

Table 1 Properties of Pure Calcium Chloride* Brine

Pure CaCl ₂ % by wt	Specific gravity 60 F	Baumé density 60 F	Specific heat 60 F Btu per lb (°F deg)	Crystallization starts F	Weight per gallon			Weight per cubic foot			Specific Gravity at Various Temperatures (Refers to water at 60 F)			
					CaCl ₂ lb/gal	Water lb/gal	Brine lb/gal	CaCl ₂ lb/cu ft	Water lb/cu ft	Brine lb/cu ft	-4 F -20 C	14 F -10 C	32 F 0 C	50 F 10 C
					CaCl ₂ lb/gal	Water lb/gal	Brine lb/gal	CaCl ₂ lb/cu ft	Water lb/cu ft	Brine lb/cu ft				
0	1.000	0.0	1.000	22.0	0.000	8.34	8.34	0.00	62.40	62.40				
1	1.044	6.1	0.924	27.7	0.426	8.221	8.717	3.28	61.89	65.15			1.043	1.042
2	1.053	7.0	0.914	28.8	0.825	8.234	8.760	3.53	61.59	65.32			1.032	1.031
3	1.060	8.2	0.898	29.9	1.225	8.251	8.811	4.03	61.14	66.14			1.021	1.020
4	1.069	9.3	0.884	30.6	1.618	8.212	8.829	5.34	61.35	66.70			1.071	1.069
5	1.078	10.4	0.869	32.5	2.010	8.191	9.001	6.05	61.22	67.37			1.080	1.078
10	1.087	11.5	0.855	35.3	3.808	8.168	9.076	6.78	61.03	67.83			1.089	1.087
11	1.096	12.6	0.842	36.8	4.202	8.137	9.143	7.12	60.81	68.23			1.098	1.096
12	1.103	13.5	0.829	38.3	4.595	8.120	9.227	8.27	60.68	68.95			1.108	1.105
13	1.114	14.5	0.816	39.8	4.988	8.093	9.302	9.04	60.47	69.51			1.117	1.115
14	1.124	15.5	0.804	41.3	5.381	8.064	9.377	9.51	60.27	70.08			1.127	1.124
15	1.133	16.9	0.793	43.5	5.774	8.034	9.452	10.60	60.04	70.64			1.139	1.137
16	1.143	18.0	0.779	45.3	6.167	8.010	9.526	11.40	59.88	71.26			1.149	1.146
17	1.153	19.1	0.767	47.8	6.560	7.984	9.610	12.22	59.67	71.89			1.159	1.156
18	1.163	20.2	0.756	49.8	6.953	7.956	9.703	13.05	59.48	72.51			1.169	1.166
19	1.172	21.3	0.746	51.8	7.346	7.927	9.796	13.90	59.23	73.13			1.180	1.177
20	1.182	22.1	0.737	53.8	7.739	7.893	9.833	14.73	58.90	73.63			1.190	1.187
21	1.192	23.0	0.729	55.8	8.132	7.863	9.925	15.58	58.61	74.19	1.215	1.211	1.207	1.203
22	1.202	24.4	0.718	57.8	8.525	7.828	10.017	16.40	58.30	74.70	1.226	1.222	1.222	1.218
23	1.212	25.3	0.707	59.8	8.918	7.792	10.120	17.40	58.23	75.63				
24	1.223	26.4	0.699	61.8	9.311	7.761	10.212	18.32	58.00	76.32				
25	1.233	27.4	0.689	63.8	9.704	7.721	10.325	19.24	57.70	76.94				
26	1.244	28.3	0.682	65.8	10.097	7.680	10.437	20.17	57.39	77.50				
27	1.254	29.3	0.673	67.8	10.490	7.644	10.571	21.13	57.12	78.25				
28	1.265	30.4	0.665	69.8	10.883	7.604	10.704	22.09	56.84	78.94				
29	1.276	31.4	0.658	71.8	11.276	7.565	10.838	23.09	56.53	79.62				
30	1.287	32.5	0.651	73.8	11.669	7.525	10.971	24.05	56.20	80.45				
31	1.298	33.0	0.643	75.8	12.062	7.485	11.104	24.96	56.04	81.14				
32	1.310	34.0	0.636	77.8	12.455	7.445	11.237	25.80	55.70	81.84				
33	1.321	35.0	0.629	79.8	12.848	7.405	11.370	26.68	55.35	82.53				

