

Table 2. Unsmoothed corrected experimental points for density determinations of molten potassium chloride.

P/bar	T/°C	ρ/gcm^{-3}	P/bar	T/°C	ρ/gcm^{-3}	P/bar	T/°C	ρ/gcm^{-3}	P/bar	T/°C	ρ/gcm^{-3}
1	958.2	1.4180	485	980.0	1.4379	877	981.0	1.4606	526	911.5	1.4772
136	978.0	1.4166	631	1000.0	1.4363	768	967.0	1.4616	684	930.0	1.4758
244	992.5	1.4155	733	1013.5	1.4353	625	949.5	1.4630	950	963.5	1.4731
348	1008.5	1.4143	846	1029.0	1.4340	460	929.0	1.4646	1119	983.5	1.4714
476	1025.5	1.4130	943	1042.5	1.4329	1	852.3	1.4797	1334	1010.5	1.4692
897	1038.5	1.4138	824	1034.5	1.4321	274	899.0	1.4775	1206	995.0	1.4705
308	1002.0	1.4148	1006	1050.0	1.4323	441	905.5	1.4759	1058	977.5	1.4719
218	988.5	1.4158	899	1038.5	1.4332	596	924.0	1.4744	915	960.0	1.4733
96	971.0	1.4171	1	870.9	1.4689	752	943.5	1.4729	773	941.5	1.4749
278	997.0	1.4152	157	889.0	1.4676	882	958.5	1.4717	620	922.0	1.4764
447	1021.0	1.4134	304	907.0	1.4663	1028	977.0	1.4702	508	909.5	1.4774
589	1041.5	1.4118	413	921.5	1.4652	840	953.5	1.4721	394	895.5	1.4785
750	1065.5	1.4099	546	938.5	1.4639	701	936.5	1.4734	287	882.5	1.4794
659	1051.5	1.4110	852	978.0	1.4608	530	916.5	1.4750	186	870.5	1.4803
541	1034.0	1.4124	970	994.0	1.4594	378	896.5	1.4766	112	862.0	1.4809
305	999.0	1.4151	830	975.0	1.4610	217	877.5	1.4780	73	857.5	1.4812
1	916.0	1.4426	710	960.0	1.4622	79	863.5	1.4789	41	854.5	1.4814
261	950.5	1.4401	611	947.5	1.4632	61	862.5	1.4790	1	841.5	1.4860
402	967.5	1.4389	518	934.5	1.4642	354	894.5	1.4767	550	906.0	1.4813
536	986.5	1.4374	342	912.0	1.4660	534	917.0	1.4750	710	926.0	1.4797
658	1002.5	1.4362	236	899.5	1.4659	679	934.0	1.4736	895	949.0	1.4776
779	1022.0	1.4346	147	888.5	1.4677	860	955.0	1.4720	1058	968.0	1.4763
708	1010.5	1.4355	63	879.0	1.4683	1027	979.5	1.4699	1201	986.0	1.4748
622	1000.5	1.4363	313	909.0	1.4662	1156	994.0	1.4687	1106	974.0	1.4758
509	984.0	1.4376	473	930.0	1.4646	1265	1009.0	1.4675	964	957.0	1.4772
425	972.5	1.4385	638	950.0	1.4630	1486	1036.0	1.4652	815	940.0	1.4786
247	958.5	1.4395	824	973.5	1.4613	1338	1016.0	1.4669	660	921.0	1.4801
105	942.5	1.4407	935	988.0	1.4599	1203	995.5	1.4683	510	902.5	1.4816
231	933.5	1.4413	1066	1005.5	1.4585	1067	983.5	1.4696	373	884.0	1.4830
90	929.0	1.4417	1220	1026.0	1.4568	912	964.0	1.4712	247	869.0	1.4841
49	923.5	1.4420	1393	1049.5	1.4548	1	848.7	1.4818	154	859.0	1.4848
109	932.5	1.4414	1305	1036.0	1.4560	106	862.0	1.4809	83	850.5	1.4854
183	941.5	1.4408	1142	1015.5	1.4577	245	878.0	1.4798	209	865.0	1.4844
302	956.0	1.4397	1000	997.0	1.4592	410	897.5	1.4783	317	879.0	1.4834
448	984.0	1.4822	1313	971.5	1.4874	702	851.5	1.5184	1125	906.5	1.5110
600	913.5	1.4807	1450	987.0	1.4861	522	831.5	1.5200	1288	925.0	1.5095
748	931.5	1.4793	1600	1005.5	1.4845	257	801.0	1.5223	1161	910.0	1.5107
919	952.5	1.4775	1749	1025.0	1.4829	42	779.5	1.5238	1042	895.0	1.5122
1088	972.5	1.4759	1858	1038.5	1.4818	108	787.0	1.5232	905	879.5	1.5134
1230	991.0	1.4744	1790	1031.0	1.4824	212	797.5	1.5225	1294	879.0	1.5328
1380	1008.5	1.4729	1696	1019.0	1.4834	547	834.5	1.5175	1156	863.5	1.5341
1513	1024.0	1.4716	1705	1018.0	1.4835	803	862.5	1.5175	1005	847.0	1.5357
1639	1039.5	1.4703	1632	1010.0	1.4841	1078	893.0	1.5150	864	830.0	1.5371
1620	1038.0	1.4705	1510	995.0	1.4854	1329	921.5	1.5126	719	813.5	1.5381
1561	1030.5	1.4711	1404	982.0	1.4865	1510	943.0	1.5107	555	795.5	1.5386
1447	1016.0	1.4723	1235	960.0	1.4883	1736	968.5	1.5086	659	809.0	1.5381
1439	1015.5	1.4723	1072	940.5	1.4900	1950	994.5	1.5064	807	826.0	1.5373
1317	999.5	1.4737	1	811.0	1.5038	2195	1023.5	1.5041	951	841.5	1.5361
