

SOUTHWESTERN RADIOLOGICAL HEALTH LABORATORY

INTRALABORATORY TECHNICAL REPORT

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A TABLE FOR DETERMINING  
THE TRUE TIME REPRESENTING AN OBSERVED COUNT RATE

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Introduction to Tables

The accompanying tables were compiled as an aid in selecting a time correction for the radioactive decay which occurs during counting. For example, when a count is made, neither the time at the start nor the time at the end of counting is a true representation of the disintegration rate calculated from the observed counts. However, there is a time during the counting interval which is correct for this rate of disintegration. A value,  $\Delta t$ , obtained from the table, when added to the time at the start of the count produces the desired true time.

The most obvious use for the time correction tables would be in work concerned with short-lived radionuclides, as encountered in reactors and activation analysis. In any instance, the tables are useful whenever the counting time is appreciable as compared to the half life of the radionuclide being counted.

### Mathematical motivation

Definition of variables:

$N_0$  = number of radioactive atoms at start of count.

$N_T$  = number of radioactive atoms at end of count time(T).

T = count time.

$t_{1/2}$  = half life of radionuclide in question.

$\lambda$  = lambda =  $\ln 2 / t_{1/2}$

$\Delta t$  = time correction (tabulated results).

From the standard decay equations:

$$-dN/dt = \lambda N \quad \text{and,}$$

$$N = N_0 e^{-\lambda t}$$

then at time T;

$$N_T = N_0 e^{-\lambda T}$$

$$\Delta N = (N_0 - N_T) = (N_0 - N_0 e^{-\lambda T}) = N_0 (1 - e^{-\lambda T}).$$

The DPM observed for count time T is:

$$\text{DPM} = \Delta N / T = N_0 (1 - e^{-\lambda T}) / T$$

but this observed DPM actually occurred after some  $\Delta t$ .

Therefore, since:

$$\text{DPM} = -dN/dt = \lambda N = \lambda N_0 e^{-\lambda \Delta t},$$

and equating DPM's:

$$N_0 (1 - e^{-\lambda T}) / T = \lambda N_0 e^{-\lambda \Delta t},$$

it follows that:

$$e^{-\lambda \Delta t} = (1 - e^{-\lambda T}) / \lambda T \quad \text{or,}$$

$$-\lambda \Delta t = \ln \{ (1 - e^{-\lambda T}) / \lambda T \}.$$

Substituting  $\ln 2 / t_{1/2}$  for  $\lambda$ :

$$-\Delta t \ln 2 / t_{1/2} = \ln \{ t_{1/2} (1 - e^{-T \ln 2 / t_{1/2}}) / (T \ln 2) \}.$$

Therefore:

$$\Delta t = -t_{1/2} \ln \{ t_{1/2} (1 - e^{-T \ln 2 / t_{1/2}}) / (T \ln 2) \} / \ln 2.$$

Defining R (or half lives counted) =  $T/t_{1/2}$  ,  
 this relationship now becomes:

$$\Delta t = -t_{1/2} \ln(1 - e^{-R \ln 2}) / (R \ln 2) / \ln 2 .$$

For a constant R in the above expression, it is immediately apparent, as is borne out by the tabulated values for  $\Delta t$ , that  $\Delta t$  is directly proportional to  $t_{1/2}$ .

### Use of the Tables

The physical structure of the tables includes the values of R, half life, and the time correction  $\Delta t$ , where:

R = Counting Time/Half Life = number of half lives counted, and

$\Delta t$  = Time increment to be added to the chronological time at the start of the count. The resulting time is the true chronological time for the observed disintegration rate.

A necessary restriction on the use of the tables is that the count time and half life must have the same units of time. In the event that the half life under consideration is greater than the largest tabulated value of 60, the units may be changed to those of the next higher time unit for both the half life and the counting time, or the R ratio may be located and the value of  $\Delta t$  multiplied by the appropriate factor to obtain the required correction (See sample problem below).

### Sample problem

Say one has:

$$t_{1/2} = 120 \text{ min.}$$

$$\text{and } T = 30 \text{ min.}$$

Therefore:

$$R = T/t_{1/2} = 30 \text{ min.} / 120 \text{ min.} = 0.25.$$

Since the half life scale ( $t_{1/2}$ ) is limited to 60 units, the  $t_{1/2} = 120 \text{ min.}$  can be reduced to  $t_{1/2} = 2 \text{ hrs}$  while R remains = 0.25, and  $T = 0.5 \text{ hrs.}$  Therefore, for a R = 0.25 and a  $t_{1/2} = 2 \text{ hrs.}$ , the  $\Delta t$  may be read directly from the table:

$$\text{i.e. } \Delta t = 0.25 \text{ hrs. ;}$$

or working in minutes, for  $R = 0.25$  and  $t_{1/2} = 60$  min., the  $\Delta t$  value  $\approx 7.39$  min. Since the  $t_{1/2}$  we are actually concerned with is 120 min., or exactly twice (120 min. / 60 min. = 2) the 60 units limit of the  $t_{1/2}$  scale, for  $t_{1/2} = 120$  min., the value of  $\Delta t = 2 \times 7.39$  min.  $\approx 14.78$  min.  $\approx$  ca. 0.25 hrs.

The slight discrepancy in the results of the alternative approaches is due to the rounding incorporated in the computerized compilation. The effect of this rounding process is most prominent when using the values at the lower end of the  $t_{1/2}$  units scale.

