expressions for the neon samples are used to generate the smooth heat-capacity values in the tables, as well as the thermodynamic functions.

As will be discussed in detail below, the scatter and reproducibility of these data indicate that the precision for any given sample is between 0.1 and 0.2% for temperatures below 30 K. The smooth variation of C_V from one sample to another at constant temperature, and also on reduced plots at common values of a reduced temperature, suggest that systematic errors are small, and that the accuracy of these C_V data are close to $\pm 0.3\%$. The addenda contribution becomes larger and the precision begins to deteriorate above 30 K so that these data are perhaps reliable to only $\pm 1\%$.

TABLE V

Smoothed Thermodynamic Functions for the Ne 8 Sample as Corrected to Constant Volume, $V = 12.39\ cm^3/mole$

T, K	C_V, J/mole·K	Θ, K	U^*, J/mole	S, J/mole·K
0	0	91.50	0	0
1.0	2.543×10^{-3}	91.45	6.38×10^{-4}	8.51×10^{-4}
2.0	2.051×10^{-2}	91.18	1.023×10^{-2}	6.82×10^{-3}
3.0	7.093	90.46	5.235	2.322×10^{-2}
4.0	1.768×10^{-1}	88.95	1.706×10^{-1}	5.650
5.0	3.702	86.90	4.353	1.148×10^{-1}
6.0	6.820	85.03	9.507	2.079
7.0	1.129×10^{0}	83.71	1.845×10^{0}	3.449
8.0	1.710	82.89	3.254	8.322
9.0	2.413	82.45	5.306	7.733
10.0	3.211	82.25	8.111	1.068×10^{0}
12.0	4.981	82.35	16.29	1.809
14.0	6.824	82.75	28.08	2.718
16.0	8.621	83.18	43.54	3.752
18.0	10.288	83.66	62.48	4.872
20.0	11.792	84.15	84.58	6.045
22.0	13.12	84.67	109.54	7.244
24.0	14.28	85.26	137.0	8.451
26.0	15.28	85.90	166.6	9.651
28.0	16.15	86.59	198.0	10.836
30.0	16.91	87.16	231.1	12.00
32.0	17.57	87.98	265.6	13.14
34.0	18.16	88.76	319.8	14.24
36.0	18.69	89.40	338.2	15.32
38.0	19.16	89.92	376.1	16.37
40.0	19.58	90.44	414.8	17.40
42.0	19.94	91.06	454.3	18.39
44.0	20.27	91.66	494.6	19.36
46.0	20.57	92.24	535.6	20.30
48.0	20.88	92.24	577.0	21.21
50.0	21.25	91.08	619.3	22.11
52.0	(21.7)	(88.1)	(662.)	(22.9)
53.5	(22.0)	(86.0)	(692.)	(23.6)

TABLE VI

Smoothed Thermodynamic Functions for Neon at the $T = 0$ Equilibrium Molar Volume, $V_0 = 13.39$ cm^3/mole[a]

T, K	C_V, J/mole·K	Θ, K	U^*, J/mole	S, J/mole·K
0	0	75.1	0	0
1.0	4.62×10^{-3}	75.0	1.15×10^{-3}	1.53×10^{-3}
2.0	3.75×10^{-2}	74.6	1.863×10^{-2}	1.24×10^{-2}
3.0	1.327×10^{-1}	73.4	9.70	4.29
4.0	3.42	71.4	3.22×10^{-1}	1.062×10^{-1}
5.0	7.25	69.4	8.37	2.20
6.0	1.318×10^{0}	68.0	1.843×10^{0}	4.01
7.0	2.111	67.3	3.55	6.62
8.0	3.062	67.0	6.11	1.004×10^{0}
9.0	4.13	66.9	9.71	1.426
10.0	5.27	66.9	14.42	1.921
12.0	7.55	67.3	27.2	3.08
14.0	9.70	67.7	44.5	4.41
16.0	11.61	68.1	65.9	5.84
18.0	13.25	68.7	90.7	7.30
20.0	14.62	69.4	118.7	8.77
22.0	15.76	70.2	149.1	10.22
24.0	16.71	71.0	182.	11.63
26.0	17.55	71.7	216.	13.01
28.0	18.3	72.2	252.	14.33
30.0	18.9	72.9	289.	15.6
32.0	19.4	73.5	327.	16.9
34.0	19.9	74.1	367.	18.0
34.8	20.1	74.4	383.	18.5

[a]The values below 7 K are as obtained from the Ne 4 data, while the higher temperature values are as derived from an extrapolation to V_0 of the specific heat data for smaller molar volumes.

3.1. The Addenda Heat Capacity

The addenda heat capacities were determined in several experiments before the natural neon data were taken and again after the Ne 8 sample had been measured. The calorimeter never was disassembled or modified in any manner in the course of the addenda and the solid neon measurements. Equation (3) (with $n = 1, 3, 5, 7, \ldots$) is used to represent the addenda heat capacity in three ranges; 1–3.41, 3.41–9.32, and 9.32–52 K. The scatter of the experimental data gives a rms deviation of approximately 0.2% for each range. The indium in the bomb gasket and seals becomes superconducting at 3.41 K, and hence contributes a slight anomaly (less than 1%) at this temperature, so the addenda representations are chosen to exclude this temperature and no heat pulses ever included it. The ratio of the addenda heat capacity C_{Add} to the total measured heat capacity C_{Tot} depends to some extent on sample density but even more so on the temperature. Near 1 K,