

BRITISH STANDARD

**BS 2000 :
Part 0 :
Section 0.4 :
1996**

Methods of test for

Petroleum and its products

**Part 0. Section 0.4.
Barometric pressure corrections**

(Identical with IP Appendix D)

Confirmed
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BSi
British Standards

National foreword

This British Standard was published under the authority of the Materials and Chemicals Sector Board and comes into effect on 29 February 1996.

BS 2000 comprises a series of test methods for petroleum and its products that are published by the Institute of Petroleum (IP) and have been accorded the status of a British Standard. Each method should be read in conjunction with the preliminary pages of 'IP Standard methods for analysis and testing of petroleum and related products' which gives details of the BSI/IP agreement for publication of the series, provides general information on safety precautions, sampling and other matters, and lists the methods published as Parts of BS 2000.

Under the terms of the agreement between BSI and the Institute of Petroleum, BS 2000 : Part 0 : Section 0.4 will be published by the IP (in 'Standard methods for analysis and testing of petroleum and related products' and as a separate publication). BS 2000 : Part 0 : Section 0.4 : 1996 is identical with IP Appendix I.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

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The following BSI references
relate to the work of this
standard:

Committee reference PTI/13
Announcement in *BSI News*
March 1996

BAROMETRIC PRESSURE CORRECTIONS FOR MERCURY BAROMETERS

The preferred unit of barometric pressure, agreed at the eighth Congress of the World Meteorological Organization, is the hectopascal (hPa), also barometers of the Fortin type are usually calibrated in either these units or millibars. For these reasons the tables of corrections I1 and I2 are given in these units.

Tables are also given for correcting observed barometric pressure for barometers calibrated in millimetres of mercury (mmHg) these are Tables 1a and 2a.

It is important to note that some equations for correcting temperature readings for barometric pressure, such as the Sydney Young equation used in IP 123 and IP 191, need to be entered in kilopascals. Therefore the barometric pressure in hectopascals, which has been corrected to 0°C and standard gravity (and if necessary for vertical distance), shall be converted to kPa before being entered in such equations.

I.1 Correction to 0°C

Read the temperature of the barometer or its immediate area. Enter the temperature into Table I.1, read off the correction and apply it to the observed barometric pressure.

I.2 Correction to standard gravity, 9.806 65 m/s²

Enter the latitude in degrees of the barometer location into Table I.2, and read off the correction and apply it to the observed barometric pressure.

I.3 Correction for vertical distance between barometer and the test apparatus.

Using the equation given below calculate the appropriate correction.

NOTE 1 – If the test apparatus is above the barometer the correction will need to be subtracted and if the test apparatus is below the barometer the correction will need to be added.

$$P_A = P_B \pm 0.119 \times m$$

where

P_A is the pressure at the apparatus hPa or mbar,
 P_B is the barometric pressure hPa or mbar,
 m is the vertical distance in metres between the barometer cistern and the apparatus.

or if the barometric pressure is in mmHg.

$$P_A = P_B \pm 0.090 \times m$$

where

P_A is the pressure at the apparatus mmHg,
 P_B is the barometric pressure mmHg,
 m is the vertical distance in metres between the barometer and the apparatus.

I.4 Where necessary convert the corrected barometric pressure to kilopascals, kPa using the conversion factors below.

$$\begin{aligned} \text{kPa} &= \text{hPa/mbar} \times 10^{-1} \\ \text{kPa} &= \text{mmHg} \times 0.133\ 322 \end{aligned}$$