|      | .5  | 1.0  | 1.5  | 2.0  | 2.5  | 3.0  | 3.5  | 4.0  | 4.5  | 5.0  |
|------|-----|------|------|------|------|------|------|------|------|------|
| .05  | .01 | .02  | .04  | .05  | .06  | .07  | .09  | .10  | .11  | .12  |
| .10  | .02 | .05  | .07  | .10  | .12  | .15  | .17  | .20  | .22  | .25  |
| .15  | .04 | .07  | .11  | .15  | .19  | .22  | .26  | .30  | .33  | .37  |
| .20  | .05 | .10  | .15  | .20  | .25  | .30  | .35  | .40  | .44  | .49  |
| .25  | .06 | .12  | .18  | .25  | .31  | .37  | .43  | .49  | .55  | .62  |
| .30  | .07 | .15  | .22  | .29  | .37  | .44  | .52  | .59  | .66  | .74  |
| .35  | .09 | .17  | .26  | .34  | .43  | .51  | .60  | .69  | .77  | .86  |
| .40  | .10 | .20  | .29  | .39  | .49  | .59  | .68  | .78  | .88  | .98  |
| .45  | .11 | .22  | .33  | .44  | .55  | .66  | .77  | .88  | .99  | 1.10 |
| .50  | .12 | .24  | .36  | .49  | .61  | .73  | .85  | .97  | 1.09 | 1.21 |
| .55  | .13 | .27  | .40  | .53  | .67  | .80  | .93  | 1.07 | 1.20 | 1.33 |
| .60  | .14 | .29  | .43  | .58  | .72  | .87  | 1.01 | 1.16 | 1.30 | 1.45 |
| .65  | .16 | .31  | .47  | .63  | .78  | .94  | 1.09 | 1.25 | 1.41 | 1.56 |
| .70  | .17 | .34  | .50  | .67  | .84  | 1.01 | 1.18 | 1.34 | 1.51 | 1.68 |
| .75  | .18 | .36  | .54  | .72  | .90  | 1.08 | 1.26 | 1.44 | 1.61 | 1.79 |
| .80  | .19 | .38  | .57  | .76  | .95  | 1.14 | 1.34 | 1.53 | 1.72 | 1.91 |
| .85  | .20 | .40  | .61  | .81  | 1.01 | 1.21 | 1.41 | 1.62 | 1.82 | 2.02 |
| .90  | .21 | .43  | .64  | .85  | 1.07 | 1.28 | 1.49 | 1.71 | 1.92 | 2.13 |
| .95  | .22 | .45  | .67  | .90  | 1.12 | 1.35 | 1.57 | 1.80 | 2.02 | 2.25 |
| 1.00 | .24 | .47  | .71  | .94  | 1.18 | 1.41 | 1.65 | 1.88 | 2.12 | 2.36 |
| 1.05 | .25 | .49  | .74  | .99  | 1.23 | 1.48 | 1.73 | 1.97 | 2.22 | 2.47 |
| 1.10 | .26 | .52  | .77  | 1.03 | 1.29 | 1.55 | 1.80 | 2.06 | 2.32 | 2.58 |
| 1.15 | .27 | .54  | .81  | 1.07 | 1.34 | 1.61 | 1.88 | 2.15 | 2.42 | 2.69 |
| 1.20 | .28 | .56  | .84  | 1.12 | 1.40 | 1.68 | 1.96 | 2.23 | 2.51 | 2.79 |
| 1.25 | .29 | .58  | .87  | 1.16 | 1.45 | 1.74 | 2.03 | 2.32 | 2.61 | 2.90 |
| 1.30 | .30 | .60  | .90  | 1.20 | 1.50 | 1.80 | 2.11 | 2.41 | 2.71 | 3.01 |
| 1.35 | .31 | .62  | .93  | 1.25 | 1.56 | 1.87 | 2.18 | 2.49 | 2.80 | 3.11 |
| 1.40 | .32 | .64  | .97  | 1.29 | 1.61 | 1.93 | 2.25 | 2.58 | 2.90 | 3.22 |
| 1.45 | .33 | .66  | 1.00 | 1.33 | 1.66 | 1.99 | 2.32 | 2.66 | 2.99 | 3.32 |
| 1.50 | .34 | .69  | 1.03 | 1.37 | 1.71 | 2.06 | 2.40 | 2.74 | 3.09 | 3.43 |
| 1.55 | .35 | .71  | 1.06 | 1.41 | 1.77 | 2.12 | 2.47 | 2.83 | 3.18 | 3.53 |
| 1.60 | .36 | .73  | 1.09 | 1.45 | 1.82 | 2.18 | 2.54 | 2.91 | 3.27 | 3.63 |
| 1.65 | .37 | .75  | 1.12 | 1.49 | 1.87 | 2.24 | 2.62 | 2.99 | 3.36 | 3.74 |
| 1.70 | .38 | .77  | 1.15 | 1.53 | 1.92 | 2.30 | 2.69 | 3.07 | 3.45 | 3.84 |
| 1.75 | .39 | .79  | 1.18 | 1.58 | 1.97 | 2.36 | 2.76 | 3.15 | 3.54 | 3.94 |
| 1.80 | .40 | .81  | 1.21 | 1.62 | 2.02 | 2.42 | 2.83 | 3.23 | 3.63 | 4.04 |
| 1.85 | .41 | .83  | 1.24 | 1.65 | 2.07 | 2.48 | 2.90 | 3.31 | 3.72 | 4.14 |
| 1.90 | .42 | .85  | 1.27 | 1.69 | 2.12 | 2.54 | 2.97 | 3.39 | 3.81 | 4.24 |
| 1.95 | .43 | .87  | 1.30 | 1.73 | 2.17 | 2.60 | 3.03 | 3.47 | 3.90 | 4.33 |
| 2.00 | .44 | .89  | 1.33 | 1.77 | 2.22 | 2.66 | 3.10 | 3.55 | 3.99 | 4.43 |
| 2.05 | .45 | .91  | 1.36 | 1.81 | 2.26 | 2.72 | 3.17 | 3.62 | 4.08 | 4.53 |
| 2.10 | .46 | .92  | 1.39 | 1.85 | 2.31 | 2.77 | 3.24 | 3.70 | 4.16 | 4.62 |
| 2.15 | .47 | .94  | 1.42 | 1.89 | 2.36 | 2.83 | 3.30 | 3.78 | 4.25 | 4.72 |
| 2.20 | .48 | .96  | 1.44 | 1.93 | 2.41 | 2.89 | 3.37 | 3.85 | 4.33 | 4.81 |
| 2.25 | .49 | .98  | 1.47 | 1.96 | 2.45 | 2.94 | 3.44 | 3.93 | 4.42 | 4.91 |
| 2.30 | .50 | 1.00 | 1.50 | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 | 5.00 |
| 2.35 | .51 | 1.02 | 1.53 | 2.04 | 2.55 | 3.06 | 3.57 | 4.08 | 4.59 | 5.09 |
| 2.40 | .52 | 1.04 | 1.56 | 2.07 | 2.59 | 3.11 | 3.63 | 4.15 | 4.67 | 5.19 |
| 2.45 | .53 | 1.06 | 1.58 | 2.11 | 2.64 | 3.17 | 3.69 | 4.22 | 4.75 | 5.28 |
| 2.50 | .54 | 1.07 | 1.61 | 2.15 | 2.68 | 3.22 | 3.76 | 4.30 | 4.83 | 5.37 |

|      | 5.5  | 6.0  | 6.5  | 7.0  | 7.5  | 8.0  | 8.5  | 9.0  | 9.5   | 10.0  |
|------|------|------|------|------|------|------|------|------|-------|-------|
| .05  | .14  | .15  | .16  | .17  | .19  | .20  | .21  | .22  | .24   | .25   |
| .10  | .27  | .30  | .32  | .35  | .37  | .40  | .42  | .45  | .47   | .50   |
| .15  | .41  | .45  | .48  | .52  | .56  | .59  | .63  | .67  | .71   | .74   |
| .20  | .54  | .59  | .64  | .69  | .74  | .79  | .84  | .89  | .94   | .99   |
| .25  | .69  | .74  | .80  | .86  | .92  | .99  | 1.05 | 1.11 | 1.17  | 1.23  |
| .30  | .81  | .88  | .96  | 1.03 | 1.11 | 1.18 | 1.25 | 1.33 | 1.40  | 1.47  |
| .35  | .94  | 1.03 | 1.11 | 1.20 | 1.29 | 1.37 | 1.46 | 1.54 | 1.63  | 1.71  |
| .40  | 1.07 | 1.17 | 1.27 | 1.37 | 1.47 | 1.56 | 1.66 | 1.76 | 1.86  | 1.95  |
| .45  | 1.21 | 1.31 | 1.42 | 1.53 | 1.64 | 1.75 | 1.86 | 1.97 | 2.08  | 2.19  |
| .50  | 1.34 | 1.46 | 1.58 | 1.70 | 1.82 | 1.94 | 2.06 | 2.19 | 2.31  | 2.43  |
| .55  | 1.46 | 1.60 | 1.73 | 1.86 | 2.00 | 2.13 | 2.26 | 2.40 | 2.53  | 2.66  |
| .60  | 1.59 | 1.74 | 1.88 | 2.03 | 2.17 | 2.32 | 2.46 | 2.61 | 2.75  | 2.90  |
| .65  | 1.72 | 1.88 | 2.03 | 2.19 | 2.35 | 2.50 | 2.66 | 2.82 | 2.97  | 3.13  |
| .70  | 1.85 | 2.02 | 2.18 | 2.35 | 2.52 | 2.69 | 2.85 | 3.02 | 3.19  | 3.36  |
| .75  | 1.97 | 2.15 | 2.33 | 2.51 | 2.69 | 2.87 | 3.05 | 3.23 | 3.41  | 3.59  |
| .80  | 2.10 | 2.29 | 2.48 | 2.67 | 2.86 | 3.05 | 3.24 | 3.43 | 3.62  | 3.82  |
| .85  | 2.22 | 2.43 | 2.63 | 2.83 | 3.03 | 3.23 | 3.44 | 3.64 | 3.84  | 4.04  |
| .90  | 2.35 | 2.56 | 2.77 | 2.99 | 3.20 | 3.41 | 3.62 | 3.84 | 4.05  | 4.27  |
| .95  | 2.47 | 2.69 | 2.92 | 3.14 | 3.37 | 3.59 | 3.82 | 4.04 | 4.27  | 4.49  |
| 1.00 | 2.59 | 2.83 | 3.06 | 3.30 | 3.53 | 3.77 | 4.01 | 4.24 | 4.48  | 4.71  |
| 1.05 | 2.71 | 2.96 | 3.21 | 3.45 | 3.70 | 3.95 | 4.19 | 4.44 | 4.69  | 4.93  |
| 1.10 | 2.83 | 3.09 | 3.35 | 3.61 | 3.86 | 4.12 | 4.38 | 4.64 | 4.89  | 5.15  |
| 1.15 | 2.95 | 3.22 | 3.49 | 3.76 | 4.03 | 4.30 | 4.56 | 4.83 | 5.10  | 5.37  |
| 1.20 | 3.07 | 3.35 | 3.63 | 3.91 | 4.19 | 4.47 | 4.75 | 5.03 | 5.31  | 5.59  |
| 1.25 | 3.19 | 3.48 | 3.77 | 4.06 | 4.35 | 4.64 | 4.93 | 5.22 | 5.51  | 5.80  |
| 1.30 | 3.31 | 3.61 | 3.91 | 4.21 | 4.51 | 4.81 | 5.11 | 5.41 | 5.71  | 6.02  |
| 1.35 | 3.43 | 3.74 | 4.05 | 4.36 | 4.67 | 4.98 | 5.29 | 5.60 | 5.92  | 6.23  |
| 1.40 | 3.54 | 3.86 | 4.18 | 4.51 | 4.83 | 5.15 | 5.47 | 5.79 | 6.12  | 6.44  |
| 1.45 | 3.66 | 3.99 | 4.32 | 4.65 | 4.99 | 5.32 | 5.65 | 5.98 | 6.32  | 6.65  |
| 1.50 | 3.77 | 4.11 | 4.46 | 4.80 | 5.14 | 5.48 | 5.82 | 6.17 | 6.51  | 6.86  |
| 1.55 | 3.89 | 4.24 | 4.59 | 4.94 | 5.30 | 5.65 | 6.00 | 6.36 | 6.71  | 7.06  |
| 1.60 | 4.00 | 4.36 | 4.72 | 5.09 | 5.45 | 5.81 | 6.18 | 6.54 | 6.90  | 7.27  |
| 1.65 | 4.11 | 4.48 | 4.86 | 5.23 | 5.60 | 5.98 | 6.35 | 6.72 | 7.10  | 7.47  |
| 1.70 | 4.22 | 4.60 | 4.99 | 5.37 | 5.75 | 6.14 | 6.52 | 6.91 | 7.29  | 7.67  |
| 1.75 | 4.33 | 4.73 | 5.12 | 5.51 | 5.91 | 6.30 | 6.69 | 7.09 | 7.48  | 7.88  |
| 1.80 | 4.44 | 4.85 | 5.25 | 5.65 | 6.06 | 6.46 | 6.86 | 7.27 | 7.67  | 8.08  |
| 1.85 | 4.55 | 4.96 | 5.38 | 5.79 | 6.21 | 6.62 | 7.03 | 7.45 | 7.86  | 8.27  |
| 1.90 | 4.66 | 5.08 | 5.51 | 5.93 | 6.35 | 6.78 | 7.20 | 7.62 | 8.05  | 8.47  |
| 1.95 | 4.77 | 5.20 | 5.63 | 6.07 | 6.50 | 6.93 | 7.37 | 7.80 | 8.23  | 8.67  |
| 2.00 | 4.87 | 5.32 | 5.76 | 6.20 | 6.65 | 7.09 | 7.53 | 7.98 | 8.42  | 8.86  |
| 2.05 | 4.98 | 5.43 | 5.89 | 6.34 | 6.79 | 7.24 | 7.70 | 8.15 | 8.60  | 9.06  |
| 2.10 | 5.09 | 5.55 | 6.01 | 6.47 | 6.94 | 7.40 | 7.86 | 8.32 | 8.79  | 9.25  |
| 2.15 | 5.19 | 5.66 | 6.14 | 6.61 | 7.08 | 7.55 | 8.02 | 8.49 | 8.97  | 9.44  |
| 2.20 | 5.30 | 5.78 | 6.26 | 6.74 | 7.22 | 7.70 | 8.18 | 8.67 | 9.15  | 9.63  |
| 2.25 | 5.40 | 5.89 | 6.38 | 6.87 | 7.36 | 7.85 | 8.34 | 8.83 | 9.33  | 9.82  |
| 2.30 | 5.50 | 6.00 | 6.50 | 7.00 | 7.50 | 8.00 | 8.50 | 9.00 | 9.50  | 10.00 |
| 2.35 | 5.60 | 6.11 | 6.62 | 7.13 | 7.64 | 8.15 | 8.66 | 9.17 | 9.68  | 10.19 |
| 2.40 | 5.71 | 6.22 | 6.74 | 7.26 | 7.78 | 8.30 | 8.82 | 9.34 | 9.85  | 10.37 |
| 2.45 | 5.81 | 6.33 | 6.86 | 7.39 | 7.92 | 8.45 | 8.97 | 9.50 | 10.03 | 10.56 |
| 2.50 | 5.91 | 6.44 | 6.98 | 7.52 | 8.05 | 8.59 | 9.13 | 9.66 | 10.20 | 10.74 |

