

DENSITY OF MOLTEN ELEMENTS AND REPRESENTATIVE SALTS

This table lists the liquid density at the melting point, ρ_m , for elements that are solid at room temperature, as well as for some representative salts of these elements. Densities at higher temperatures (up to the t_{\max} given in the last column) may be estimated from the equation

$$\rho(t) = \rho_m - k(t - t_m)$$

where t_m is the melting point and k is given in the fifth column of the table. If a value of t_{\max} is not given, the equation should not be used to extrapolate more than about 20°C beyond the melting point.

Data for the elements were selected from the primary literature; the assistance of Gernot Lang in compiling these data is gratefully acknowledged. The molten salt data were derived from Reference 1.

References

1. Janz, G. J., Thermodynamic and Transport Properties of Molten Salts: Correlation Equations for Critically Evaluated Density, Surface Tension, Electrical Conductance, and Viscosity Data, *J. Phys. Chem. Ref. Data*, 17, Suppl. 2, 1988.
2. Nasch, P. M., and Steinemann, S. G., *Phys. Chem. Liq.*, 29, 43, 1995.

Formula	Name	$t_m/^\circ\text{C}$	$\rho_m/\text{g cm}^{-3}$	$k/\text{g cm}^{-3} \text{ }^\circ\text{C}^{-1}$	t_{\max}
Ag	Silver	961.78	9.320	0.0009	1500
AgBr	Silver(I) bromide	430	5.577	0.001035	667
AgCl	Silver(I) chloride	455	4.83	0.00094	627
AgI	Silver(I) iodide	558	5.58	0.00101	802
AgNO ₃	Silver(I) nitrate	210	3.970	0.001098	360
Ag ₂ SO ₄	Silver(I) sulfate	660	4.84	0.001089	770
Al	Aluminum	660.32	2.375	0.000233	1340
AlBr ₃	Aluminum bromide	97.5	2.647	0.002435	267
AlCl ₃	Aluminum chloride	192.6	1.302	0.002711	296
AlI ₃	Aluminum iodide	188.32	3.223	0.0025	240
As	Arsenic	817	5.22	0.000544	
Au	Gold	1064.18	17.31	0.001343	1200
B	Boron	2075	2.08		
Ba	Barium	727	3.338	0.000299	1550
BaBr ₂	Barium bromide	857	3.991	0.000924	900
BaCl ₂	Barium chloride	961	3.174	0.000681	1081
BaF ₂	Barium fluoride	1368	4.14	0.000999	1727
BaI ₂	Barium iodide	711	4.26	0.000977	975
Be	Beryllium	1287	1.690	0.00011	
BeCl ₂	Beryllium chloride	415	1.54	0.0011	473
BeF ₂	Beryllium fluoride	552	1.96	0.000015	850
Bi	Bismuth	271.406	10.05	0.00135	800
BiBr ₃	Bismuth bromide	219	4.76	0.002637	927
BiCl ₃	Bismuth chloride	234	3.916	0.0023	350
Ca	Calcium	842	1.378	0.000230	1484
CaBr ₂	Calcium bromide	742	3.111	0.0005	791
CaCl ₂	Calcium chloride	775	2.085	0.000422	950
CaF ₂	Calcium fluoride	1418	2.52	0.000391	2027
CaI ₂	Calcium iodide	783	3.443	0.000751	1028
Cd	Cadmium	321.069	7.996	0.001218	500
CdBr ₂	Cadmium bromide	568	4.075	0.00108	720
CdCl ₂	Cadmium chloride	568	3.392	0.00082	807
CdI ₂	Cadmium iodide	388	4.396	0.001117	700
Ce	Cerium	799	6.55	0.000710	1460
CeCl ₃	Cerium(III) chloride	807	3.25	0.00092	950
CeF ₃	Cerium(III) fluoride	1430	4.659	0.000936	1927
Co	Cobalt	1495	7.75	0.00165	1580
Cr	Chromium	1907	6.3	0.0011	2100
Cs	Cesium	28.44	1.843	0.000556	510
CsBr	Cesium bromide	636	3.133	0.001223	860
CsCl	Cesium chloride	646	2.79	0.001065	906
CsF	Cesium fluoride	703	3.649	0.001282	912
CsI	Cesium iodide	632	3.197	0.001183	907
CsNO ₃	Cesium nitrate	409	2.820	0.001166	491
Cs ₂ SO ₄	Cesium sulfate	1005	3.1	0.00095	1530
Cu	Copper	1084.62	8.02	0.000609	1630
CuCl	Copper(I) chloride	423	3.692	0.00076	585

