TABLE 5. PROPERTIES OF METHYL CHLORIDE

SAT. TEMP. F	ABS PRESS. LB PER SQ IN.	VOLUME		HEAT CONTENT AND ENTROPY TAKEN FROM −40 F							
				Heat Content		Entropy		100 F Superheat		200 F Superheat	
		Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Ht. Ct.	Entropy	Ht. Ct.	Entropy
0	18.5	0.01628	5.00	14.5	194.0	0.032	0.424	215.6	0.467	237.2	0.507
5	20.89	0.01635	4.52	16.3	195.3	0.036	0.4225	217.0	0.464	238.5	0.503
10	23.3	0.01645	4.09	18.0	196.5	0.040	0.421	218.5	0.463	240.0	0.500
15	25.8	0.01652	3.73	19.9	198.0	0.044	0.420	219.8	0.461	241.0	0.498
20	28.3	0.01660	3.37	21.7	199.0	0.048	0.418	221.0	0.460	242.5	0.496
25	32.0	0.01669	3.07	23.5	200.0	0.052	0.417	222.1	0.459	244.0	0.494
30	35.0	0.01678	2 78	25.2	201.2	0.056	0.415	223.4	0.457	245.2	0.493
35	38.8	0.01689	2.55	27.0	202.4	0.060	0.414	224.5	0.454	246.5	0.492
40	42.8	0.01700	2.32	28.9	203.7	0.064	0.413	225.7	0.453	247.7	0.490
45	46.5	0.01710	2.13	30.7	204.5	0.068	0.412	226.8	0.451	249.1	0.488
50	51.0	0.01721	1.94	32.5	205.3	0.071	0.410	227.9	0.449	250.5	0.487
55	55.7	0.01727	1.79	34.5	206.1	0.075	0.408	228.8	0.448	251.7	0.486
60	61.0	0.01734	1.64	36.5	207.0	0.079	0.406	229.6	0.446	253.0	0.484
65	66.8	0.01746	1.51	38.5	207.5	0.083	0.404	230.5	0.443	254.3	0.483
70	72.6	0.01758	1.39	40.5	208.0	0.086	0.402	231.3	0.441	255.5	0.481
75	79.5	0.01768	1.28	42.5	208.5	0.090	0.400	232.2	0.439	256.8	0.479
80	87.0	0.01779	1.18	44.5	209.0	0.093	0.398	233.0	0.437	257.9	0.478
85	93.9	0.01790	1.09	46.3	209.5	0.097	0.396	233.8	0.435	259.2	0.477
90	102.0	0.01801	1.01	48.0	210.0	0.100	0.394	234.5	0.433	260.4	0.476
95	108.7	0.01813	0.94	50.0	210.3	0.104	0.392	235.2	0.432	261.5	0.475
100	117.0	0.01825	0.87	52.0	210.5	0.107	0.390	236.0	0.431	262.4	0.474
105	124.3	0.01836	....	53.8	210.6	0.111	0.388	237.0	0.430	263.3	0.473
110	133.0	0.01847	....	55.5	210.7	0.114	0.386	237.9	0.428	264.3	0.472
115	143.0	....	....	57.3	210.8	0.118	0.384	238.5	0.427	265.0	0.470
120	154.0	....	....	59.0	211.0	0.121	0.382	239.0	0.425	265.6	0.468

$n = \frac{C_p}{C_v} = 1.20$

It is frequently helpful to think of the compression of the vapor in terms of head. The head may be likened to a vertical column of vapor in which is located the vapor to be compressed. The compression occurs when the vapor is moved down from a level corresponding to P_1 to a new level corresponding to P_2, in equilibrium with the surrounding vapor. If this process is carried on isentropically, the result will be the same as indicated previously. Then if h is the head in feet,

$$W = h \tag{3}$$

This relationship may easily be seen from the fact that a small difference of head dh divided by the specific volume of the vapor V is equal to the increment of pressure difference dP.

Thus, $dh = VdP$; also it can be seen by a comparison of the diagram that $VdP = SdT$, whence by integration all three of the previous expressions may be derived.