|      | 10.5  | 11.0  | 11.5  | 12.0  | 12.5  | 13.0  | 13.5  | 14.0  | 14.5  | 15.0  |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| .05  | .26   | .27   | .29   | .30   | .31   | .32   | .34   | .35   | .36   | .37   |
| .10  | .52   | .55   | .57   | .60   | .62   | .65   | .67   | .70   | .72   | .75   |
| .15  | .78   | .82   | .86   | .89   | .92   | .97   | 1.00  | 1.04  | 1.08  | 1.12  |
| .20  | 1.04  | 1.09  | 1.14  | 1.19  | 1.24  | 1.28  | 1.32  | 1.38  | 1.43  | 1.48  |
| .25  | 1.29  | 1.36  | 1.42  | 1.48  | 1.54  | 1.60  | 1.66  | 1.72  | 1.79  | 1.85  |
| .30  | 1.55  | 1.62  | 1.70  | 1.77  | 1.84  | 1.92  | 1.99  | 2.06  | 2.14  | 2.21  |
| .35  | 1.80  | 1.89  | 1.97  | 2.06  | 2.14  | 2.23  | 2.31  | 2.40  | 2.49  | 2.57  |
| .40  | 2.05  | 2.15  | 2.25  | 2.34  | 2.44  | 2.54  | 2.64  | 2.74  | 2.83  | 2.93  |
| .45  | 2.30  | 2.41  | 2.52  | 2.63  | 2.74  | 2.85  | 2.96  | 3.07  | 3.18  | 3.29  |
| .50  | 2.55  | 2.67  | 2.79  | 2.91  | 3.03  | 3.16  | 3.28  | 3.40  | 3.52  | 3.64  |
| .55  | 2.80  | 2.93  | 3.06  | 3.20  | 3.33  | 3.46  | 3.59  | 3.73  | 3.86  | 3.99  |
| .60  | 3.04  | 3.19  | 3.23  | 3.48  | 3.62  | 3.77  | 3.91  | 4.05  | 4.20  | 4.34  |
| .65  | 3.28  | 3.44  | 3.60  | 3.75  | 3.91  | 4.07  | 4.22  | 4.38  | 4.54  | 4.69  |
| .70  | 3.53  | 3.69  | 3.86  | 4.03  | 4.20  | 4.37  | 4.53  | 4.70  | 4.87  | 5.04  |
| .75  | 3.77  | 3.95  | 4.13  | 4.31  | 4.48  | 4.66  | 4.84  | 5.02  | 5.20  | 5.38  |
| .80  | 4.01  | 4.20  | 4.39  | 4.58  | 4.77  | 4.96  | 5.15  | 5.34  | 5.53  | 5.72  |
| .85  | 4.24  | 4.45  | 4.65  | 4.85  | 5.05  | 5.25  | 5.46  | 5.66  | 5.86  | 6.06  |
| .90  | 4.48  | 4.69  | 4.91  | 5.12  | 5.33  | 5.55  | 5.76  | 5.97  | 6.19  | 6.40  |
| .95  | 4.71  | 4.94  | 5.16  | 5.39  | 5.61  | 5.84  | 6.06  | 6.29  | 6.51  | 6.74  |
| 1.00 | 4.95  | 5.18  | 5.42  | 5.65  | 5.89  | 6.12  | 6.36  | 6.60  | 6.83  | 7.07  |
| 1.05 | 5.18  | 5.42  | 5.67  | 5.92  | 6.17  | 6.41  | 6.66  | 6.91  | 7.15  | 7.40  |
| 1.10 | 5.41  | 5.67  | 5.93  | 6.18  | 6.44  | 6.70  | 6.96  | 7.21  | 7.47  | 7.73  |
| 1.15 | 5.64  | 5.91  | 6.18  | 6.44  | 6.71  | 6.98  | 7.25  | 7.52  | 7.79  | 8.06  |
| 1.20 | 5.87  | 6.15  | 6.42  | 6.70  | 6.98  | 7.26  | 7.54  | 7.82  | 8.10  | 8.38  |
| 1.25 | 6.09  | 6.38  | 6.67  | 6.96  | 7.25  | 7.54  | 7.82  | 8.12  | 8.41  | 8.70  |
| 1.30 | 6.32  | 6.62  | 6.92  | 7.22  | 7.52  | 7.82  | 8.12  | 8.42  | 8.72  | 9.02  |
| 1.35 | 6.54  | 6.85  | 7.16  | 7.47  | 7.78  | 8.10  | 8.41  | 8.72  | 9.03  | 9.34  |
| 1.40 | 6.76  | 7.08  | 7.40  | 7.73  | 8.05  | 8.37  | 8.69  | 9.01  | 9.34  | 9.66  |
| 1.45 | 6.98  | 7.31  | 7.64  | 7.98  | 8.31  | 8.64  | 8.97  | 9.31  | 9.64  | 9.97  |
| 1.50 | 7.20  | 7.54  | 7.88  | 8.22  | 8.57  | 8.91  | 9.26  | 9.60  | 9.94  | 10.28 |
| 1.55 | 7.42  | 7.77  | 8.12  | 8.48  | 8.83  | 9.18  | 9.53  | 9.89  | 10.24 | 10.59 |
| 1.60 | 7.63  | 7.99  | 8.36  | 8.72  | 9.09  | 9.45  | 9.81  | 10.18 | 10.54 | 10.90 |
| 1.65 | 7.85  | 8.22  | 8.59  | 8.97  | 9.34  | 9.71  | 10.09 | 10.46 | 10.83 | 11.21 |
| 1.70 | 8.06  | 8.44  | 8.83  | 9.21  | 9.59  | 9.98  | 10.36 | 10.74 | 11.13 | 11.51 |
| 1.75 | 8.27  | 8.66  | 9.06  | 9.45  | 9.85  | 10.24 | 10.62 | 11.03 | 11.42 | 11.81 |
| 1.80 | 8.48  | 8.88  | 9.29  | 9.69  | 10.10 | 10.50 | 10.90 | 11.31 | 11.71 | 12.11 |
| 1.85 | 8.69  | 9.10  | 9.52  | 9.93  | 10.34 | 10.76 | 11.17 | 11.58 | 12.00 | 12.41 |
| 1.90 | 8.90  | 9.32  | 9.74  | 10.17 | 10.59 | 11.01 | 11.44 | 11.86 | 12.28 | 12.71 |
| 1.95 | 9.10  | 9.53  | 9.97  | 10.40 | 10.84 | 11.27 | 11.70 | 12.14 | 12.57 | 13.00 |
| 2.00 | 9.31  | 9.75  | 10.19 | 10.64 | 11.08 | 11.52 | 11.96 | 12.41 | 12.85 | 13.29 |
| 2.05 | 9.51  | 9.96  | 10.41 | 10.87 | 11.32 | 11.77 | 12.22 | 12.68 | 13.13 | 13.58 |
| 2.10 | 9.71  | 10.17 | 10.64 | 11.10 | 11.56 | 12.02 | 12.48 | 12.95 | 13.41 | 13.87 |
| 2.15 | 9.91  | 10.38 | 10.85 | 11.33 | 11.80 | 12.27 | 12.74 | 13.21 | 13.69 | 14.16 |
| 2.20 | 10.11 | 10.59 | 11.07 | 11.55 | 12.04 | 12.52 | 13.00 | 13.48 | 13.96 | 14.44 |
| 2.25 | 10.31 | 10.80 | 11.29 | 11.78 | 12.27 | 12.76 | 13.25 | 13.74 | 14.23 | 14.72 |
| 2.30 | 10.50 | 11.00 | 11.50 | 12.00 | 12.50 | 13.00 | 13.50 | 14.00 | 14.50 | 15.00 |
| 2.35 | 10.70 | 11.21 | 11.72 | 12.23 | 12.74 | 13.25 | 13.76 | 14.26 | 14.77 | 15.28 |
| 2.40 | 10.89 | 11.41 | 11.93 | 12.45 | 12.97 | 13.49 | 14.00 | 14.52 | 15.04 | 15.56 |
| 2.45 | 11.08 | 11.61 | 12.14 | 12.67 | 13.20 | 13.72 | 14.25 | 14.78 | 15.31 | 15.83 |
| 2.50 | 11.27 | 11.81 | 12.35 | 12.89 | 13.42 | 13.96 | 14.50 | 15.03 | 15.57 | 16.11 |