1146	977.5	1.4755	171	829.5	1.5025	2426	1050.5	1.5021	1099	857.5	1.5346
1	818.7	1.4993	393	854.5	1.5007	2300	1037.0	1.5031	1243	873.5	1.5333
449	870.0	1.4956	585	875.5	1.4991	2196	1025.0	1.5040	1411	893.5	1.5311
593	887.0	1.4943	730	892.5	1.4977	2087	1009.0	1.5053	1564	910.5	1.5291
736	904.5	1.4929	816	903.0	1.4969	1910	990.5	1.5068	1663	920.5	1.5281
894	923.5	1.4913	682	887.5	1.4981	1799	975.5	1.5080	1824	940.5	1.5259
1049	942.5	1.4898	542	872.5	1.4993	1504	942.0	1.5108	1989	960.5	1.5237
1205	961.5	1.4882	443	860.0	1.5003	180	811.5	1.5137	2177	983.0	1.5215
1354	978.0	1.4868	343	848.0	1.5012	292	820.5	1.5148	2080	968.5	1.5229
1254	965.5	1.4878	223	835.5	1.5021	458	833.5	1.5153	1941	950.5	1.5249
1128	951.5	1.4890	1	776.5	1.5238	604	848.5	1.5150	1792	933.5	1.5267
973	933.0	1.4905	133	790.5	1.5230	773	867.0	1.5141	1477	879.0	1.5401
829	914.0	1.4921	338	812.0	1.5214	941	887.0	1.5128	1673	900.0	1.5381
686	897.0	1.4935	451	824.0	1.5205	855	875.5	1.5137	1647	916.5	1.5364
544	879.5	1.4949	577	839.0	1.5193	716	858.5	1.5148	1569	889.0	1.5391
421	866.0	1.4959	754	857.0	1.5179	568	842.0	1.5155	1383	870.0	1.5408
331	855.0	1.4968	961	879.5	1.5161	415	828.5	1.5156	1178	848.0	1.5428
222	843.0	1.4976	1152	902.0	1.5142	320	820.5	1.5156	967	825.0	1.5446
124	831.5	1.4985	1510	943.0	1.5107	205	810.5	1.5147	729	800.0	1.5464
72	826.0	1.4988	1826	980.0	1.5076	96	801.0	1.5139	1058	834.5	1.5439
201	840.5	1.4978	1732	968.0	1.5086	256	815.5	1.5146	1426	874.5	1.5405
370	861.5	1.4962	1607	953.0	1.5099	373	825.0	1.5153	1763	909.5	1.5372
502	876.5	1.4951	1445	931.5	1.5117	521	838.5	1.5155	1970	931.5	1.5351
715	900.5	1.4932	1298	917.5	1.5129	679	854.5	1.5144	2160	952.5	1.5329
914	923.5	1.4914	1088	894.0	1.5149	818	871.5	1.5140	2386	980.0	1.5304
1125	948.5	1.4893	872	869.5	1.5169	976	890.0	1.5125	2555	1000.5	1.5285
2776	1028.5	1.5263	2652	965.0	1.5493	2838	921.5	1.5741	4646	964.0	1.6153
2641	1009.5	1.5278	2873	925.5	1.5468	3071	947.5	1.5717	4567	955.5	1.6160
953	796.0	1.5580	3138	1025.5	1.5439	3287	971.0	1.5696	4389	935.5	1.6179
1104	813.0	1.5563	3286	1044.0	1.5422	3475	993.5	1.5675	4155	911.0	1.6202
1265	830.0	1.5549	3169	1027.0	1.5437	3671	1016.5	1.5654	4804	921.0	1.6352
1409	846.0	1.5530	3080	1017.0	1.5446	3953	1049.5	1.5625	4469	885.0	1.6386
1576	863.5	1.5510	2969	1002.0	1.5460	3817	1031.5	1.5641	4319	875.0	1.6396
1768	885.0	1.5487	2780	979.0	1.5480	3708	1018.0	1.5653	4583	899.0	1.6373
1585	863.5	1.5510	2585	954.5	1.5503	3573	1002.5	1.5667	4788	918.5	1.6354
1445	849.0	1.5528	2410	935.5	1.5520	3027	899.0	1.5689	4929	934.5	1.6339
1300	833.5	1.5543	2438	900.0	1.5681	3429	944.0	1.5847	5146	957.0	1.6318
1185	820.0	1.5557	2208	876.0	1.5704	3615	964.5	1.5828	5356	981.5	1.6295
1002	799.0	1.5577	1975	849.5	1.5728	3860	993.5	1.5802	5562	1003.5	1.6275
1000	799.0	1.5577	1723	822.5	1.5753	4064	1017.5	1.5780	5748	1023.5	1.6256
1143	815.0	1.5561	1847	837.5	1.5739	4208	1035.5	1.5764	6028	1055.5	1.6227
1336	836.0	1.5541	2025	856.5	1.5722	4081	1021.0	1.5777			
1506	856.5	1.5519	2164	871.5	1.5709	3948	1004.0	1.5792			
1685	877.5	1.5496	2359	893.5	1.5687	3744	980.5	1.5814			
1835	894.5	1.5476	2580	918.0	1.5665	3531	955.5	1.5837			
2007	913.5	1.5456	2769	938.5	1.5646	3320	931.5	1.5859			
1892	899.5	1.5470	2976	961.5	1.5625	3110	907.0	1.5882			
1720	881.5	1.5493	3174	985.0	1.5604	2900	884.0	1.5903			
1600	867.5	1.5507	3378	1007.5	1.5584	2668	858.5	1.5927			
1434	848.5	1.5528	3630	1038.0	1.5566	3637	920.0	1.6007			
1286	833.0	1.5544	3521	1024.0	1.5569	3443	899.5	1.6026			
1169	820.0	1.5557	3388	1008.0	1.5583	3252	879.0	1.6045			