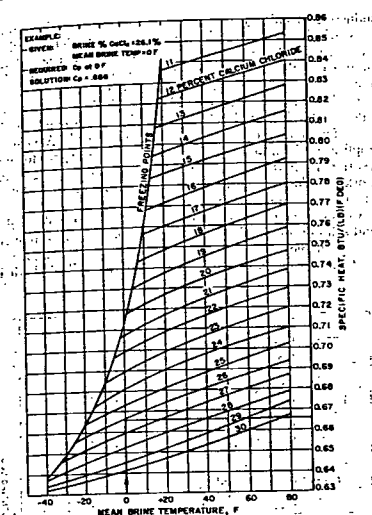
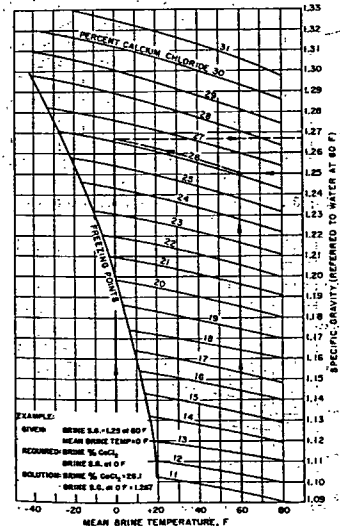
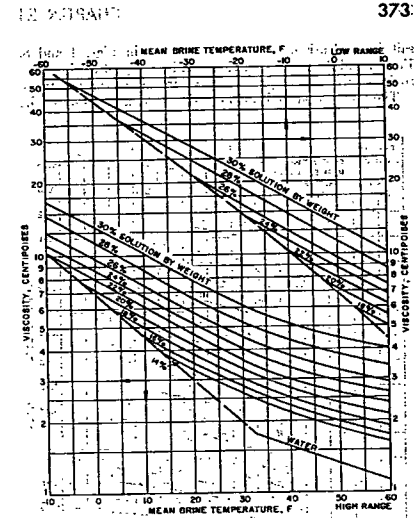
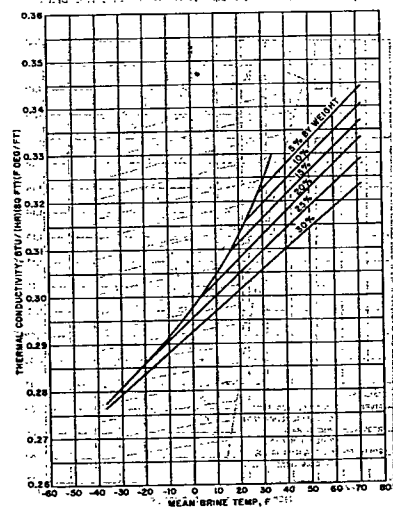
* Wt of Type 1 (77% min.) CaCl₂ = $\frac{\text{wt of pure CaCl}_2}{0.77}$ Wt of Type 2 (94% min.) CaCl₂ = $\frac{\text{wt of pure CaCl}_2}{0.94}$