|      | 15.5  | 16.0  | 16.5  | 17.0  | 17.5  | 18.0  | 18.5  | 19.0  | 19.5  | 20.0  |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| .05  | .39   | .40   | .41   | .42   | .44   | .45   | .46   | .47   | .49   | .50   |
| .10  | .77   | .80   | .82   | .85   | .87   | .89   | .92   | .94   | .97   | .99   |
| .15  | 1.15  | 1.19  | 1.23  | 1.26  | 1.30  | 1.34  | 1.38  | 1.41  | 1.45  | 1.49  |
| .20  | 1.53  | 1.58  | 1.63  | 1.68  | 1.73  | 1.78  | 1.83  | 1.88  | 1.93  | 1.98  |
| .25  | 1.91  | 1.97  | 2.03  | 2.09  | 2.16  | 2.22  | 2.28  | 2.34  | 2.40  | 2.46  |
| .30  | 2.28  | 2.36  | 2.43  | 2.51  | 2.58  | 2.65  | 2.73  | 2.80  | 2.87  | 2.95  |
| .35  | 2.66  | 2.74  | 2.83  | 2.91  | 3.00  | 3.09  | 3.17  | 3.26  | 3.34  | 3.43  |
| .40  | 3.03  | 3.13  | 3.22  | 3.32  | 3.42  | 3.52  | 3.61  | 3.71  | 3.81  | 3.91  |
| .45  | 3.40  | 3.51  | 3.62  | 3.73  | 3.84  | 3.94  | 4.05  | 4.16  | 4.27  | 4.38  |
| .50  | 3.76  | 3.88  | 4.01  | 4.13  | 4.25  | 4.37  | 4.49  | 4.61  | 4.73  | 4.85  |
| .55  | 4.13  | 4.26  | 4.39  | 4.53  | 4.66  | 4.79  | 4.93  | 5.06  | 5.19  | 5.33  |
| .60  | 4.49  | 4.63  | 4.78  | 4.92  | 5.07  | 5.21  | 5.36  | 5.50  | 5.65  | 5.79  |
| .65  | 4.85  | 5.01  | 5.16  | 5.32  | 5.47  | 5.63  | 5.79  | 5.94  | 6.10  | 6.26  |
| .70  | 5.21  | 5.37  | 5.54  | 5.71  | 5.88  | 6.05  | 6.21  | 6.38  | 6.55  | 6.72  |
| .75  | 5.56  | 5.74  | 5.92  | 6.10  | 6.28  | 6.46  | 6.64  | 6.82  | 7.00  | 7.18  |
| .80  | 5.91  | 6.11  | 6.30  | 6.49  | 6.68  | 6.87  | 7.06  | 7.25  | 7.44  | 7.63  |
| .85  | 6.26  | 6.47  | 6.67  | 6.87  | 7.07  | 7.28  | 7.48  | 7.68  | 7.88  | 8.08  |
| .90  | 6.61  | 6.83  | 7.04  | 7.25  | 7.47  | 7.68  | 7.89  | 8.11  | 8.32  | 8.53  |
| .95  | 6.96  | 7.18  | 7.41  | 7.63  | 7.86  | 8.08  | 8.31  | 8.53  | 8.76  | 8.98  |
| 1.00 | 7.30  | 7.54  | 7.79  | 8.01  | 8.25  | 8.48  | 8.72  | 8.95  | 9.19  | 9.42  |
| 1.05 | 7.65  | 7.89  | 8.14  | 8.39  | 8.63  | 8.88  | 9.12  | 9.37  | 9.62  | 9.87  |
| 1.10 | 7.99  | 8.24  | 8.50  | 8.76  | 9.02  | 9.27  | 9.53  | 9.79  | 10.05 | 10.30 |
| 1.15 | 8.32  | 8.59  | 8.86  | 9.13  | 9.40  | 9.67  | 9.93  | 10.20 | 10.47 | 10.74 |
| 1.20 | 8.66  | 8.94  | 9.22  | 9.50  | 9.78  | 10.06 | 10.33 | 10.61 | 10.89 | 11.17 |
| 1.25 | 8.99  | 9.28  | 9.57  | 9.86  | 10.15 | 10.44 | 10.73 | 11.02 | 11.31 | 11.60 |
| 1.30 | 9.32  | 9.62  | 9.93  | 10.23 | 10.53 | 10.83 | 11.13 | 11.43 | 11.73 | 12.03 |
| 1.35 | 9.65  | 9.96  | 10.28 | 10.59 | 10.90 | 11.21 | 11.52 | 11.83 | 12.14 | 12.45 |
| 1.40 | 9.98  | 10.30 | 10.62 | 10.95 | 11.27 | 11.59 | 11.91 | 12.23 | 12.55 | 12.88 |
| 1.45 | 10.30 | 10.64 | 10.97 | 11.30 | 11.63 | 11.97 | 12.30 | 12.63 | 12.96 | 13.30 |
| 1.50 | 10.62 | 10.97 | 11.31 | 11.66 | 12.00 | 12.34 | 12.68 | 13.03 | 13.37 | 13.71 |
| 1.55 | 10.95 | 11.30 | 11.65 | 12.01 | 12.36 | 12.71 | 13.07 | 13.42 | 13.77 | 14.13 |
| 1.60 | 11.27 | 11.63 | 11.99 | 12.36 | 12.72 | 13.08 | 13.45 | 13.81 | 14.17 | 14.54 |
| 1.65 | 11.58 | 11.96 | 12.33 | 12.70 | 13.08 | 13.45 | 13.82 | 14.20 | 14.57 | 14.94 |
| 1.70 | 11.90 | 12.28 | 12.66 | 13.05 | 13.43 | 13.81 | 14.20 | 14.58 | 14.97 | 15.35 |
| 1.75 | 12.21 | 12.60 | 13.00 | 13.39 | 13.78 | 14.18 | 14.57 | 14.96 | 15.36 | 15.75 |
| 1.80 | 12.52 | 12.92 | 13.33 | 13.73 | 14.13 | 14.54 | 14.94 | 15.34 | 15.75 | 16.15 |
| 1.85 | 12.83 | 13.24 | 13.65 | 14.07 | 14.48 | 14.89 | 15.31 | 15.72 | 16.14 | 16.55 |
| 1.90 | 13.13 | 13.56 | 13.98 | 14.40 | 14.83 | 15.25 | 15.67 | 16.10 | 16.52 | 16.94 |
| 1.95 | 13.44 | 13.87 | 14.30 | 14.74 | 15.17 | 15.60 | 16.04 | 16.47 | 16.90 | 17.34 |
| 2.00 | 13.74 | 14.18 | 14.62 | 15.07 | 15.51 | 15.95 | 16.40 | 16.84 | 17.28 | 17.73 |
| 2.05 | 14.04 | 14.49 | 14.94 | 15.40 | 15.85 | 16.30 | 16.75 | 17.21 | 17.66 | 18.11 |
| 2.10 | 14.33 | 14.80 | 15.26 | 15.72 | 16.18 | 16.65 | 17.11 | 17.57 | 18.03 | 18.50 |
| 2.15 | 14.63 | 15.10 | 15.57 | 16.05 | 16.52 | 16.99 | 17.46 | 17.93 | 18.41 | 18.88 |
| 2.20 | 14.92 | 15.41 | 15.89 | 16.37 | 16.85 | 17.33 | 17.81 | 18.29 | 18.78 | 19.26 |
| 2.25 | 15.22 | 15.71 | 16.20 | 16.69 | 17.18 | 17.67 | 18.16 | 18.65 | 19.14 | 19.63 |
| 2.30 | 15.51 | 16.01 | 16.51 | 17.01 | 17.51 | 18.01 | 18.51 | 19.01 | 19.51 | 20.01 |
| 2.35 | 15.79 | 16.30 | 16.81 | 17.32 | 17.83 | 18.34 | 18.85 | 19.36 | 19.87 | 20.38 |
| 2.40 | 16.08 | 16.60 | 17.12 | 17.63 | 18.15 | 18.67 | 19.19 | 19.71 | 20.23 | 20.75 |
| 2.45 | 16.36 | 16.89 | 17.42 | 17.95 | 18.47 | 19.00 | 19.53 | 20.06 | 20.58 | 21.11 |
| 2.50 | 16.64 | 17.18 | 17.72 | 18.25 | 18.79 | 19.33 | 19.87 | 20.40 | 20.94 | 21.48 |



