

COMPONENTS:  Mercury; Hg; [7439-97-6]	EVALUATOR:  Appendix III  Density of Liquid Mercury
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## CRITICAL EVALUATION:

There are several evaluations of the density of liquid mercury. Density data are reproduced on the following page from two evaluations as a function of temperature between 253 and 1073 K. The values are given in the units of megagram per cubic meter,  $\text{Mg m}^{-3}$ , which conveniently have the same decimal location at grams per cubic centimeter.

Density values in the first column are from Herington, Brown and Lane (ref. 1). The values are described as the "absolute density of mercury at a pressure of 101.325 kPa for temperatures  $t/^{\circ}\text{C}$  on the International Practical Temperature Scale of 1968". The values are based on data presented by Bigg (ref. 2) corrected to bring the values to the 1968 IPTS.

The Herington *et al.* table contains values at one degree intervals from  $-20$  to  $100^{\circ}\text{C}$ , and at ten degree intervals from  $100$  to  $300^{\circ}\text{C}$ . Also presented are values of the temperature coefficient and error in density. Reproduced on the next page are density values at five degree intervals from  $-20$  to  $100^{\circ}\text{C}$ , and at ten degree intervals from  $100$  to  $300^{\circ}\text{C}$ .

Density values in the second column are from Vargaftik (ref. 3). They are described as properties of mercury in saturation. They are credited to the evaluation of Vukalovich and Fokin (ref. 4). There are no mentions of the original data source or the temperature scale.

The Vargaftik table contains density values at ten degree intervals from  $0$  to  $800^{\circ}\text{C}$ . Reproduced here are the density values at ten degree intervals from  $0$  to  $300^{\circ}\text{C}$ , at 20 degree intervals from  $300$  to  $400^{\circ}\text{C}$ , and at 40 degree intervals from  $400$  to  $800^{\circ}\text{C}$ .

The two evaluations differ slightly with the Russian data being a little smaller at all temperatures over the  $0$  to  $300^{\circ}\text{C}$  range common to both tables. The difference in parts per million, ppm, is given below for several temperatures. The difference is negligible for most applications.

$t/^{\circ}\text{C}$	0	50	90	200	300
Difference (ppm)	3.7	1.5	4.5	7.6	15.5

## REFERENCES:

1. Herington, E. F. G.; Brown, I.; Lane, J. E.; Ambrose, D. *Pure Appl. Chem.* 1976, *45*, 1 - 9.
2. Bigg, P. H. *Brit. J. Appl. Phys.* 1964, *15*, 1111 - 3.
3. Vargaftik, N. B. *Tables on the thermophysical properties of liquids and gases*, Hemisphere Pub. Corp., Washington and London, 1975. (English translation of the 2nd Russian Edition, distributed by Halsted Press); *Chem. Abstr.* 1974, *80*, 137452v; 1976, *84*, 35655d.
4. Vukalovich, M. P.; Fokin, R. V. *Thermophysical properties of mercury*, Standards Press, 1971, 311 pp.; *Chem. Abstr.* 1973, *78*, 114619z.

COMPONENTS:				EVALUATOR:			
Mercury; Hg; [7439-97-6]				Appendix III Density of Liquid Mercury			
CRITICAL EVALUATION:							
Temperature		Density		Temperature		Density	
$t/^{\circ}\text{C}$	$T/\text{K}$	(1) $\rho/\text{Mg m}^{-3}$	(2) $\rho/\text{Mg m}^{-3}$	$t/^{\circ}\text{C}$	$T/\text{K}$	(1) $\rho/\text{Mg m}^{-3}$	(2) $\rho/\text{Mg m}^{-3}$
-20	253.15	13.64459		320	593.15		12.8256
-15	258.15	13.63218		340	613.15		12.7776
-10	263.15	13.61978		360	633.15		12.7294
-5	268.15	13.60743		380	653.15		12.6811
0	273.15	13.59508	13.59503	400	673.15		12.6326
5	278.15	13.58276					
10	283.15	13.57044	13.57039	440	713.15		12.5348
15	288.15	13.55815		480	753.15		12.4358
20	293.15	13.54587	13.54583	520	793.15		12.3336
25	298.15	13.53362		560	833.15		12.234
30	303.15	13.52137	13.52133	600	873.15		12.130
35	308.15	13.50914		640	913.15		12.025
40	313.15	13.49693	13.49689	680	953.15		11.918
45	318.15	13.48473		720	993.15		11.809
50	323.15	13.47253	13.47251	760	1033.15		11.697
55	328.15	13.46038		800	1073.15		11.584
60	333.15	13.44823	13.44819				
65	338.15	13.43610					
70	343.15	13.42397	13.42393				
75	348.15	13.41186					
80	353.15	13.39977	13.39971				
85	358.15	13.38767					
90	363.15	13.37560	13.37554				
95	368.15	13.36354					
100	373.15	13.3515	13.35142				
110	383.15	13.3274	13.32734				
120	393.15	13.3034	13.30330				
130	403.15	13.2794	13.27929				
140	413.15	13.2554	13.25531				
150	423.15	13.2315	13.23137				
160	433.15	13.2076	13.20745				
170	443.15	13.1837	13.18356				
180	453.15	13.1598	13.15968				
190	463.15	13.1360	13.13582				
200	473.15	13.1121	13.11197				
210	483.15	13.0883	13.08814				
220	493.15	13.0645	13.06431				
230	503.15	13.0407	13.04048				
240	513.15	13.0169	13.01665				
250	523.15	12.9930	12.99282				
260	533.15	12.9692	12.96898				
270	543.15	12.9454	12.94514				
280	553.15	12.9215	12.92127				
290	563.15	12.8976	12.89734				
300	573.15	12.8737	12.8735				