Table 2 Properties of Pure Sodium Chloride* Brine

Pure NaCl % by wt	Specific gravity 59 F	Baumé density 60 F	Specific heat 59 F Btu per lb (°F deg)	Crystallization starts F	Weight per gallon*			Weight per cubic foot*			Sp. Gravity at Other Temperatures (Refers to water at 60 F)			
					NaCl lb/gal	Water lb/gal	Brine lb/gal	NaCl lb/cu ft	Water lb/cu ft	Brine lb/cu ft	14 F -10 C	32 F 0 C	50 F 10 C	68 F 20 C
					NaCl lb/gal	Water lb/gal	Brine lb/gal	NaCl lb/cu ft	Water lb/cu ft	Brine lb/cu ft				
0	1.000	0.0	1.000	22.0	0.000	8.34	8.34	0.000	62.40	62.40				
1	1.035	5.1	0.938	26.7	0.432	8.22	8.65	3.230	61.37	64.6	1.0382	1.0366	1.0341	
2	1.043	6.1	0.927	25.5	0.823	8.19	8.71	3.906	61.19	65.1	1.0459	1.0440	1.0413	
3	1.050	7.0	0.917	24.3	1.214	8.15	8.76	4.583	60.91	65.5	1.0536	1.0515	1.0489	
4	1.057	8.0	0.907	23.0	1.605	8.11	8.82	5.260	60.72	66.0	1.0613	1.0590	1.0559	
5	1.065	9.0	0.897	21.6	2.000	8.09	8.89	5.935	60.51	66.5	1.0691	1.0665	1.0633	
10	1.072	10.1	0.888	20.2	3.805	8.05	8.95	6.600	60.21	66.9	1.0769	1.0741	1.0707	
11	1.080	10.8	0.879	18.8	4.200	8.03	9.02	7.414	59.99	67.4	1.0849	1.0817	1.0782	
12	1.087	11.5	0.870	17.3	4.595	7.99	9.08	8.136	59.66	67.8	1.0925	1.0897	1.0857	
13	1.095	12.7	0.862	15.7	4.990	7.95	9.14	8.870	59.42	68.3	1.1004	1.0971	1.0933	
14	1.103	13.6	0.854	14.0	5.385	7.93	9.22	9.632	59.17	68.8	1.1083	1.1048	1.1003	
15	1.111	14.5	0.847	12.3	5.780	7.89	9.28	10.395	58.90	69.3	1.1165	1.1126	1.1086	
16	1.118	15.4	0.840	10.5	6.175	7.84	9.33	11.168	58.63	69.8	1.1247	1.1205	1.1163	
17	1.126	16.3	0.833	8.6	6.570	7.80	9.40	11.951	58.36	70.3	1.1329	1.1284	1.1241	
18	1.134	17.2	0.826	6.6	6.965	7.76	9.47	12.744	58.08	70.8	1.1412	1.1363	1.1319	
19	1.142	18.1	0.819	4.5	7.360	7.73	9.54	13.547	57.75	71.3	1.1496	1.1443	1.1398	
20	1.150	19.0	0.813	2.3	7.755	7.68	9.60	14.350	57.44	71.8	1.1580	1.1524	1.1478	
21	1.158	19.8	0.807	0.0	8.150	7.64	9.67	15.153	57.12	72.3	1.1662	1.1606	1.1559	
22	1.166	20.8	0.802	-2.3	8.545	7.60	9.74	15.956	56.78	72.8	1.1747	1.1688	1.1640	
23	1.175	21.7	0.796	-5.1	8.940	7.55	9.81	16.759	56.45	73.3	1.1832	1.1771	1.1721	
24	1.183	22.5	0.791	-7.8	9.335	7.51	9.88	17.562	56.09	73.8	1.1918	1.1854	1.1804	
25	1.191	23.4	0.786	-10.5	9.730	7.46	9.95	18.365	55.72	74.3				
26	1.200	24.2	0.780	-13.2	10.125	7.42								

* Wt of commercial NaCl required = $\frac{\text{wt of pure NaCl required}}{\text{per cent purity}}$

Secondary Coolants (Brines)

Fig. 2 Specific Heat of Calcium Chloride Brine¹Fig. 3 Specific Gravity of Calcium Chloride Brine¹Fig. 4 Viscosity of Calcium Chloride Brine¹Fig. 5 Thermal Conductivity of Calcium Chloride Brine¹