|      | 20.5  | 21.0  | 21.5  | 22.0  | 22.5  | 23.0  | 23.5  | 24.0  | 24.5  | 25.0  |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| .05  | .51   | .52   | .54   | .55   | .56   | .57   | .59   | .60   | .61   | .62   |
| .10  | 1.02  | 1.04  | 1.07  | 1.09  | 1.12  | 1.14  | 1.17  | 1.19  | 1.22  | 1.24  |
| .15  | 1.52  | 1.56  | 1.60  | 1.64  | 1.67  | 1.71  | 1.75  | 1.78  | 1.82  | 1.86  |
| .20  | 2.03  | 2.08  | 2.13  | 2.17  | 2.22  | 2.27  | 2.32  | 2.37  | 2.42  | 2.47  |
| .25  | 2.53  | 2.59  | 2.65  | 2.71  | 2.77  | 2.83  | 2.90  | 2.96  | 3.02  | 3.08  |
| .30  | 3.02  | 3.10  | 3.17  | 3.24  | 3.32  | 3.39  | 3.46  | 3.54  | 3.61  | 3.69  |
| .35  | 3.52  | 3.60  | 3.69  | 3.77  | 3.86  | 3.94  | 4.02  | 4.12  | 4.20  | 4.29  |
| .40  | 4.01  | 4.10  | 4.20  | 4.30  | 4.40  | 4.49  | 4.59  | 4.69  | 4.79  | 4.88  |
| .45  | 4.49  | 4.60  | 4.71  | 4.82  | 4.93  | 5.04  | 5.15  | 5.26  | 5.37  | 5.48  |
| .50  | 4.98  | 5.10  | 5.22  | 5.34  | 5.46  | 5.58  | 5.71  | 5.83  | 5.95  | 6.07  |
| .55  | 5.46  | 5.59  | 5.72  | 5.86  | 5.99  | 6.12  | 6.26  | 6.39  | 6.52  | 6.66  |
| .60  | 5.94  | 6.08  | 6.23  | 6.37  | 6.52  | 6.66  | 6.81  | 6.95  | 7.10  | 7.24  |
| .65  | 6.41  | 6.57  | 6.73  | 6.88  | 7.04  | 7.19  | 7.35  | 7.51  | 7.66  | 7.82  |
| .70  | 6.89  | 7.05  | 7.22  | 7.39  | 7.56  | 7.73  | 7.89  | 8.06  | 8.23  | 8.40  |
| .75  | 7.36  | 7.53  | 7.71  | 7.89  | 8.07  | 8.25  | 8.43  | 8.61  | 8.79  | 8.97  |
| .80  | 7.82  | 8.01  | 8.20  | 8.39  | 8.59  | 8.78  | 8.97  | 9.16  | 9.35  | 9.54  |
| .85  | 8.29  | 8.49  | 8.69  | 8.89  | 9.09  | 9.30  | 9.50  | 9.70  | 9.90  | 10.10 |
| .90  | 8.75  | 8.96  | 9.17  | 9.39  | 9.60  | 9.81  | 10.03 | 10.24 | 10.45 | 10.67 |
| .95  | 9.21  | 9.43  | 9.65  | 9.88  | 10.10 | 10.33 | 10.55 | 10.78 | 11.00 | 11.23 |
| 1.00 | 9.66  | 9.90  | 10.13 | 10.37 | 10.60 | 10.84 | 11.07 | 11.31 | 11.55 | 11.79 |
| 1.05 | 10.11 | 10.36 | 10.61 | 10.85 | 11.10 | 11.35 | 11.59 | 11.84 | 12.09 | 12.33 |
| 1.10 | 10.56 | 10.82 | 11.08 | 11.33 | 11.59 | 11.85 | 12.11 | 12.37 | 12.62 | 12.88 |
| 1.15 | 11.01 | 11.28 | 11.55 | 11.81 | 12.09 | 12.35 | 12.62 | 12.89 | 13.16 | 13.43 |
| 1.20 | 11.45 | 11.73 | 12.01 | 12.29 | 12.57 | 12.85 | 13.13 | 13.41 | 13.69 | 13.97 |
| 1.25 | 11.89 | 12.18 | 12.47 | 12.76 | 13.05 | 13.34 | 13.63 | 13.92 | 14.21 | 14.50 |
| 1.30 | 12.33 | 12.63 | 12.93 | 13.23 | 13.53 | 13.83 | 14.14 | 14.44 | 14.74 | 15.04 |
| 1.35 | 12.77 | 13.08 | 13.39 | 13.70 | 14.01 | 14.32 | 14.63 | 14.95 | 15.26 | 15.57 |
| 1.40 | 13.20 | 13.52 | 13.84 | 14.16 | 14.49 | 14.81 | 15.13 | 15.45 | 15.77 | 16.10 |
| 1.45 | 13.63 | 13.96 | 14.29 | 14.63 | 14.96 | 15.29 | 15.62 | 15.95 | 16.29 | 16.62 |
| 1.50 | 14.05 | 14.40 | 14.74 | 15.08 | 15.42 | 15.77 | 16.11 | 16.45 | 16.80 | 17.14 |
| 1.55 | 14.48 | 14.83 | 15.18 | 15.54 | 15.89 | 16.24 | 16.60 | 16.95 | 17.30 | 17.66 |
| 1.60 | 14.90 | 15.26 | 15.63 | 15.99 | 16.35 | 16.72 | 17.09 | 17.44 | 17.81 | 18.17 |
| 1.65 | 15.32 | 15.69 | 16.07 | 16.44 | 16.81 | 17.19 | 17.56 | 17.93 | 18.31 | 18.68 |
| 1.70 | 15.73 | 16.12 | 16.50 | 16.88 | 17.27 | 17.65 | 18.04 | 18.42 | 18.80 | 19.19 |
| 1.75 | 16.15 | 16.54 | 16.93 | 17.33 | 17.72 | 18.12 | 18.51 | 18.90 | 19.30 | 19.69 |
| 1.80 | 16.56 | 16.96 | 17.36 | 17.77 | 18.17 | 18.58 | 18.98 | 19.38 | 19.79 | 20.19 |
| 1.85 | 16.96 | 17.38 | 17.79 | 18.20 | 18.62 | 19.03 | 19.45 | 19.86 | 20.27 | 20.69 |
| 1.90 | 17.37 | 17.79 | 18.21 | 18.64 | 19.06 | 19.49 | 19.91 | 20.33 | 20.76 | 21.18 |
| 1.95 | 17.77 | 18.20 | 18.64 | 19.07 | 19.50 | 19.94 | 20.37 | 20.80 | 21.24 | 21.67 |
| 2.00 | 18.17 | 18.61 | 19.05 | 19.50 | 19.94 | 20.38 | 20.82 | 21.27 | 21.71 | 22.16 |
| 2.05 | 18.56 | 19.02 | 19.47 | 19.92 | 20.38 | 20.83 | 21.28 | 21.72 | 22.19 | 22.64 |
| 2.10 | 18.96 | 19.42 | 19.88 | 20.35 | 20.81 | 21.27 | 21.73 | 22.20 | 22.66 | 23.12 |
| 2.15 | 19.35 | 19.82 | 20.29 | 20.77 | 21.24 | 21.71 | 22.18 | 22.65 | 23.13 | 23.60 |
| 2.20 | 19.74 | 20.22 | 20.70 | 21.18 | 21.66 | 22.15 | 22.63 | 23.11 | 23.59 | 24.07 |
| 2.25 | 20.12 | 20.61 | 21.11 | 21.60 | 22.09 | 22.59 | 23.07 | 23.56 | 24.05 | 24.54 |
| 2.30 | 20.51 | 21.01 | 21.51 | 22.01 | 22.51 | 23.01 | 23.51 | 24.01 | 24.51 | 25.01 |
| 2.35 | 20.89 | 21.40 | 21.91 | 22.42 | 22.93 | 23.43 | 23.94 | 24.45 | 24.96 | 25.47 |
| 2.40 | 21.27 | 21.78 | 22.30 | 22.82 | 23.34 | 23.86 | 24.38 | 24.90 | 25.41 | 25.93 |
| 2.45 | 21.64 | 22.17 | 22.70 | 23.22 | 23.75 | 24.28 | 24.81 | 25.34 | 25.86 | 26.39 |
| 2.50 | 22.01 | 22.55 | 23.09 | 23.62 | 24.16 | 24.70 | 25.23 | 25.77 | 26.31 | 26.85 |