Table I.1. Correction of barometer readings to standard temperature 0°C

| Temperature/°C | Barometer reading hPa or mbar | | | | | | |
|----------------|-------------------------------|-------|-------|-------|-------|-------|-------|
| | 940 | 960 | 980 | 1000 | 1020 | 1040 | 1060 |
| 10.0 | -1.61 | -1.64 | -1.68 | -1.71 | -1.74 | -1.77 | -1.81 |
| 10.5 | -1.69 | -1.72 | -1.76 | -1.79 | -1.83 | -1.86 | -1.90 |
| 11.0 | -1.77 | -1.81 | -1.84 | -1.88 | -1.91 | -1.95 | -1.99 |
| 11.5 | -1.85 | -1.89 | -1.93 | -1.96 | -2.00 | -2.04 | -2.08 |
| 12.0 | -1.93 | -1.97 | -2.01 | -2.05 | -2.09 | -2.13 | -2.17 |
| 12.5 | -2.01 | -2.05 | -2.09 | -2.13 | -2.18 | -2.22 | -2.26 |
| 13.0 | -2.09 | -2.13 | -2.18 | -2.22 | -2.26 | -2.30 | -2.35 |
| 13.5 | -2.17 | -2.22 | -2.25 | -2.30 | -2.35 | -2.39 | -2.44 |
| 14.0 | -2.25 | -2.30 | -2.34 | -2.39 | -2.44 | -2.48 | -2.53 |
| 14.5 | -2.33 | -2.38 | -2.43 | -2.47 | -2.52 | -2.57 | -2.62 |
| 15.0 | -2.41 | -2.46 | -2.51 | -2.56 | -2.61 | -2.66 | -2.71 |
| 15.5 | -2.49 | -2.54 | -2.59 | -2.65 | -2.70 | -2.75 | -2.80 |
| 16.0 | -2.57 | -2.63 | -2.68 | -2.73 | -2.78 | -2.83 | -2.89 |
| 16.5 | -2.65 | -2.71 | -2.76 | -2.82 | -2.87 | -2.92 | -2.98 |
| 17.0 | -2.73 | -2.79 | -2.84 | -2.90 | -2.96 | -3.01 | -3.07 |
| 17.5 | -2.81 | -2.87 | -2.93 | -2.99 | -3.04 | -3.10 | -3.16 |
| 18.0 | -2.89 | -2.95 | -3.01 | -3.07 | -3.13 | -3.19 | -3.25 |

APPENDIX I — BAROMETRIC PRESSURE CORRECTIONS

Table I.1. Continued

| Temperature/°C | Barometer reading hPa or mbar | | | | | | |
|----------------|-------------------------------|-------|-------|-------|-------|-------|-------|
| | 940 | 960 | 980 | 1000 | 1020 | 1040 | 1060 |
| 18.5 | -2.97 | -3.03 | -3.10 | -3.16 | -3.22 | -3.28 | -3.34 |
| 19.0 | -3.05 | -3.12 | -3.18 | -3.24 | -3.30 | -3.36 | -3.43 |
| 19.5 | -3.13 | -3.20 | -3.26 | -3.33 | -3.39 | -3.45 | -3.52 |
| 20.0 | -3.21 | -3.28 | -3.35 | -3.41 | -3.48 | -3.54 | -3.61 |
| 20.5 | -3.30 | -3.36 | -3.43 | -3.50 | -3.56 | -3.63 | -3.70 |
| 21.0 | -3.38 | -3.44 | -3.51 | -3.58 | -3.65 | -3.72 | -3.79 |
| 21.5 | -3.46 | -3.53 | -3.60 | -3.67 | -3.74 | -3.81 | -3.88 |
| 22.0 | -3.54 | -3.61 | -3.68 | -3.75 | -3.82 | -3.89 | -3.96 |
| 22.5 | -3.62 | -3.69 | -3.76 | -3.83 | -3.91 | -3.98 | -4.05 |
| 23.0 | -3.70 | -3.77 | -3.85 | -3.92 | -3.99 | -4.07 | -4.14 |
| 23.5 | -3.78 | -3.85 | -3.93 | -4.00 | -4.08 | -4.16 | -4.23 |
| 24.0 | -3.86 | -3.93 | -4.01 | -4.09 | -4.17 | -4.25 | -4.32 |
| 24.5 | -3.94 | -4.02 | -4.09 | -4.17 | -4.25 | -4.33 | -4.41 |
| 25.0 | -4.01 | -4.10 | -4.18 | -4.26 | -4.34 | -4.42 | -4.50 |
| 25.5 | -4.10 | -4.18 | -4.26 | -4.34 | -4.43 | -4.51 | -4.59 |
| 26.0 | -4.18 | -4.26 | -4.34 | -4.43 | -4.51 | -4.60 | -4.68 |
| 26.5 | -4.26 | -4.34 | -4.43 | -4.51 | -4.60 | -4.69 | -4.77 |
| 27.0 | -4.34 | -4.42 | -4.51 | -4.60 | -4.69 | -4.77 | -4.86 |
| 27.5 | -4.41 | -4.50 | -4.59 | -4.68 | -4.77 | -4.86 | -4.95 |
| 28.0 | -4.49 | -4.59 | -4.68 | -4.77 | -4.86 | -4.95 | -5.04 |
| 28.5 | -4.57 | -4.67 | -4.76 | -4.85 | -4.95 | -5.04 | -5.13 |
| 29.0 | -4.65 | -4.75 | -4.84 | -4.94 | -5.03 | -5.13 | -5.22 |
| 29.5 | -4.73 | -4.83 | -4.93 | -5.02 | -5.12 | -5.21 | -5.31 |
| 30.0 | -4.81 | -4.91 | -5.01 | -5.11 | -5.20 | -5.30 | -5.40 |

