

NATIONAL MEASUREMENT ACT 1960

DETERMINATION BY THE NATIONAL STANDARDS COMMISSION

Recognized-Value Standard of Measurement  
of Density Mercury

In pursuance of paragraphs 8A(1) (a) and (b) of the National Measurement Act 1960, the National Standards Commission hereby determines that the magnitude of the density of mercury  $d_t$  at a temperature  $t$  and a mean pressure  $p$  shall be a recognized-value standard of measurement, provided  $t$  lies within the range 0°C to 40°C and  $p$  lies within the range 0 Pa to  $10^7$  Pa.

For the purposes of this Determination -

- (a) When  $p$  is 101 325 Pa and  $t$  is one of the temperatures listed in the attached table then the magnitude of the density in  $\text{kg.m}^{-3}$  is as stated in the table, which is derived from the following formula:

$$d_t = 13\,595.08 / \{1 + (18\,150.36 t + 0.702\,09 t^2 + 2.865\,5 \times 10^{-3} t^3 + 2.621 \times 10^{-6} t^4) \times 10^{-8}\}$$

where  $d_t$  is the density in  $\text{kg.m}^{-3}$ , and

$t$  is the temperature in °C;

- (b) When  $p$  is 101 325 Pa and  $t$  is between two adjacent values of temperature listed in the attached table then the magnitude of the density in  $\text{kg.m}^{-3}$  shall be determined from the table by linear interpolation;
- (c) When  $p$  differs from 101 325 Pa the magnitude of the density in  $\text{kg.m}^{-3}$  as stated in the attached table or derived therefrom in accordance with the above linear interpolation shall be algebraically increased by an amount equal to

$$5.47 \times 10^{-7} (p - 101\,325); \text{ and}$$

- (d) If the value of  $t$  used in the attached table and the above equations does not differ from the true mean temperature of the mercury by more than 0.1°C, if the value of  $p$  used in the equation does not differ from the true mean pressure within the mercury by more than 1 000 Pa, and if impurities in the mercury do not exceed 5 part in  $10^6$  by mass, the chance is not more than one in one hundred that the density so ascertained differs from the true density by more than 0.3  $\text{kg.m}^{-3}$ .

Dated this 21<sup>st</sup> day of March 1985

The COMMON SEAL OF THE NATIONAL  
STANDARDS COMMISSION was hereto  
affixed by authority of the Commission  
in the presence of