|      | 25.5  | 26.0  | 26.5  | 27.0  | 27.5  | 28.0  | 28.5  | 29.0  | 29.5  | 30.0  |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| .05  | .64   | .65   | .66   | .67   | .69   | .70   | .71   | .72   | .74   | .75   |
| .10  | 1.27  | 1.29  | 1.32  | 1.34  | 1.37  | 1.39  | 1.42  | 1.44  | 1.47  | 1.49  |
| .15  | 1.90  | 1.93  | 1.97  | 2.01  | 2.04  | 2.08  | 2.12  | 2.16  | 2.19  | 2.23  |
| .20  | 2.52  | 2.57  | 2.62  | 2.67  | 2.72  | 2.77  | 2.82  | 2.87  | 2.92  | 2.97  |
| .25  | 3.14  | 3.20  | 3.26  | 3.33  | 3.39  | 3.45  | 3.51  | 3.57  | 3.63  | 3.70  |
| .30  | 3.76  | 3.83  | 3.91  | 3.98  | 4.05  | 4.13  | 4.20  | 4.27  | 4.35  | 4.42  |
| .35  | 4.37  | 4.46  | 4.54  | 4.63  | 4.72  | 4.80  | 4.89  | 4.97  | 5.06  | 5.14  |
| .40  | 4.98  | 5.08  | 5.18  | 5.28  | 5.37  | 5.47  | 5.57  | 5.67  | 5.76  | 5.86  |
| .45  | 5.59  | 5.70  | 5.81  | 5.92  | 6.03  | 6.14  | 6.25  | 6.36  | 6.47  | 6.57  |
| .50  | 6.19  | 6.31  | 6.43  | 6.56  | 6.68  | 6.80  | 6.92  | 7.04  | 7.16  | 7.28  |
| .55  | 6.79  | 6.92  | 7.06  | 7.19  | 7.32  | 7.46  | 7.59  | 7.72  | 7.86  | 7.99  |
| .60  | 7.39  | 7.53  | 7.67  | 7.82  | 7.96  | 8.11  | 8.25  | 8.40  | 8.54  | 8.69  |
| .65  | 7.98  | 8.13  | 8.29  | 8.45  | 8.60  | 8.76  | 8.92  | 9.07  | 9.23  | 9.38  |
| .70  | 8.56  | 8.73  | 8.90  | 9.07  | 9.24  | 9.40  | 9.57  | 9.74  | 9.91  | 10.08 |
| .75  | 9.15  | 9.33  | 9.51  | 9.69  | 9.87  | 10.05 | 10.23 | 10.40 | 10.58 | 10.76 |
| .80  | 9.73  | 9.92  | 10.11 | 10.30 | 10.49 | 10.68 | 10.87 | 11.07 | 11.26 | 11.45 |
| .85  | 10.31 | 10.51 | 10.71 | 10.91 | 11.12 | 11.32 | 11.52 | 11.72 | 11.92 | 12.13 |
| .90  | 10.88 | 11.09 | 11.31 | 11.52 | 11.73 | 11.95 | 12.16 | 12.37 | 12.59 | 12.80 |
| .95  | 11.45 | 11.67 | 11.90 | 12.12 | 12.35 | 12.57 | 12.80 | 13.02 | 13.25 | 13.47 |
| 1.00 | 12.02 | 12.25 | 12.49 | 12.72 | 12.96 | 13.19 | 13.43 | 13.67 | 13.90 | 14.14 |
| 1.05 | 12.58 | 12.83 | 13.07 | 13.32 | 13.57 | 13.81 | 14.06 | 14.31 | 14.55 | 14.80 |
| 1.10 | 13.14 | 13.40 | 13.65 | 13.91 | 14.17 | 14.43 | 14.68 | 14.94 | 15.20 | 15.46 |
| 1.15 | 13.69 | 13.96 | 14.23 | 14.50 | 14.77 | 15.04 | 15.30 | 15.57 | 15.84 | 16.11 |
| 1.20 | 14.25 | 14.52 | 14.80 | 15.08 | 15.36 | 15.64 | 15.92 | 16.20 | 16.48 | 16.76 |
| 1.25 | 14.79 | 15.08 | 15.37 | 15.66 | 15.95 | 16.24 | 16.53 | 16.82 | 17.11 | 17.40 |
| 1.30 | 15.34 | 15.64 | 15.94 | 16.24 | 16.54 | 16.84 | 17.14 | 17.44 | 17.74 | 18.05 |
| 1.35 | 15.88 | 16.19 | 16.50 | 16.81 | 17.12 | 17.44 | 17.75 | 18.06 | 18.37 | 18.68 |
| 1.40 | 16.42 | 16.74 | 17.06 | 17.38 | 17.71 | 18.03 | 18.35 | 18.67 | 18.99 | 19.31 |
| 1.45 | 16.95 | 17.28 | 17.62 | 17.95 | 18.28 | 18.61 | 18.95 | 19.28 | 19.61 | 19.94 |
| 1.50 | 17.48 | 17.83 | 18.17 | 18.51 | 18.85 | 19.20 | 19.54 | 19.88 | 20.22 | 20.57 |
| 1.55 | 18.01 | 18.36 | 18.72 | 19.07 | 19.42 | 19.78 | 20.12 | 20.48 | 20.83 | 21.19 |
| 1.60 | 18.53 | 18.90 | 19.26 | 19.62 | 19.99 | 20.35 | 20.71 | 21.08 | 21.44 | 21.80 |
| 1.65 | 19.05 | 19.43 | 19.80 | 20.17 | 20.55 | 20.92 | 21.30 | 21.67 | 22.04 | 22.42 |
| 1.70 | 19.57 | 19.95 | 20.34 | 20.72 | 21.11 | 21.49 | 21.87 | 22.26 | 22.64 | 23.02 |
| 1.75 | 20.08 | 20.48 | 20.87 | 21.27 | 21.66 | 22.05 | 22.45 | 22.84 | 23.23 | 23.63 |
| 1.80 | 20.59 | 21.00 | 21.40 | 21.81 | 22.21 | 22.61 | 23.02 | 23.42 | 23.82 | 24.23 |
| 1.85 | 21.10 | 21.51 | 21.93 | 22.34 | 22.76 | 23.17 | 23.58 | 24.00 | 24.41 | 24.82 |
| 1.90 | 21.60 | 22.03 | 22.45 | 22.87 | 23.30 | 23.72 | 24.15 | 24.57 | 24.99 | 25.42 |
| 1.95 | 22.10 | 22.54 | 22.97 | 23.40 | 23.84 | 24.27 | 24.70 | 25.14 | 25.57 | 26.00 |
| 2.00 | 22.60 | 23.04 | 23.49 | 23.93 | 24.37 | 24.82 | 25.26 | 25.70 | 26.14 | 26.59 |
| 2.05 | 23.09 | 23.55 | 24.00 | 24.45 | 24.90 | 25.36 | 25.81 | 26.26 | 26.72 | 27.17 |
| 2.10 | 23.58 | 24.05 | 24.51 | 24.97 | 25.43 | 25.89 | 26.36 | 26.82 | 27.28 | 27.74 |
| 2.15 | 24.07 | 24.54 | 25.01 | 25.48 | 25.96 | 26.43 | 26.90 | 27.37 | 27.84 | 28.32 |
| 2.20 | 24.55 | 25.03 | 25.51 | 26.00 | 26.48 | 26.96 | 27.44 | 27.92 | 28.40 | 28.88 |
| 2.25 | 25.03 | 25.52 | 26.01 | 26.50 | 27.00 | 27.49 | 27.98 | 28.47 | 28.96 | 29.45 |
| 2.30 | 25.51 | 26.01 | 26.51 | 27.01 | 27.51 | 28.01 | 28.51 | 29.01 | 29.51 | 30.01 |
| 2.35 | 25.98 | 26.49 | 27.00 | 27.51 | 28.02 | 28.53 | 29.04 | 29.55 | 30.06 | 30.57 |
| 2.40 | 26.45 | 26.97 | 27.49 | 28.01 | 28.53 | 29.04 | 29.56 | 30.08 | 30.61 | 31.12 |
| 2.45 | 26.92 | 27.45 | 27.97 | 28.50 | 29.03 | 29.56 | 30.09 | 30.61 | 31.14 | 31.67 |
| 2.50 | 27.38 | 27.92 | 28.46 | 28.99 | 29.53 | 30.07 | 30.60 | 31.14 | 31.68 | 32.21 |