Table I.1a. Correction of barometer readings to standard temperature (0°C)

| Temperature/°C | Barometer reading mmHg | | | | | | | | | |
|----------------|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 700 | 720 | 740 | 760 | 780 | 800 | 820 | 840 | 860 | 880 |
| 10.0 | -1.14 | -1.17 | -1.21 | -1.24 | -1.27 | -1.30 | -1.34 | -1.37 | -1.40 | -1.44 |
| 10.5 | -1.20 | -1.23 | -1.27 | -1.30 | -1.34 | -1.37 | -1.40 | -1.44 | -1.47 | -1.51 |
| 11.0 | -1.26 | -1.29 | -1.33 | -1.36 | -1.40 | -1.44 | -1.47 | -1.51 | -1.54 | -1.58 |
| 11.5 | -1.31 | -1.35 | -1.39 | -1.43 | -1.46 | -1.50 | -1.54 | -1.58 | -1.61 | -1.65 |
| 12.0 | -1.37 | -1.41 | -1.45 | -1.49 | -1.53 | -1.57 | -1.60 | -1.64 | -1.68 | -1.72 |
| 12.5 | -1.43 | -1.47 | -1.51 | -1.55 | -1.59 | -1.63 | -1.67 | -1.71 | -1.75 | -1.79 |
| 13.0 | -1.48 | -1.53 | -1.57 | -1.61 | -1.65 | -1.70 | -1.74 | -1.78 | -1.82 | -1.86 |
| 13.5 | -1.54 | -1.58 | -1.63 | -1.67 | -1.72 | -1.76 | -1.80 | -1.85 | -1.89 | -1.94 |
| 14.0 | -1.60 | -1.64 | -1.69 | -1.73 | -1.78 | -1.83 | -1.87 | -1.92 | -1.96 | -2.01 |
| 14.5 | -1.65 | -1.70 | -1.75 | -1.80 | -1.84 | -1.89 | -1.94 | -1.98 | -2.03 | -2.08 |
| 15.0 | -1.71 | -1.76 | -1.81 | -1.86 | -1.91 | -1.96 | -2.00 | -2.05 | -2.10 | -2.15 |
| 15.5 | -1.77 | -1.82 | -1.87 | -1.92 | -1.97 | -2.02 | -2.07 | -2.12 | -2.17 | -2.22 |
| 16.0 | -1.82 | -1.88 | -1.93 | -1.98 | -2.03 | -2.09 | -2.14 | -2.19 | -2.24 | -2.29 |
| 16.5 | -1.88 | -1.94 | -1.99 | -2.04 | -2.10 | -2.15 | -2.20 | -2.26 | -2.31 | -2.37 |
| 17.0 | -1.94 | -1.99 | -2.05 | -2.10 | -2.16 | -2.22 | -2.27 | -2.33 | -2.38 | -2.44 |
| 17.5 | -2.00 | -2.05 | -2.11 | -2.17 | -2.22 | -2.28 | -2.34 | -2.39 | -2.45 | -2.51 |
| 18.0 | -2.05 | -2.11 | -2.17 | -2.23 | -2.29 | -2.35 | -2.40 | -2.46 | -2.52 | -2.58 |
| 18.5 | -2.11 | -2.17 | -2.23 | -2.29 | -2.35 | -2.41 | -2.47 | -2.53 | -2.59 | -2.65 |
| 19.0 | -2.17 | -2.23 | -2.29 | -2.35 | -2.41 | -2.48 | -2.54 | -2.60 | -2.66 | -2.72 |