T.J. PETRY

THE DENSITY OF MERCURY IN KILOGRAMS PER CUBIC METRE AS A FUNCTION OF THE  
TEMPERATURE IN DEGREES CELSIUS

0.0	13595.08	5.0	13582.75	10.0	13570.44	15.0	13558.14	20.0	13545.87	25.0	13533.60	30.0	13521.36	35.0	13509.13
0.1	13594.83	5.1	13582.50	10.1	13570.19	15.1	13557.90	20.1	13545.62	25.1	13533.36	30.1	13521.11	35.1	13508.88
0.2	13594.59	5.2	13582.26	10.2	13569.95	15.2	13557.65	20.2	13545.38	25.2	13533.11	30.2	13520.87	35.2	13508.64
0.3	13594.34	5.3	13582.01	10.3	13569.70	15.3	13557.41	20.3	13545.13	25.3	13532.87	30.3	13520.62	35.3	13508.39
0.4	13594.09	5.4	13581.77	10.4	13569.46	15.4	13557.16	20.4	13544.88	25.4	13532.62	30.4	13520.38	35.4	13508.15
0.5	13593.85	5.5	13581.52	10.5	13569.21	15.5	13556.92	20.5	13544.64	25.5	13532.38	30.5	13520.13	35.5	13507.91
0.6	13593.60	5.6	13581.27	10.6	13568.96	15.6	13556.67	20.6	13544.39	25.6	13532.13	30.6	13519.89	35.6	13507.66
0.7	13593.35	5.7	13581.03	10.7	13568.72	15.7	13556.42	20.7	13544.15	25.7	13531.89	30.7	13519.65	35.7	13507.42
0.8	13593.11	5.8	13580.78	10.8	13568.47	15.8	13556.18	20.8	13543.90	25.8	13531.64	30.8	13519.40	35.8	13507.17
0.9	13592.86	5.9	13580.53	10.9	13568.22	15.9	13555.93	20.9	13543.66	25.9	13531.40	30.9	13519.16	35.9	13506.93
1.0	13592.61	6.0	13580.29	11.0	13567.98	16.0	13555.69	21.0	13543.41	26.0	13531.15	31.0	13518.91	36.0	13506.68
1.1	13592.37	6.1	13580.04	11.1	13567.73	16.1	13555.44	21.1	13543.17	26.1	13530.91	31.1	13518.67	36.1	13506.44
1.2	13592.12	6.2	13579.79	11.2	13567.49	16.2	13555.20	21.2	13542.92	26.2	13530.66	31.2	13518.42	36.2	13506.20
1.3	13591.87	6.3	13579.55	11.3	13567.24	16.3	13554.95	21.3	13542.68	26.3	13530.42	31.3	13518.18	36.3	13505.95
1.4	13591.63	6.4	13579.30	11.4	13567.00	16.4	13554.70	21.4	13542.43	26.4	13530.17	31.4	13517.93	36.4	13505.71
1.5	13591.38	6.5	13579.06	11.5	13566.75	16.5	13554.46	21.5	13542.19	26.5	13529.93	31.5	13517.69	36.5	13505.46
1.6	13591.13	6.6	13578.81	11.6	13566.50	16.6	13554.21	21.6	13541.94	26.6	13529.68	31.6	13517.44	36.6	13505.22
1.7	13590.89	6.7	13578.56	11.7	13566.26	16.7	13553.97	21.7	13541.70	26.7	13529.44	31.7	13517.20	36.7	13504.97
1.8	13590.64	6.8	13578.32	11.8	13566.01	16.8	13553.72	21.8	13541.45	26.8	13529.19	31.8	13516.95	36.8	13504.73
1.9	13590.39	6.9	13578.07	11.9	13565.77	16.9	13553.48	21.9	13541.20	26.9	13528.95	31.9	13516.71	36.9	13504.48
2.0	13590.15	7.0	13577.82	12.0	13565.52	17.0	13553.23	22.0	13540.96	27.0	13528.70	32.0	13516.46	37.0	13504.24
2.1	13589.90	7.1	13577.58	12.1	13565.27	17.1	13552.99	22.1	13540.71	27.1	13528.46	32.1	13516.22	37.1	13504.00
2.2	13589.65	7.2	13577.33	12.2	13565.03	17.2	13552.74	22.2	13540.47	27.2	13528.21	32.2	13515.98	37.2	13503.75
2.3	13589.41	7.3	13577.09	12.3	13564.78	17.3	13552.49	22.3	13540.22	27.3	13527.97	32.3	13515.73	37.3	13503.51
2.4	13589.16	7.4	13576.84	12.4	13564.54	17.4	13552.25	22.4	13539.98	27.4	13527.72	32.4	13515.49	37.4	13503.26