Head is very useful in considering the performance of centrifugal compressors, which merely substitute a centrifugal for the gravity head. It is also useful in considering problems of fluid flow. In these problems, the head per degree can be obtained either by direct calculation or

TABLE 6. PROPERTIES OF MONOFLUOROTRICHLOROMETHANE (F_{11})

SAT. TEMP. F	ABS PRESS. LB PER SQ IN.	VOLUME		HEAT CONTENT AND ENTROPY TAKEN FROM −40 F							
				Heat Content		Entropy		25 F Superheat		50 F Superheat	
		Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Ht. Ct.	Entropy	Ht. Ct.	Entropy
0	2.59	0.01020	13.7	7.81	90.4	0.0178	0.1975	93.9	0.2049	97.4	0.2120
5	2.96	0.01024	12.1	8.81	91.2	0.0200	0.1974	94.7	0.2047	98.2	0.2117
10	3.38	0.01028	10.7	9.82	92.0	0.0222	0.1973	95.5	0.2045	99.0	0.2114
15	3.85	0.01032	9.53	10.8	92.8	0.0243	0.1971	96.3	0.2043	99.8	0.2111
20	4.36	0.01036	8.49	11.9	93.7	0.0264	0.1970	97.2	0.2041	100.7	0.2109
25	4.94	0.01040	7.58	12.9	94.5	0.0286	0.1969	98.0	0.2039	101.5	0.2107
30	5.57	0.01045	6.77	13.9	95.3	0.0307	0.1969	98.8	0.2038	102.3	0.2105
35	6.27	0.01049	6.08	14.9	96.1	0.0328	0.1968	99.6	0.2037	103.1	0.2103
40	7.03	0.01053	5.46	16.0	96.8	0.0349	0.1968	100.3	0.2036	103.8	0.2101
45	7.88	0.01057	4.92	17.0	97.6	0.0370	0.1967	101.1	0.2035	104.6	0.2099
50	8.79	0.01062	4.44	18.1	98.4	0.0391	0.1967	101.9	0.2034	105.4	0.2098
55	9.80	0.01066	4.02	19.1	99.2	0.0412	0.1967	102.7	0.2033	106.2	0.2097
60	10.9	0.01071	3.64	20.2	100.0	0.0432	0.1967	103.5	0.2033	107.0	0.2096
65	12.1	0.01076	3.30	21.3	100.8	0.0453	0.1967	104.3	0.2032	107.8	0.2094
70	13.4	0.01081	3.00	22.4	101.5	0.0473	0.1967	105.0	0.2032	108.5	0.2093
75	14.8	0.01086	2.74	23.5	102.2	0.0493	0.1967	105.7	0.2031	109.2	0.2092
80	16.3	0.01091	2.50	24.5	102.9	0.0513	0.1966	106.4	0.2030	109.9	0.2090
85	17.9	0.01096	2.28	25.6	103.6	0.0533	0.1966	107.1	0.2029	110.6	0.2089
90	19.7	0.01101	2.09	26.7	104.4	0.0553	0.1966	107.9	0.2028	111.4	0.2088
95	21.6	0.01106	1.918	27.8	105.1	0.0573	0.1966	108.6	0.2028	112.1	0.2087
100	23.6	0.01111	1.761	28.9	105.7	0.0593	0.1965	109.2	0.2027	112.7	0.2085
105	25.9	0.01116	1.620	30.1	106.4	0.0613	0.1965	109.9	0.2026	113.4	0.2084

$n = \frac{C_p}{C_v} = 1.13$

approximately by dividing the total head by the temperature difference $T_2 - T_1$. The velocity head loss can then be calculated in degrees, using the customary formula $V^2 = 2gh$.

Refrigerating Effect per Pound

The refrigerating effect per pound is computed by the same method, regardless of the type of refrigeration system. The solution is indicated on the temperature-entropy diagram of Fig. 2. Assuming that the vapor leaving the evaporator is saturated, the refrigerating effect in Btu per pound is obtained by subtracting from the heat content of the vapor at temperature T_1, the heat content of the liquid at T_2, or if the liquid is sub-cooled, the liquid temperature.

Thus, the refrigerating effect in Btu per pound is equal to

$$H_a - H_c = H_a - H_e \tag{4}$$

If the vapor entering the compressor is superheated or supersaturated, a correction in the heat of the vapor is made accordingly.

The unit of refrigeration is the *ton*, based on the latent heat of fusion of one ton of ice in 24 hours.

Thus one ton = 200 Btu per minute = 12,000 Btu per hour.