| 19.5 | -2.22 | -2.29 | -2.35 | -2.41 | -2.48 | -2.54 | -2.60 | -2.67 | -2.73 | -2.79 |
| 20.0 | -2.28 | -2.34 | -2.41 | -2.47 | -2.54 | -2.60 | -2.67 | -2.74 | -2.80 | -2.87 |
| 20.5 | -2.34 | -2.40 | -2.47 | -2.54 | -2.60 | -2.67 | -2.74 | -2.80 | -2.87 | -2.94 |
| 21.0 | -2.39 | -2.46 | -2.53 | -2.60 | -2.67 | -2.73 | -2.80 | -2.87 | -2.94 | -3.01 |
| 21.5 | -2.45 | -2.52 | -2.59 | -2.66 | -2.73 | -2.80 | -2.87 | -2.94 | -3.01 | -3.08 |
| 22.0 | -2.51 | -2.58 | -2.65 | -2.72 | -2.79 | -2.86 | -2.94 | -3.01 | -3.08 | -3.15 |
| 22.5 | -2.56 | -2.64 | -2.71 | -2.78 | -2.86 | -2.93 | -3.00 | -3.08 | -3.15 | -3.22 |
| 23.0 | -2.62 | -2.69 | -2.77 | -2.84 | -2.92 | -2.99 | -3.07 | -3.14 | -3.22 | -3.29 |
| 23.5 | -2.68 | -2.75 | -2.83 | -2.91 | -2.98 | -3.06 | -3.14 | -3.21 | -3.29 | -3.36 |
| 24.0 | -2.73 | -2.81 | -2.89 | -2.97 | -3.05 | -3.12 | -3.20 | -3.28 | -3.36 | -3.44 |
| 24.5 | -2.79 | -2.87 | -2.95 | -3.03 | -3.11 | -3.19 | -3.27 | -3.35 | -3.43 | -3.51 |
| 25.0 | -2.85 | -2.93 | -3.01 | -3.09 | -3.17 | -3.25 | -3.33 | -3.42 | -3.50 | -3.58 |
| 25.5 | -2.90 | -2.99 | -3.07 | -3.15 | -3.24 | -3.32 | -3.40 | -3.48 | -3.57 | -3.65 |
| 26.0 | -2.96 | -3.04 | -3.13 | -3.21 | -3.30 | -3.38 | -3.47 | -3.55 | -3.64 | -3.72 |
| 26.5 | -3.02 | -3.10 | -3.19 | -3.28 | -3.36 | -3.45 | -3.53 | -3.62 | -3.71 | -3.79 |
| 27.0 | -3.07 | -3.16 | -3.25 | -3.34 | -3.42 | -3.51 | -3.60 | -3.69 | -3.78 | -3.86 |
| 27.5 | -3.13 | -3.22 | -3.31 | -3.40 | -3.49 | -3.58 | -3.67 | -3.76 | -3.85 | -3.93 |
| 28.0 | -3.19 | -3.28 | -3.37 | -3.46 | -3.55 | -3.64 | -3.73 | -3.82 | -3.91 | -4.01 |
| 28.5 | -3.24 | -3.34 | -3.43 | -3.52 | -3.61 | -3.71 | -3.80 | -3.89 | -3.98 | -4.08 |
| 29.0 | -3.30 | -3.39 | -3.49 | -3.58 | -3.68 | -3.77 | -3.87 | -3.96 | -4.05 | -4.15 |
| 29.5 | -3.36 | -3.45 | -3.55 | -3.64 | -3.74 | -3.84 | -3.93 | -4.03 | -4.12 | -4.22 |
| 30.0 | -3.41 | -3.51 | -3.61 | -3.71 | -3.80 | -3.90 | -4.00 | -4.10 | -4.19 | -4.29 |