|      | 30.5  | 31.0  | 31.5  | 32.0  | 32.5  | 33.0  | 33.5  | 34.0  | 34.5  | 35.0  |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| .05  | .76   | .77   | .79   | .80   | .81   | .82   | .84   | .85   | .86   | .87   |
| .10  | 1.52  | 1.54  | 1.57  | 1.59  | 1.62  | 1.64  | 1.67  | 1.69  | 1.71  | 1.74  |
| .15  | 2.27  | 2.30  | 2.34  | 2.38  | 2.42  | 2.45  | 2.49  | 2.53  | 2.57  | 2.60  |
| .20  | 3.01  | 3.06  | 3.11  | 3.16  | 3.21  | 3.26  | 3.31  | 3.36  | 3.41  | 3.46  |
| .25  | 3.76  | 3.82  | 3.88  | 3.94  | 4.00  | 4.07  | 4.13  | 4.19  | 4.25  | 4.31  |
| .30  | 4.50  | 4.57  | 4.64  | 4.72  | 4.79  | 4.86  | 4.94  | 5.01  | 5.09  | 5.16  |
| .35  | 5.23  | 5.32  | 5.40  | 5.49  | 5.57  | 5.65  | 5.74  | 5.83  | 5.92  | 6.00  |
| .40  | 5.96  | 6.06  | 6.15  | 6.25  | 6.35  | 6.45  | 6.55  | 6.64  | 6.74  | 6.84  |
| .45  | 6.68  | 6.79  | 6.90  | 7.01  | 7.12  | 7.22  | 7.34  | 7.45  | 7.56  | 7.67  |
| .50  | 7.40  | 7.53  | 7.65  | 7.77  | 7.89  | 8.01  | 8.13  | 8.25  | 8.38  | 8.50  |
| .55  | 8.12  | 8.25  | 8.39  | 8.52  | 8.65  | 8.79  | 8.92  | 9.05  | 9.19  | 9.32  |
| .60  | 8.83  | 8.98  | 9.12  | 9.27  | 9.41  | 9.56  | 9.70  | 9.85  | 9.99  | 10.14 |
| .65  | 9.54  | 9.70  | 9.85  | 10.01 | 10.17 | 10.32 | 10.48 | 10.64 | 10.79 | 10.95 |
| .70  | 10.24 | 10.41 | 10.58 | 10.75 | 10.92 | 11.08 | 11.25 | 11.42 | 11.59 | 11.76 |
| .75  | 10.94 | 11.12 | 11.30 | 11.48 | 11.66 | 11.84 | 12.02 | 12.20 | 12.38 | 12.55 |
| .80  | 11.64 | 11.83 | 12.02 | 12.21 | 12.40 | 12.59 | 12.78 | 12.97 | 13.16 | 13.35 |
| .85  | 12.33 | 12.53 | 12.73 | 12.93 | 13.14 | 13.34 | 13.54 | 13.74 | 13.94 | 14.15 |
| .90  | 13.01 | 13.23 | 13.44 | 13.65 | 13.87 | 14.08 | 14.29 | 14.51 | 14.72 | 14.92 |
| .95  | 13.70 | 13.92 | 14.14 | 14.37 | 14.59 | 14.82 | 15.04 | 15.27 | 15.49 | 15.72 |
| 1.00 | 14.37 | 14.61 | 14.84 | 15.08 | 15.32 | 15.55 | 15.79 | 16.02 | 16.26 | 16.49 |
| 1.05 | 15.05 | 15.29 | 15.54 | 15.79 | 16.03 | 16.28 | 16.53 | 16.77 | 17.02 | 17.27 |
| 1.10 | 15.71 | 15.97 | 16.23 | 16.49 | 16.74 | 17.00 | 17.26 | 17.52 | 17.78 | 18.03 |
| 1.15 | 16.38 | 16.65 | 16.92 | 17.18 | 17.45 | 17.72 | 17.99 | 18.26 | 18.53 | 18.80 |
| 1.20 | 17.04 | 17.32 | 17.60 | 17.88 | 18.16 | 18.44 | 18.71 | 18.99 | 19.27 | 19.55 |
| 1.25 | 17.69 | 17.98 | 18.27 | 18.56 | 18.85 | 19.15 | 19.44 | 19.73 | 20.02 | 20.31 |
| 1.30 | 18.35 | 18.65 | 18.95 | 19.25 | 19.55 | 19.85 | 20.15 | 20.45 | 20.75 | 21.05 |
| 1.35 | 18.99 | 19.31 | 19.62 | 19.93 | 20.24 | 20.55 | 20.86 | 21.17 | 21.48 | 21.80 |
| 1.40 | 19.64 | 19.96 | 20.29 | 20.60 | 20.92 | 21.25 | 21.57 | 21.89 | 22.21 | 22.53 |
| 1.45 | 20.28 | 20.61 | 20.94 | 21.27 | 21.61 | 21.94 | 22.27 | 22.61 | 22.93 | 23.27 |
| 1.50 | 20.91 | 21.25 | 21.60 | 21.94 | 22.28 | 22.62 | 22.97 | 23.31 | 23.65 | 24.00 |
| 1.55 | 21.54 | 21.89 | 22.25 | 22.60 | 22.95 | 23.31 | 23.66 | 24.01 | 24.37 | 24.72 |
| 1.60 | 22.17 | 22.53 | 22.89 | 23.26 | 23.62 | 23.98 | 24.35 | 24.71 | 25.07 | 25.44 |
| 1.65 | 22.79 | 23.16 | 23.54 | 23.91 | 24.28 | 24.66 | 25.03 | 25.41 | 25.78 | 26.15 |
| 1.70 | 23.41 | 23.79 | 24.18 | 24.56 | 24.94 | 25.33 | 25.71 | 26.09 | 26.48 | 26.86 |
| 1.75 | 24.02 | 24.42 | 24.81 | 25.20 | 25.60 | 25.99 | 26.38 | 26.78 | 27.17 | 27.57 |
| 1.80 | 24.63 | 25.04 | 25.44 | 25.84 | 26.25 | 26.65 | 27.05 | 27.46 | 27.86 | 28.27 |
| 1.85 | 25.24 | 25.65 | 26.07 | 26.48 | 26.89 | 27.31 | 27.72 | 28.13 | 28.55 | 28.96 |
| 1.90 | 25.84 | 26.26 | 26.69 | 27.11 | 27.53 | 27.96 | 28.38 | 28.80 | 29.23 | 29.65 |
| 1.95 | 26.44 | 26.87 | 27.30 | 27.74 | 28.17 | 28.60 | 29.04 | 29.47 | 29.90 | 30.34 |
| 2.00 | 27.03 | 27.47 | 27.92 | 28.36 | 28.80 | 29.25 | 29.69 | 30.13 | 30.58 | 31.02 |
| 2.05 | 27.62 | 28.07 | 28.53 | 28.98 | 29.43 | 29.89 | 30.34 | 30.79 | 31.24 | 31.70 |
| 2.10 | 28.21 | 28.67 | 29.13 | 29.59 | 30.06 | 30.52 | 30.98 | 31.44 | 31.91 | 32.37 |
| 2.15 | 28.79 | 29.26 | 29.73 | 30.20 | 30.68 | 31.15 | 31.62 | 32.09 | 32.56 | 33.04 |
| 2.20 | 29.37 | 29.85 | 30.33 | 30.81 | 31.29 | 31.77 | 32.25 | 32.74 | 33.22 | 33.70 |
| 2.25 | 29.94 | 30.43 | 30.92 | 31.41 | 31.90 | 32.39 | 32.89 | 33.38 | 33.87 | 34.36 |
| 2.30 | 30.51 | 31.01 | 31.51 | 32.01 | 32.51 | 33.01 | 33.51 | 34.01 | 34.51 | 35.01 |
| 2.35 | 31.08 | 31.59 | 32.10 | 32.60 | 33.11 | 33.62 | 34.13 | 34.64 | 35.15 | 35.66 |
| 2.40 | 31.64 | 32.16 | 32.68 | 33.19 | 33.71 | 34.23 | 34.75 | 35.27 | 35.79 | 36.31 |
| 2.45 | 32.20 | 32.72 | 33.25 | 33.78 | 34.31 | 34.84 | 35.36 | 35.89 | 36.42 | 36.95 |
| 2.50 | 32.75 | 33.29 | 33.82 | 34.36 | 34.90 | 35.44 | 35.97 | 36.51 | 37.05 | 37.58 |

