COMPONENTS:	EVALUATOR:
Mercury; Hg; [7439-97-6]	Appendix II Some Physicochemical Properties of Mercury

CRITICAL EVALUATION:

I. Atomic weight. The atomic weight of mercury is 200.59 ± 0.03. The isotopic composition of terrestrial mercury, $_{80}$Hg, is

Mass Number	Representative Isotopic Composition	
196	0.15	(5)
198	10.1	(5)
199	17.0	(5)
200	23.1	(6)
201	13.2	(4)
202	29.65	(75)
204	6.8	(3)

The uncertainties listed in parentheses cover the range of variations of the materials as well as experimental errors.

REFERENCES:

Holden, N. E.; Martin, R. L. *Pure Appl. Chem.* 1983, *55*, 1101 -18.
Holden, N. E.; Martin, R. L.; Barnes, I. L. *Pure Appl. Chem.* 1983, *55*, 1119 - 36.

II. Some enthalpy, entropy, and heat capacity values.

Mercury State	Values for 298.15 K and 1 bar (0.1 MPa)			
	$\Delta_f H°$/kJ mol^{-1}	$\Delta_f G°$/kJ mol^{-1}	$S°$/J K^{-1} mol^{-1}	$C_p°$/J K^{-1} mol^{-1}
Liquid	0	0	76.02	27.983
Gas	61.317	31.820	174.96	20.786
Aqueous Soln. hyp 1 *m*	37.7	39.3	71	-

Mercury Transition[a]	*T*/K	*P*/mmHg	ΔH/kJ mol^{-1}	ΔS/J K^{-1} mol^{-1}
Sublimation	234.39	2.5 x 10^{-6}	63.60	271.5
Fusion	234.39	2.5 x 10^{-6}	2.33	9.92
Vaporization	298.15	0.00209	60.84[a]	204.1[a]
Vaporization	629.73	760	58.12	92.30

[a]Values from 1952 evaluation. More recent literature should be checked.

[b]Better values from enthalpy of formations above are 61.317 kJ mol^{-1} and 205.7 J K^{-1} mol^{-1}.

The values above are from 1952 and 1982 evaluations of the U.S. National Bureau of Standards publications. The review paper of Hepler and Olofsson should be consulted.

REFERENCES:

Rossini, F. D.; Wagman, D. D.; Evans, W. H.; Levine, S.; Jaffe, I. *Selected Values of Chemical Thermodynamic Properties*, Part I. Tables, National Bureau of Standards Circular 500, U.S. Government Printing Office, Washington D.C., 1952 (reprinted 1961).
Wagman, D. D.; Evans, W. H.; Parker, V. B.; Schumm, R. H.; Halow, I.; Bailey, S. M.; Churney, K. L.; Nuttall, R. L. *NBS Tables of Chemical Thermodynamic Properties, J. Phys. Chem. Ref. Data* 1982, *11*, Supplement 2, 392 pp.
Hepler, L. G.; Olofsson, F. *Chem. Rev.* 1975, *75*, 585 - 602.

COMPONENTS:	EVALUATOR:
Mercury; Hg; [7439-97-6]	Appendix II Some Physicochemical Properties of Mercury

CRITICAL EVALUATION:

III. Melting point, triple point, normal boiling point, and critical properties of mercury.

Compared below are values from the evaluations of Ambrose and Sprake and of Vargaftik.

Value	Ambrose and Sprake	Vargaftik	
Melting point		-38.83°C	234.32 K
Triple point	234.53 K at 3 x 10^{-4} Pa		
Boiling point	629.815 K	356.95°C	630.10 K
Critical Properties			
Temperature	1765 K	1490°C	1763 K
Pressure	151 MPa	151 MPa	1510 Bar
Density			5.500 Mg m^{-3}

REFERENCES:

Ambrose, D.; Sprake, C. H. S. *J. Chem. Thermodynam.* 1972, *4*, 603 - 20.

Vargaftik, N. B. *Tables on the Thermophysical Properties of Liquids and Gases*, Hemisphere Pub. Corp., Washington and London, 1975; *Chem. Abstr.* 1974, *80*, 137452v; 1976, *84*, 35655d.

IV. Other Properties of Mercury.

Density of liquid mercury	Appendix III
Vapor pressure of liquid mercury	Appendix IV
Second Virial coefficients of mercury vapor	Appendix V

The N. B. Vargaftik Handbook (reference above) contains about twelve pages of tables of liquid and gaseous mercury physical properties. There are values of vapor pressure, density, and specific volume of both liquid and vapor. There are values of coefficients of thermal expansion, coefficient of isothermal compressibility, latent heat of vaporization, entropy and constant volume and constant pressure heat capacities of the liquid at 10 degree intervals from 0 to 800°C.

A small table gives values of the liquid specific resistance, thermal conductivity, viscosity and other properties from the melting point to 800°C.

The mercury vapor specific volume, enthalpy, entropy, heat capacity and velocity of sound are given from 180 to 2000°C at pressures from 0.01 to 200 bar. A separate table gives values of the viscosity and thermal conductivity of mercury vapor.