APPENDIX I — BAROMETRIC PRESSURE CORRECTIONS

Table I.2. Correction of barometer readings to standard gravity (9.806 65 m/s²) for latitude variation

| Latitude (N or S)/degrees | Barometer reading hPa or mbar | | | | | | |
|---------------------------|-------------------------------|-------|-------|-------|-------|-------|-------|
| | 940 | 960 | 980 | 1000 | 1020 | 1040 | 1060 |
| 90 | 2.44 | 2.49 | 2.54 | 2.59 | 2.64 | 2.70 | 2.75 |
| 85 | 2.40 | 2.45 | 2.50 | 2.55 | 2.60 | 2.65 | 2.71 |
| 80 | 2.29 | 2.34 | 2.38 | 2.43 | 2.48 | 2.53 | 2.58 |
| 75 | 2.10 | 2.15 | 2.19 | 2.24 | 2.28 | 2.33 | 2.37 |
| 70 | 1.86 | 1.89 | 1.93 | 1.97 | 2.01 | 2.05 | 2.09 |
| 65 | 1.55 | 1.58 | 1.61 | 1.65 | 1.68 | 1.71 | 1.75 |
| 60 | 1.19 | 1.22 | 1.24 | 1.27 | 1.30 | 1.32 | 1.35 |
| 58 | 1.04 | 1.06 | 1.08 | 1.11 | 1.13 | 1.15 | 1.17 |
| 56 | 0.88 | 0.90 | 0.92 | 0.94 | 0.96 | 0.98 | 0.99 |
| 54 | 0.72 | 0.73 | 0.75 | 0.77 | 0.78 | 0.80 | 0.81 |
| 52 | 0.55 | 0.56 | 0.58 | 0.59 | 0.60 | 0.61 | 0.62 |
| 50 | 0.38 | 0.39 | 0.40 | 0.41 | 0.42 | 0.42 | 0.43 |
| 49 | 0.30 | 0.30 | 0.31 | 0.32 | 0.32 | 0.33 | 0.34 |
| 48 | 0.21 | 0.21 | 0.22 | 0.23 | 0.23 | 0.23 | 0.24 |
| 47 | 0.13 | 0.13 | 0.13 | 0.13 | 0.14 | 0.14 | 0.14 |
| 46 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| 45 | -0.05 | -0.05 | -0.05 | -0.05 | -0.05 | -0.05 | -0.05 |
| 44 | -0.13 | -0.14 | -0.14 | -0.14 | -0.14 | -0.15 | -0.15 |
| 43 | -0.22 | -0.22 | -0.23 | -0.23 | -0.24 | -0.24 | -0.25 |
| 42 | -0.31 | -0.31 | -0.32 | -0.33 | -0.33 | -0.34 | -0.35 |
| 41 | -0.39 | -0.40 | -0.41 | -0.42 | -0.43 | -0.43 | -0.44 |
| 40 | -0.48 | -0.49 | -0.50 | -0.51 | -0.52 | -0.53 | -0.54 |
| 39 | -0.56 | -0.57 | -0.59 | -0.60 | -0.61 | -0.62 | -0.63 |
| 38 | -0.65 | -0.66 | -0.67 | -0.69 | -0.70 | -0.71 | -0.73 |
| 37 | -0.73 | -0.75 | -0.76 | -0.78 | -0.79 | -0.81 | -0.82 |
| 36 | -0.81 | -0.83 | -0.85 | -0.86 | -0.88 | -0.90 | -0.92 |
| 35 | -0.89 | -0.91 | -0.93 | -0.95 | -0.97 | -0.99 | -1.01 |
| 34 | -0.97 | -1.00 | -1.02 | -1.04 | -1.06 | -1.08 | -1.10 |
| 33 | -1.05 | -1.08 | -1.10 | -1.12 | -1.14 | -1.17 | -1.19 |