Formula	Name	$t_m/^\circ\text{C}$	$\rho_m/\text{g cm}^{-3}$	$k/\text{g cm}^{-3} \text{ }^\circ\text{C}^{-1}$	t_{max}
Dy	Dysprosium	1411	8.37	0.00143	1540
DyCl ₃	Dysprosium(III) chloride	718	3.62	0.00068	987
Er	Erbium	1529	8.86	0.00157	1700
Eu	Europium	822	5.13	0.0028	980
Fe	Iron	1538	6.98	0.000572	1680
FeCl ₂	Iron(II) chloride	677	2.348	0.000555	877
Ga	Gallium	29.7666	6.08	0.00062	400
GaBr ₃	Gallium(III) bromide	123	3.116	0.00246	135
GaCl ₃	Gallium(III) chloride	77.9	2.053	0.002083	141
GaI ₃	Gallium(III) iodide	212	3.630	0.002377	252
Gd	Gadolinium	1314	7.4		
GdCl ₃	Gadolinium(III) chloride	602	3.56	0.000671	1007
GdI ₃	Gadolinium(III) iodide	930	4.12	0.000908	1032
Ge	Germanium	938.25	5.60	0.00055	1600
Hf	Hafnium	2233	12		
HgBr ₂	Mercury(II) bromide	241	5.126	0.003233	319
HgCl ₂	Mercury(II) chloride	277	4.368	0.002862	304
HgI ₂	Mercury(II) iodide	256	5.222	0.003235	354
Ho	Holmium	1472	8.34		
In	Indium	156.60	7.02	0.000836	500
InBr ₃	Indium(III) bromide	420	3.121	0.0015	528
InCl ₃	Indium(III) chloride	583	2.140	0.0021	666
InI ₃	Indium(III) iodide	207	3.820	0.0015	360
Ir	Iridium	2446	19		
K	Potassium	63.38	0.828	0.000232	500
KBr	Potassium bromide	734	2.127	0.000825	930
KCl	Potassium chloride	771	1.527	0.000583	939
KF	Potassium fluoride	858	1.910	0.000651	1037
KI	Potassium iodide	681	2.448	0.000956	904
KNO ₃	Potassium nitrate	334	1.865	0.000723	457
La	Lanthanum	920	5.94	0.00061	1600
LaBr ₃	Lanthanum bromide	788	4.933	0.000096	912
LaCl ₃	Lanthanum chloride	858	3.209	0.000777	973
LaF ₃	Lanthanum fluoride	1493	4.589	0.000682	2177
LaI ₃	Lanthanum iodide	778	4.29	0.001110	907
Li	Lithium	180.5	0.512	0.00052	285
LiBr	Lithium bromide	550	2.528	0.000652	739
LiCl	Lithium chloride	610	1.502	0.000432	781
LiF	Lithium fluoride	848.2	1.81	0.000490	1047
LiI	Lithium iodide	469	3.109	0.000917	667
LiNO ₃	Lithium nitrate	253	1.781	0.000546	441
Li ₂ SO ₄	Lithium sulfate	860	2.003	0.000407	1214
Lu	Lutetium	1663	9.3		
Mg	Magnesium	650	1.584	0.000234	900
MgBr ₂	Magnesium bromide	711	2.62	0.000478	935
MgCl ₂	Magnesium chloride	714	1.68	0.000271	826
MgI ₂	Magnesium iodide	634	3.05	0.000651	888
Mn	Manganese	1246	5.95	0.00105	1590
MnCl ₂	Manganese(II) chloride	650	2.353	0.000437	850
Mo	Molybdenum	2623	9.33		
Na	Sodium	97.794	0.927	0.00023	600
NaBr	Sodium bromide	747	2.342	0.000816	945
Na ₂ CO ₃	Sodium carbonate	856	1.972	0.000448	1004
NaCl	Sodium chloride	800.7	1.556	0.000543	1027
NaF	Sodium fluoride	996	1.948	0.000636	1097
NaI	Sodium iodide	661	2.742	0.000949	912
NaNO ₃	Sodium nitrate	306.5	1.90	0.000715	370
Na ₂ SO ₄	Sodium sulfate	884	2.069	0.000483	1077
Nd	Neodymium	1016	6.89	0.00076	1350
Ni	Nickel	1455	7.81	0.000726	1700
NiCl ₂	Nickel(II) chloride	1031	2.653	0.00066	1057
Os	Osmium	3033	20		
Pb	Lead	327.462	10.66	0.00122	700
PbBr ₂	Lead(II) bromide	371	5.73	0.00165	600
PbCl ₂	Lead(II) chloride	501	4.951	0.0015	710