in Fig. 5 in comparison with data from the literature¹⁵⁻²⁶ which show considerable discrepancies.

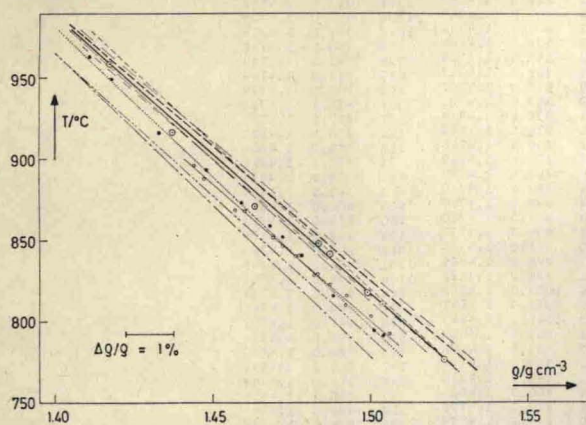


Fig. 5. Density of molten potassium chloride as a function of temperature at 1 bar. — Grjotheim et al. (1971)¹⁵, — Kirshenbaum et al. (1962)¹⁶, ●····· Neithamer and Peake (1961)¹⁷, — Van Artsdalen and Yaffe (1955)¹⁸, ○ Peake and Bothwell (1954)²⁰, —····· Bloom et al. (1953)²¹, —····· Mashovetz and Lundina (1935)²², —····· Klemm (1926)²³, —····· Jäger (1917)²⁵, —····· Brunner (1904)²⁶, ⊙ This work.