| 32 | -1.13 | -1.16 | -1.18 | -1.20 | -1.23 | -1.25 | -1.28 |
| 31 | -1.21 | -1.24 | -1.26 | -1.29 | -1.31 | -1.34 | -1.36 |
| 30 | -1.28 | -1.31 | -1.34 | -1.37 | -1.39 | -1.42 | -1.45 |
| 29 | -1.36 | -1.39 | -1.42 | -1.45 | -1.47 | -1.50 | -1.53 |
| 28 | -1.43 | -1.46 | -1.49 | -1.52 | -1.55 | -1.58 | -1.61 |
| 27 | -1.50 | -1.53 | -1.57 | -1.60 | -1.63 | -1.66 | -1.69 |
| 26 | -1.57 | -1.60 | -1.64 | -1.67 | -1.70 | -1.74 | -1.77 |
| 25 | -1.64 | -1.67 | -1.71 | -1.74 | -1.78 | -1.81 | -1.85 |
| 24 | -1.70 | -1.74 | -1.78 | -1.81 | -1.85 | -1.88 | -1.92 |
| 23 | -1.77 | -1.80 | -1.84 | -1.88 | -1.92 | -1.95 | -1.99 |
| 22 | -1.83 | -1.87 | -1.91 | -1.94 | -1.98 | -2.02 | -2.06 |
| 21 | -1.89 | -1.93 | -1.97 | -2.01 | -2.05 | -2.09 | -2.13 |
| 20 | -1.94 | -1.98 | -2.03 | -2.07 | -2.11 | -2.15 | -2.19 |
| 19 | -2.00 | -2.04 | -2.08 | -2.12 | -2.17 | -2.21 | -2.25 |
| 18 | -2.05 | -2.09 | -2.14 | -2.18 | -2.22 | -2.27 | -2.31 |
| 17 | -2.10 | -2.14 | -2.19 | -2.23 | -2.28 | -2.32 | -2.37 |
| 16 | -2.15 | -2.19 | -2.24 | -2.28 | -2.33 | -2.37 | -2.42 |
| 15 | -2.19 | -2.24 | -2.28 | -2.33 | -2.38 | -2.42 | -2.47 |
| 14 | -2.23 | -2.28 | -2.33 | -2.37 | -2.42 | -2.47 | -2.52 |
| 13 | -2.27 | -2.32 | -2.37 | -2.42 | -2.46 | -2.51 | -2.56 |
| 12 | -2.31 | -2.36 | -2.40 | -2.45 | -2.50 | -2.55 | -2.60 |
| 11 | -2.34 | -2.39 | -2.44 | -2.49 | -2.54 | -2.59 | -2.64 |
| 10 | -2.37 | -2.42 | -2.47 | -2.52 | -2.57 | -2.62 | -2.67 |
| 9 | -2.40 | -2.45 | -2.50 | -2.55 | -2.60 | -2.65 | -2.71 |
| 8 | -2.42 | -2.48 | -2.53 | -2.58 | -2.63 | -2.68 | -2.73 |
| 7 | -2.45 | -2.50 | -2.55 | -2.60 | -2.65 | -2.71 | -2.76 |
| 6 | -2.47 | -2.52 | -2.57 | -2.62 | -2.68 | -2.73 | -2.78 |
| 5 | -2.48 | -2.54 | -2.59 | -2.64 | -2.69 | -2.75 | -2.80 |
| 4 | -2.50 | -2.55 | -2.60 | -2.66 | -2.71 | -2.76 | -2.82 |
| 3 | -2.51 | -2.56 | -2.61 | -2.67 | -2.72 | -2.77 | -2.83 |
| 2 | -2.51 | -2.57 | -2.62 | -2.67 | -2.73 | -2.78 | -2.84 |
| 1 | -2.52 | -2.57 | -2.63 | -2.68 | -2.73 | -2.79 | -2.84 |
| 0 | -2.52 | -2.57 | -2.63 | -2.68 | -2.73 | -2.79 | -2.84 |