2.5	13588.91	7.5	13576.59	12.5	13564.29	17.5	13552.00	22.5	13539.73	27.5	13527.48	32.5	13515.24	37.5	13503.02
2.6	13588.67	7.6	13576.35	12.6	13564.04	17.6	13551.76	22.6	13539.49	27.6	13527.23	32.6	13515.00	37.6	13502.77
2.7	13588.42	7.7	13576.10	12.7	13563.80	17.7	13551.51	22.7	13539.24	27.7	13526.99	32.7	13514.75	37.7	13502.53
2.8	13588.17	7.8	13575.85	12.8	13563.55	17.8	13551.27	22.8	13539.00	27.8	13526.74	32.8	13514.51	37.8	13502.29
2.9	13587.93	7.9	13575.61	12.9	13563.31	17.9	13551.02	22.9	13538.75	27.9	13526.50	32.9	13514.26	37.9	13502.04
3.0	13587.68	8.0	13575.36	13.0	13563.06	18.0	13550.78	23.0	13538.51	28.0	13526.26	33.0	13514.02	38.0	13501.80
3.1	13587.43	8.1	13575.12	13.1	13562.81	18.1	13550.53	23.1	13538.26	28.1	13526.01	33.1	13513.77	38.1	13501.55
3.2	13587.19	8.2	13574.87	13.2	13562.57	18.2	13550.28	23.2	13538.02	28.2	13525.77	33.2	13513.53	38.2	13501.31
3.3	13586.94	8.3	13574.62	13.3	13562.32	18.3	13550.04	23.3	13537.77	28.3	13525.52	33.3	13513.28	38.3	13501.06
3.4	13586.69	8.4	13574.38	13.4	13562.08	18.4	13549.79	23.4	13537.53	28.4	13525.28	33.4	13513.04	38.4	13500.82
3.5	13586.45	8.5	13574.13	13.5	13561.83	18.5	13549.55	23.5	13537.28	28.5	13525.03	33.5	13512.80	38.5	13500.58
3.6	13586.20	8.6	13573.88	13.6	13561.59	18.6	13549.30	23.6	13537.04	28.6	13524.79	33.6	13512.55	38.6	13500.33
3.7	13585.95	8.7	13573.64	13.7	13561.34	18.7	13549.06	23.7	13536.79	28.7	13524.54	33.7	13512.31	38.7	13500.09
3.8	13585.71	8.8	13573.39	13.8	13561.09	18.8	13548.81	23.8	13536.55	28.8	13524.30	33.8	13512.06	38.8	13499.84
3.9	13585.46	8.9	13573.15	13.9	13560.85	18.9	13548.57	23.9	13536.30	28.9	13524.05	33.9	13511.82	38.9	13499.60
4.0	13585.22	9.0	13572.90	14.0	13560.60	19.0	13548.32	24.0	13536.06	29.0	13523.81	34.0	13511.57	39.0	13499.35
4.1	13584.97	9.1	13572.65	14.1	13560.36	19.1	13548.08	24.1	13535.81	29.1	13523.56	34.1	13511.33	39.1	13499.11
4.2	13584.72	9.2	13572.41	14.2	13560.11	19.2	13547.83	24.2	13535.57	29.2	13523.32	34.2	13511.08	39.2	13498.87
4.3	13584.48	9.3	13572.16	14.3	13559.86	19.3	13547.58	24.3	13535.32	29.3	13523.07	34.3	13510.84	39.3	13498.62
4.4	13584.23	9.4	13571.92	14.4	13559.62	19.4	13547.34	24.4	13535.08	29.4	13522.83	34.4	13510.60	39.4	13498.38
4.5	13583.98	9.5	13571.67	14.5	13559.37	19.5	13547.09	24.5	13534.83	29.5	13522.58	34.5	13510.35	39.5	13498.13
4.6	13583.74	9.6	13571.42	14.6	13559.13	19.6	13546.85	24.6	13534.58	29.6	13522.34	34.6	13510.11	39.6	13497.89
4.7	13583.49	9.7	13571.18	14.7	13558.88	19.7	13546.60	24.7	13534.34	29.7	13522.09	34.7	13509.86	39.7	13497.65
4.8	13583.24	9.8	13570.93	14.8	13558.64	19.8	13546.36	24.8	13534.09	29.8	13521.85	34.8	13509.62	39.8	13497.40
4.9	13583.00	9.9	13570.69	14.9	13558.39	19.9	13546.11	24.9	13533.85	29.9	13521.60	34.9	13509.37	39.9	13497.16
5.0	13582.75	10.0	13570.44	15.0	13558.14	20.0	13545.87	25.0	13533.60	30.0	13521.36	35.0	13509.13	40.0	13496.91