Our extrapolated values, with the exception of two, agree to better than 0.1% with the data of Van Artsdalen and Yaffe^{18, 19}. A linear fit of our extrapolated densities as a function of temperature is almost identical with that of Yaffe and Van Artsdalen¹⁹ and may be expressed as

$$\rho_0(T) = \rho_{0YA}(T) = 1.9767 - 0.5831 \cdot 10^{-3} t.$$

The good agreement with the accurate values of Van Artsdalen and Yaffe points out that our smoothed values at 1 bar pressure are accurate to about 0.1% rather than 0.28% as noted in the second last line of Table 1 and that the error limits of the high-pressure density values can be changed to the numbers given in the last line of Table 1, if the densities are based on the smoothed values at 1 bar rather than being regarded as absolute values.

The corrected experimental density values are fitted by an equation of state (modified Tait-equation) with temperature and pressure as independent variables with a standard deviation of 0.04% in density. The smoothed data are reported in Table 3.

Table 3. Smoothed density values in g/cm³ for molten potassium chloride.

T/°C P/bar	800	825	850	875	900	925	950	975	1000	1025	1050
1	1.510	1.496	1.481	1.467	1.452	1.437	1.423	1.408	1.394	1.379	1.364
250	1.523	1.509	1.495	1.481	1.468	1.454	1.440	1.426	1.412	1.398	1.384
500	1.536	1.522	1.509	1.495	1.482	1.469	1.455	1.442	1.428	1.415	1.402
750	1.547	1.534	1.521	1.508	1.495	1.482	1.469	1.457	1.444	1.431	1.418
1000	1.558	1.546	1.533	1.520	1.508	1.495	1.483	1.470	1.458	1.445	1.432
1250		1.556	1.544	1.532	1.519	1.507	1.495	1.483	1.471	1.459	1.446
1500		1.566	1.554	1.542	1.530	1.519	1.507	1.495	1.483	1.471	1.459
1750		1.576	1.564	1.552	1.541	1.529	1.518	1.506	1.495	1.483	1.472
2000		1.585	1.573	1.562	1.551	1.540	1.529	1.517	1.506	1.495	1.483
2250		1.594	1.583	1.572	1.561	1.550	1.540	1.528	1.518	1.506	1.495
2500			1.592	1.581	1.571	1.560	1.550	1.539	1.528	1.517	1.506
2750			1.600	1.590	1.580	1.569	1.559	1.548	1.538	1.527	1.517
3000			1.608	1.598	1.588	1.578	1.568	1.558	1.547	1.537	1.527
3250			1.616	1.606	1.596	1.587	1.577	1.567	1.557	1.547	1.536
3500			1.624	1.614	1.604	1.595	1.585	1.575	1.566	1.556	1.546
3750			1.631	1.622	1.612	1.603	1.593	1.584	1.574	1.564	1.555
4000			1.638	1.629	1.620	1.610	1.601	1.592	1.582	1.573	1.563
4250				1.636	1.627	1.618	1.609	1.600	1.590	1.581	1.572
4500				1.643	1.634	1.625	1.616	1.607	1.598	1.589	1.580
4750				1.649	1.641	1.632	1.623	1.615	1.606	1.597	1.588
5000				1.656	1.647	1.639	1.630	1.622	1.613	1.605	1.596
5250				1.662	1.654	1.646	1.637	1.629	1.621	1.612	1.603
5500				1.668	1.660	1.652	1.644	1.636	1.628	1.619	1.611
5750					1.666	1.659	1.651	1.643	1.634	1.626	1.618
6000					1.673	1.665	1.657	1.649	1.641	1.633	1.625