APPENDIX I — BAROMETRIC PRESSURE CORRECTIONS

Table I.2a. Correction of barometer readings to standard gravity (9.806 65 m/s²) for latitude variation

| Latitude (N or S)/degrees | Barometer reading mmHg | | | | | | | | | |
|---------------------------|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 700 | 720 | 740 | 760 | 780 | 800 | 820 | 840 | 860 | 880 |
| 90 | 1.82 | 1.87 | 1.92 | 1.97 | 2.02 | 2.07 | 2.13 | 2.18 | 2.23 | 2.28 |
| 85 | 1.79 | 1.84 | 1.89 | 1.94 | 1.99 | 2.04 | 2.09 | 2.14 | 2.20 | 2.25 |
| 80 | 1.70 | 1.75 | 1.80 | 1.85 | 1.90 | 1.95 | 2.00 | 2.04 | 2.09 | 2.14 |
| 75 | 1.57 | 1.61 | 1.66 | 1.70 | 1.75 | 1.79 | 1.84 | 1.88 | 1.92 | 1.97 |
| 70 | 1.38 | 1.42 | 1.46 | 1.50 | 1.54 | 1.58 | 1.62 | 1.66 | 1.70 | 1.74 |
| 65 | 1.15 | 1.19 | 1.22 | 1.25 | 1.28 | 1.32 | 1.35 | 1.38 | 1.42 | 1.45 |
| 60 | 0.89 | 0.91 | 0.94 | 0.97 | 0.99 | 1.02 | 1.04 | 1.07 | 1.09 | 1.12 |
| 58 | 0.77 | 0.80 | 0.82 | 0.84 | 1.86 | 0.89 | 0.91 | 0.93 | 0.95 | 0.97 |
| 56 | 0.66 | 0.68 | 0.69 | 0.71 | 0.73 | 0.75 | 0.77 | 0.79 | 0.81 | 0.83 |
| 54 | 0.54 | 0.55 | 0.57 | 0.58 | 0.60 | 0.61 | 0.63 | 0.64 | 0.66 | 0.67 |
| 52 | 0.41 | 0.42 | 0.44 | 0.45 | 0.46 | 0.47 | 0.48 | 0.49 | 0.51 | 0.52 |
| 50 | 0.29 | 0.29 | 0.30 | 0.31 | 0.32 | 0.33 | 0.33 | 0.34 | 0.35 | 0.36 |
| 49 | 0.22 | 0.23 | 0.23 | 0.24 | 0.25 | 0.25 | 0.26 | 0.27 | 0.27 | 0.28 |
| 48 | 0.16 | 0.16 | 0.17 | 0.17 | 0.18 | 0.18 | 0.19 | 0.19 | 0.19 | 0.20 |
| 47 | 0.09 | 0.10 | 0.10 | 0.10 | 0.10 | 0.11 | 0.11 | 0.11 | 0.12 | 0.12 |
| 46 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.04 | 0.04 |
| 45 | -0.04 | -0.04 | -0.04 | -0.04 | -0.04 | -0.04 | -0.04 | -0.04 | -0.04 | -0.04 |
| 44 | -0.10 | -0.10 | -0.10 | -0.11 | -0.11 | -0.11 | -0.12 | -0.12 | -0.12 | -0.12 |
| 43 | -0.16 | -0.17 | -0.17 | -0.18 | -0.18 | -0.19 | -0.19 | -0.20 | -0.20 | -0.21 |
| 42 | -0.23 | -0.23 | -0.24 | -0.25 | -0.25 | -0.26 | -0.27 | -0.27 | -0.28 | -0.29 |
| 41 | -0.29 | -0.30 | -0.31 | -0.32 | -0.33 | -0.33 | -0.34 | -0.35 | -0.36 | -0.37 |
| 40 | -0.36 | -0.37 | -0.38 | -0.39 | -0.40 | -0.41 | -0.42 | -0.43 | -0.44 | -0.45 |
| 39 | -0.42 | -0.43 | -0.44 | -0.45 | -0.47 | -0.48 | -0.49 | -0.50 | -0.51 | -0.53 |
| 38 | -0.48 | -0.49 | -0.51 | -0.52 | -0.54 | -0.55 | -0.56 | -0.58 | -0.59 | -0.60 |
| 37 | -0.54 | -0.56 | -0.57 | -0.59 | -0.61 | -0.62 | -0.64 | -0.65 | -0.67 | -0.68 |
| 36 | -0.60 | -0.62 | -0.64 | -0.66 | -0.67 | -0.69 | -0.71 | -0.73 | -0.74 | -0.76 |
| 35 | -0.67 | -0.68 | -0.70 | -0.72 | -0.74 | -0.76 | -0.78 | -0.80 | -0.82 | -0.84 |
| 34 | -0.73 | -0.75 | -0.77 | -0.79 | -0.81 | -0.83 | -0.85 | -0.87 | -0.89 | -0.91 |
| 33 | -0.79 | -0.81 | -0.83 | -0.85 | -0.88 | -0.90 | -0.92 | -0.94 | -0.96 | -0.99 |
| 32 | -0.84 | -0.87 | -0.89 | -0.92 | -0.94 | -0.96 | -0.99 | -1.01 | -1.04 | -1.06 |