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PbI ₂	Lead(II) iodide	410	5.691	0.001594	697
Pd	Palladium	1554.8	10.38	0.001169	1700
Pr	Praseodymium	931	6.50	0.00093	1460
PrCl ₃	Praseodymium chloride	786	3.23	0.00074	977
Pt	Platinum	1768.2	19.77	0.0024	2200
Pu	Plutonium	640	16.63	0.001419	950
Rb	Rubidium	39.31	1.46	0.000451	800
RbBr	Rubidium bromide	692	2.715	0.001072	907
Rb ₂ CO ₃	Rubidium carbonate	837	2.84	0.000640	1007
RbCl	Rubidium chloride	724	2.248	0.000883	923
RbF	Rubidium fluoride	795	2.87	0.00102	1067
RbI	Rubidium iodide	656	2.904	0.001143	902
RbNO ₃	Rubidium nitrate	310	2.519	0.001068	417
Rb ₂ SO ₄	Rubidium sulfate	1066	2.56	0.000665	1545
Re	Rhenium	3185	18.9		
Rh	Rhodium	1964	10.7	0.000895	2200
Ru	Ruthenium	2334	10.65		
S	Sulfur	115.21	1.819	0.00080	160
Sb	Antimony	630.628	6.53	0.00067	745
SbCl ₃	Antimony(III) chloride	73.4	2.681	0.002293	77
SbCl ₅	Antimony(V) chloride	4	2.37	0.001869	77
SbI ₃	Antimony(III) iodide	171	4.171	0.002483	322
Sc	Scandium	1541	2.80		
Se	Selenium	220.8	3.99		
Si	Silicon	1414	2.57	0.00036	1500
Sm	Samarium	1072	7.16		
Sn	Tin	231.93	6.99	0.000601	1200
SnCl ₂	Tin(II) chloride	247	3.36	0.001253	480
SnCl ₄	Tin(IV) chloride	-33	2.37	0.002687	138
Sr	Strontium	777	6.980		
SrBr ₂	Strontium bromide	657	3.70	0.000745	1004
SrCl ₂	Strontium chloride	874	2.727	0.000578	1037
SrF ₂	Strontium fluoride	1477	3.470	0.000751	1927
SrI ₂	Strontium iodide	538	4.085	0.000885	1026
Ta	Tantalum	3017	15		
TaCl ₅	Tantalum(V) chloride	216.6	2.700	0.004316	457
Tb	Terbium	1359	7.65		
Te	Tellurium	449.51	5.70	0.00035	600
ThCl ₄	Thorium chloride	770	3.363	0.0014	847
ThF ₄	Thorium fluoride	1110	6.058	0.000759	1378
Ti	Titanium	1668	4.11		
TiCl ₄	Titanium(IV) chloride	-25	1.807	0.001735	137
Tl	Thallium	304	11.22	0.00144	600
TlBr	Thallium(I) bromide	460	5.98	0.001755	647
TlCl	Thallium(I) chloride	431	5.628	0.0018	642
TlI	Thallium(I) iodide	441.8	6.15	0.001761	737
TlNO ₃	Thallium(I) nitrate	206	4.91	0.001873	279
Tl ₂ SO ₄	Thallium(I) sulfate	632	5.62	0.00130	927
Tm	Thulium	1545	8.56	0.00050	1675
U	Uranium	1135	17.3		
UCl ₃	Uranium(III) chloride	837	4.84	0.007943	1057
UCl ₄	Uranium(IV) chloride	590	3.572	0.001945	667
UF ₄	Uranium(IV) fluoride	1036	6.485	0.000992	1341
V	Vanadium	1910	5.5		
W	Tungsten	3422	17.6		
Y	Yttrium	1526	4.24		
YCl ₃	Yttrium chloride	721	2.510	0.0005	845
Yb	Ytterbium	824	6.21		
Zn	Zinc	419.53	6.57	0.0011	700
ZnBr ₂	Zinc bromide	402	3.47	0.000959	602
ZnCl ₂	Zinc chloride	290	2.54	0.00053	557
ZnI ₂	Zinc iodide	450	3.878	0.00136	588
ZnSO ₄	Zinc sulfate	680	3.14	0.00047	987
Zr	Zirconium	1854.7	5.8		
ZrCl ₄	Zirconium chloride	437	1.643	0.007464	492