	1.1492	1.6785
32	9.4659	8.8117	1129.9	44.455	245.01	404.37	1.154	1.6783
33	9.7211	9.0621	1125.8	45.774	246.49	404.84	1.1588	1.678
34	9.9815	9.3177	1121.7	47.129	247.97	405.31	1.1635	1.6778
35	10.247	9.5787	1117.5	48.518	249.45	405.78	1.1683	1.6775
36	10.518	9.8452	1113.3	49.944	250.94	406.24	1.173	1.6772
37	10.795	10.117	1109	51.408	252.44	406.69	1.1778	1.677
38	11.076	10.395	1104.7	52.909	253.94	407.14	1.1825	1.6767
39	11.364	10.678	1100.4	54.451	255.45	407.58	1.1873	1.6764
40	11.657	10.967	1096	56.033	256.97	408.02	1.192	1.6761
41	11.955	11.262	1091.6	57.657	258.49	408.44	1.1968	1.6758
42	12.26	11.562	1087.1	59.325	260.01	408.87	1.2016	1.6755
43	12.57	11.869	1082.6	61.037	261.55	409.28	1.2063	1.6752
44	12.886	12.182	1078.1	62.795	263.08	409.69	1.2111	1.6749
45	13.208	12.501	1073.5	64.601	264.63	410.08	1.2159	1.6746
46	13.536	12.826	1068.8	66.456	266.18	410.48	1.2206	1.6743
47	13.87	13.157	1064.1	68.362	267.74	410.86	1.2254	1.6739
48	14.211	13.495	1059.4	70.32	269.31	411.23	1.2302	1.6736
49	14.558	13.839	1054.5	72.333	270.88	411.6	1.235	1.6732
50	14.911	14.19	1049.7	74.402	272.46	411.96	1.2398	1.6728
51	15.27	14.547	1044.7	76.529	274.05	412.3	1.2446	1.6725
52	15.637	14.911	1039.8	78.717	275.65	412.64	1.2494	1.6721
53	16.009	15.282	1034.7	80.968	277.25	412.97	1.2542	1.6716
54	16.389	15.66	1029.6	83.283	278.87	413.28	1.259	1.6712
55	16.775	16.045	1024.4	85.667	280.49	413.59	1.2639	1.6707
56	17.168	16.437	1019.1	88.121	282.12	413.88	1.2687	1.6703
57	17.568	16.836	1013.8	90.649	283.76	414.17	1.2736	1.6698
58	17.975	17.242	1008.4	93.253	285.41	414.44	1.2785	1.6692
59	18.39	17.656	1002.9	95.937	287.07	414.7	1.2833	1.6687
60	18.811	18.078	997.27	98.705	288.74	414.94	1.2882	1.6681
61	19.24	18.506	991.6	101.56	290.42	415.17	1.2931	1.6675
62	19.676	18.943	985.84	104.51	292.11	415.38	1.2981	1.6669
63	20.12	19.387	979.97	107.55	293.81	415.58	1.303	1.6663
64	20.572	19.84	974	110.69	295.53	415.77	1.308	1.6656
65	21.031	20.3	967.93	113.94	297.26	415.93	1.3129	1.6649
66	21.498	20.769	961.74	117.31	299	416.08	1.3179	1.6641
67	21.973	21.245	955.43	120.79	300.76	416.21	1.323	1.6633
68	22.456	21.731	948.99	124.39	302.53	416.32	1.328	1.6625
69	22.947	22.224	942.42	128.13	304.31	416.41	1.3331	1.6616
70	23.447	22.727	935.71	132.01	306.11	416.48	1.3382	1.6606
71	23.955	23.238	928.84	136.03	307.93	416.52	1.3433	1.6597
72	24.471	23.758	921.81	140.22	309.77	416.54	1.3485	1.6586
73	24.996	24.287	914.6	144.58	311.63	416.53	1.3537	1.6575
74	25.53	24.826	907.21	149.12	313.5	416.49	1.3589	1.6563

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75	26.073	25.373	899.61	153.85	315.4	416.42	1.3642	1.6551
76	26.625	25.931	891.79	158.8	317.32	416.32	1.3696	1.6538
77	27.186	26.498	883.74	163.98	319.27	416.18	1.375	1.6524
78	27.756	27.075	875.42	169.41	321.25	416	1.3804	1.6509
79	28.336	27.663	866.83	175.11	323.25	415.78	1.3859	1.6493
80	28.926	28.26	857.91	181.12	325.29	415.51	1.3915	1.6476