| 31 | -0.90 | -0.93 | -0.95 | -0.98 | -1.00 | -1.03 | -1.06 | -1.08 | -1.11 | -1.13 |
| 30 | -0.96 | -0.98 | -1.01 | -1.04 | -1.07 | -1.09 | -1.12 | -1.15 | -1.18 | -1.20 |
| 29 | -1.01 | -1.04 | -1.07 | -1.10 | -1.13 | -1.16 | -1.19 | -1.21 | -1.24 | -1.27 |
| 28 | -1.07 | -1.10 | -1.13 | -1.16 | -1.19 | -1.22 | -1.25 | -1.28 | -1.31 | -1.34 |
| 27 | -1.12 | -1.15 | -1.18 | -1.21 | -1.25 | -1.28 | -1.31 | -1.34 | -1.37 | -1.41 |
| 26 | -1.17 | -1.20 | -1.24 | -1.27 | -1.30 | -1.34 | -1.37 | -1.40 | -1.44 | -1.47 |
| 25 | -1.22 | -1.25 | -1.29 | -1.32 | -1.36 | -1.39 | -1.43 | -1.46 | -1.50 | -1.53 |
| 24 | -1.27 | -1.30 | -1.34 | -1.38 | -1.41 | -1.45 | -1.49 | -1.52 | -1.56 | -1.59 |
| 23 | -1.32 | -1.35 | -1.39 | -1.43 | -1.47 | -1.50 | -1.54 | -1.58 | -1.62 | -1.65 |
| 22 | -1.36 | -1.40 | -1.44 | -1.48 | -1.52 | -1.56 | -1.59 | -1.63 | -1.67 | -1.71 |
| 21 | -1.40 | -1.44 | -1.48 | -1.52 | -1.57 | -1.61 | -1.65 | -1.69 | -1.73 | -1.77 |
| 20 | -1.45 | -1.49 | -1.53 | -1.57 | -1.61 | -1.65 | -1.69 | -1.74 | -1.78 | -1.82 |
| 19 | -1.49 | -1.53 | -1.57 | -1.61 | -1.66 | -1.70 | -1.74 | -1.78 | -1.83 | -1.87 |
| 18 | -1.53 | -1.57 | -1.61 | -1.66 | -1.70 | -1.74 | -1.79 | -1.83 | -1.88 | -1.92 |
| 17 | -1.56 | -1.61 | -1.65 | -1.70 | -1.74 | -1.79 | -1.83 | -1.88 | -1.92 | -1.96 |
| 16 | -1.60 | -1.64 | -1.69 | -1.73 | -1.78 | -1.83 | -1.87 | -1.92 | -1.96 | -2.01 |
| 15 | -1.63 | -1.68 | -1.72 | -1.77 | -1.82 | -1.86 | -1.91 | -1.96 | -2.00 | -2.05 |
| 14 | -1.66 | -1.71 | -1.76 | -1.80 | -1.85 | -1.90 | -1.95 | -1.99 | -2.04 | -2.09 |
| 13 | -1.69 | -1.74 | -1.79 | -1.84 | -1.88 | -1.93 | -1.98 | -2.03 | -2.08 | -2.13 |
| 12 | -1.72 | -1.77 | -1.82 | -1.86 | -1.91 | -1.96 | -2.01 | -2.06 | -2.11 | -2.16 |
| 11 | -1.74 | -1.79 | -1.84 | -1.89 | -1.94 | -1.99 | -2.04 | -2.09 | -2.14 | -2.19 |
| 10 | -1.77 | -1.82 | -1.87 | -1.92 | -1.97 | -2.02 | -2.07 | -2.12 | -2.17 | -2.22 |
| 9 | -1.79 | -1.84 | -1.89 | -1.94 | -1.99 | -2.04 | -2.09 | -2.14 | -2.20 | -2.25 |
| 8 | -1.81 | -1.86 | -1.91 | -1.96 | -2.01 | -2.06 | -2.12 | -2.17 | -2.22 | -2.27 |
| 7 | -1.82 | -1.87 | -1.93 | -1.98 | -2.03 | -2.08 | -2.13 | -2.19 | -2.24 | -2.29 |
| 6 | -1.84 | -1.89 | -1.94 | -1.99 | -2.05 | -2.10 | -2.15 | -2.20 | -2.26 | -2.31 |
| 5 | -1.85 | -1.90 | -1.95 | -2.01 | -2.06 | -2.11 | -2.17 | -2.22 | -2.27 | -2.32 |
| 4 | -1.86 | -1.91 | -1.97 | -2.02 | -2.07 | -2.12 | -2.18 | -2.23 | -2.28 | -2.34 |
| 3 | -1.87 | -1.92 | -1.97 | -2.03 | -2.08 | -2.13 | -2.19 | -2.24 | -2.29 | -2.35 |
| 2 | -1.87 | -1.93 | -1.98 | -2.03 | -2.09 | -2.14 | -2.19 | -2.25 | -2.30 | -2.35 |
| 1 | -1.88 | -1.93 | -1.98 | -2.04 | -2.09 | -2.14 | -2.20 | -2.25 | -2.30 | -2.36 |
| 0 | -1.88 | -1.93 | -1.98 | -2.04 | -2.09 | -2.15 | -2.20 | -2.25 | -2.31 | -2.36 |

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