

sensible heat removal simultaneously. In many industrial applications it is not necessary to aftercool the air. In applications requiring low dry-bulb temperatures excess sensible heat must be removed by an aftercooler.

Since the absorption process can continue only as long as there is a difference in vapor pressure between the absorbent and the air-vapor mixture and since at a given temperature of the absorbent the vapor pressure depends on the concentration of the solution, evidently there must be a relation between these quantities which, if known, would state

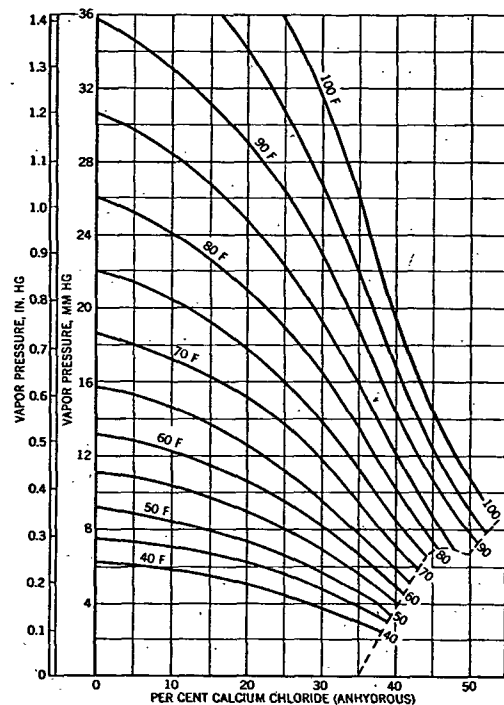


FIG. 3. TEMPERATURE—PRESSURE—CONCENTRATIONS FOR CALCIUM CHLORIDE

the limits of the process. The relationship would also depend on the absorbent being used, and would have to be determined for each substance used as an absorbent. This relationship is shown graphically in Fig. 2 for lithium chloride, and Fig. 3 presents similar data for calcium chloride. These charts are essentially similar to Fig. 1, and their direct usefulness is limited by much the same considerations. Other physical properties of lithium chloride are shown in Tables 1, 2 and 3.

In Fig. 2 and Table 1 the unit of concentration is the *mol*. An *M* molal solution is defined as a solution containing $M \times 42.37$ grains of anhydrous lithium chloride per 1000 grains of water. The formula connecting concentration in mols with weight in per cent is equivalent to: $(100 \times M \times 42.37) \div [1000 + (M \times 42.37)]$.

TABLE 1. PROPERTIES OF LITHIUM CHLORIDE SOLUTIONS

CONCENTRATION POUND MOLS (42.4 LB) LiCl PER 1000 LB WATER	CONCENTRATION PER CENT BY WEIGHT	SPECIFIC GRAVITY AT 100 F	VISCOSITY (MILLIPOISE)		PARTIAL HEAT OF MIXING AT 0 F, BTU PER LB	TEMP. COEFF. OF PARTIAL HEAT OF MIXING BTU PER LB PER F	SPECIFIC HEAT AT 70 F	BOILING POINT F AT (760 MM Hg)	FREEZING POINT, F
			80 F	180 F					
0	0.0	1.000	8.61	-3.48	0.00	0.000	0.998	212.0	32.0
2	7.8	1.037	11.19	4.56	2.04	-0.014	0.901	215.8	16.3
4	14.5	1.076	14.42	6.01	7.24	-0.036	0.831	221.5	-5.8
6	20.2	1.111	18.62	7.78	16.70	-0.069	0.778	228.9	-34.2
8	25.3	1.143	24.32	10.00	31.90	-0.109	0.739	238.1	-69.0
10	29.7	1.172	32.28	12.91	51.10	-0.143	0.710	248.4	-90.0
12	33.7	1.199	43.45	16.56	75.70	-0.160	0.687	258.8	-40.0
14	37.4	1.225	60.26	21.28	90.80	-0.167	0.666	268.9	1.0
16	40.4	1.248	82.04	27.10	124.80	-0.176	0.647	277.9	36.5
18	43.3	1.270	113.80	35.48	145.00	-0.186	0.631	285.8	58.1
20	46.0	1.291		46.45	162.00	-0.194		293.2	86.4
22	48.4			60.67	171.00	-0.200		300.2	133.0
24	50.3			84.33	177.00	-0.200		307.0	156.0
26	52.4				182.00	-0.210		313.0	180.0
28	54.3				191.00	-0.210		318.0	190.0
30	56.1				194.00	-0.210		323.0	195.0
32	57.5				198.00	-0.220		328.0	280.0

TABLE 2. DEW-POINT OF AIR IN EQUILIBRIUM WITH LITHIUM CHLORIDE SOLUTIONS
CONCENTRATION IN POUND MOLS (42.4 LB) LITHIUM CHLORIDE PER 1000 LB WATER

DEW- POINT AT ZERO CONC.	CONCENTRATION OF LITHIUM CHLORIDE														
	2.0	4.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0
320	315.2	308.7	299.9	290.2	279.7	269.4	259.6	251.5	244.1	236.5	230.0	223.8	218.6	214.5	210.3
300	295.4	289.1	280.5	270.9	260.6	250.5	240.8	232.6	225.4	218.0	211.8	205.8	200.8	196.9	192.8
280	275.6	269.5	261.1	251.7	241.5	231.6	222.2	214.0	206.7	199.7	193.5	187.8	183.2	179.3	175.2
260	255.8	250.0	241.9	232.6	222.7	212.8	203.5	195.5	188.4	181.7	175.4	170.0	165.6	162.0	158.4
240	236.0	230.4	222.5	213.5	203.8	194.2	185.0	177.1	170.0	163.6	157.5	152.2	148.3	144.6	140.5
220	216.2	210.8	203.2	194.4	184.9	175.5	166.4	158.6	151.6	145.3	139.6	134.6	130.7	127.3	124.2
200	196.4	191.2	183.9	175.4	166.1	156.7	148.0	140.3	133.5	127.3	121.9	117.0	113.3	110.1	
180	176.6	171.6	164.7	156.4	147.3	138.1	129.6	122.1	115.5	109.4	104.2	99.6	96.0		
160	156.8	152.1	145.4	137.4	128.6	119.7	111.3	103.9	97.4	91.6	86.6	82.2			
140	137.0	132.6	126.1	118.4	109.9	101.3	93.1	85.9	79.5	73.8	69.0				
120	117.2	113.0	106.8	99.4	91.1	82.7	74.7	67.8	61.5	56.0					
100	97.4	93.4	87.5	80.5	72.7	64.4	56.6	49.8	43.7	38.2					
80	77.6	73.8	68.4	61.6	54.0	46.1	38.5	31.8	25.9	20.6					
60	57.8	54.3	49.1	42.7	35.5	27.9	20.5	14.0	8.3						
40	38.0	34.7	29.9	23.9	16.9	9.6	2.4	-3.9							
20		15.1	10.7	5.0	-1.7	-8.7	-15.4								
0		-4.5	-8.6	-13.9	-20.2	-27.0	-33.3								