|      | 35.5  | 36.0  | 36.5  | 37.0  | 37.5  | 38.0  | 38.5  | 39.0  | 39.5  | 40.0  |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| .05  | .88   | .90   | .91   | .92   | .93   | .95   | .96   | .97   | .98   | 1.00  |
| .10  | 1.76  | 1.79  | 1.81  | 1.84  | 1.86  | 1.89  | 1.91  | 1.94  | 1.96  | 1.99  |
| .15  | 2.64  | 2.68  | 2.71  | 2.75  | 2.79  | 2.82  | 2.86  | 2.90  | 2.94  | 2.97  |
| .20  | 3.51  | 3.56  | 3.61  | 3.66  | 3.71  | 3.76  | 3.81  | 3.85  | 3.90  | 3.95  |
| .25  | 4.37  | 4.44  | 4.50  | 4.56  | 4.62  | 4.68  | 4.74  | 4.80  | 4.87  | 4.93  |
| .30  | 5.23  | 5.31  | 5.38  | 5.45  | 5.53  | 5.60  | 5.67  | 5.75  | 5.82  | 5.90  |
| .35  | 6.09  | 6.17  | 6.26  | 6.34  | 6.43  | 6.52  | 6.60  | 6.69  | 6.77  | 6.86  |
| .40  | 6.94  | 7.03  | 7.12  | 7.23  | 7.32  | 7.42  | 7.52  | 7.62  | 7.72  | 7.82  |
| .45  | 7.78  | 7.89  | 8.00  | 8.11  | 8.22  | 8.33  | 8.44  | 8.55  | 8.66  | 8.77  |
| .50  | 8.62  | 8.74  | 8.86  | 8.98  | 9.10  | 9.22  | 9.35  | 9.47  | 9.59  | 9.71  |
| .55  | 9.45  | 9.59  | 9.72  | 9.85  | 9.99  | 10.12 | 10.25 | 10.38 | 10.52 | 10.65 |
| .60  | 10.28 | 10.43 | 10.57 | 10.72 | 10.86 | 11.01 | 11.15 | 11.30 | 11.44 | 11.59 |
| .65  | 11.11 | 11.26 | 11.42 | 11.57 | 11.72 | 11.89 | 12.04 | 12.20 | 12.36 | 12.51 |
| .70  | 11.92 | 12.09 | 12.26 | 12.43 | 12.60 | 12.76 | 12.92 | 13.10 | 13.27 | 13.44 |
| .75  | 12.74 | 12.92 | 13.10 | 13.28 | 13.45 | 13.63 | 13.81 | 13.99 | 14.17 | 14.35 |
| .80  | 13.55 | 13.74 | 13.93 | 14.12 | 14.31 | 14.50 | 14.69 | 14.88 | 15.07 | 15.26 |
| .85  | 14.35 | 14.55 | 14.75 | 14.96 | 15.16 | 15.36 | 15.56 | 15.76 | 15.97 | 16.17 |
| .90  | 15.15 | 15.36 | 15.57 | 15.79 | 16.00 | 16.21 | 16.43 | 16.64 | 16.85 | 17.07 |
| .95  | 15.94 | 16.17 | 16.39 | 16.61 | 16.84 | 17.06 | 17.29 | 17.51 | 17.74 | 17.96 |
| 1.00 | 16.73 | 16.96 | 17.20 | 17.44 | 17.67 | 17.91 | 18.14 | 18.38 | 18.61 | 18.85 |
| 1.05 | 17.51 | 17.76 | 18.01 | 18.25 | 18.50 | 18.75 | 18.99 | 19.24 | 19.49 | 19.72 |
| 1.10 | 18.29 | 18.55 | 18.81 | 19.06 | 19.32 | 19.58 | 19.84 | 20.09 | 20.35 | 20.61 |
| 1.15 | 19.06 | 19.33 | 19.60 | 19.87 | 20.14 | 20.41 | 20.67 | 20.94 | 21.21 | 21.48 |
| 1.20 | 19.83 | 20.11 | 20.39 | 20.67 | 20.95 | 21.23 | 21.51 | 21.79 | 22.07 | 22.35 |
| 1.25 | 20.60 | 20.89 | 21.18 | 21.47 | 21.76 | 22.05 | 22.34 | 22.63 | 22.92 | 23.21 |
| 1.30 | 21.35 | 21.65 | 21.96 | 22.26 | 22.56 | 22.86 | 23.16 | 23.46 | 23.76 | 24.06 |
| 1.35 | 22.11 | 22.42 | 22.73 | 23.04 | 23.35 | 23.66 | 23.98 | 24.29 | 24.60 | 24.91 |
| 1.40 | 22.86 | 23.18 | 23.50 | 23.82 | 24.14 | 24.47 | 24.79 | 25.11 | 25.43 | 25.75 |
| 1.45 | 23.60 | 23.93 | 24.26 | 24.60 | 24.93 | 25.26 | 25.59 | 25.92 | 26.26 | 26.59 |
| 1.50 | 24.34 | 24.68 | 25.02 | 25.37 | 25.71 | 26.05 | 26.40 | 26.74 | 27.08 | 27.42 |
| 1.55 | 25.07 | 25.43 | 25.78 | 26.13 | 26.49 | 26.84 | 27.19 | 27.54 | 27.90 | 28.25 |
| 1.60 | 25.80 | 26.17 | 26.53 | 26.89 | 27.26 | 27.62 | 27.98 | 28.35 | 28.71 | 29.07 |
| 1.65 | 26.53 | 26.90 | 27.27 | 27.65 | 28.02 | 28.39 | 28.77 | 29.14 | 29.51 | 29.89 |
| 1.70 | 27.25 | 27.63 | 28.01 | 28.40 | 28.78 | 29.16 | 29.55 | 29.93 | 30.32 | 30.70 |
| 1.75 | 27.96 | 28.35 | 28.75 | 29.14 | 29.54 | 29.93 | 30.32 | 30.72 | 31.11 | 31.50 |
| 1.80 | 28.67 | 29.07 | 29.48 | 29.88 | 30.29 | 30.69 | 31.09 | 31.50 | 31.90 | 32.30 |
| 1.85 | 29.38 | 29.79 | 30.20 | 30.62 | 31.03 | 31.44 | 31.86 | 32.27 | 32.69 | 33.10 |
| 1.90 | 30.08 | 30.50 | 30.92 | 31.35 | 31.77 | 32.19 | 32.62 | 33.04 | 33.46 | 33.89 |
| 1.95 | 30.77 | 31.20 | 31.64 | 32.07 | 32.51 | 32.94 | 33.37 | 33.81 | 34.24 | 34.67 |
| 2.00 | 31.46 | 31.91 | 32.35 | 32.79 | 33.24 | 33.68 | 34.12 | 34.56 | 35.01 | 35.45 |
| 2.05 | 32.15 | 32.60 | 33.05 | 33.51 | 33.96 | 34.41 | 34.87 | 35.32 | 35.77 | 36.22 |
| 2.10 | 32.83 | 33.29 | 33.76 | 34.22 | 34.68 | 35.14 | 35.61 | 36.07 | 36.53 | 36.99 |
| 2.15 | 33.51 | 33.98 | 34.45 | 34.92 | 35.40 | 35.87 | 36.34 | 36.81 | 37.28 | 37.76 |
| 2.20 | 34.18 | 34.66 | 35.14 | 35.62 | 36.11 | 36.59 | 37.07 | 37.55 | 38.03 | 38.51 |
| 2.25 | 34.85 | 35.34 | 35.83 | 36.32 | 36.81 | 37.30 | 37.79 | 38.28 | 38.77 | 39.27 |
| 2.30 | 35.51 | 36.01 | 36.51 | 37.01 | 37.51 | 38.01 | 38.51 | 39.01 | 39.51 | 40.01 |
| 2.35 | 36.17 | 36.68 | 37.19 | 37.70 | 38.21 | 38.72 | 39.23 | 39.74 | 40.25 | 40.76 |
| 2.40 | 36.82 | 37.34 | 37.86 | 38.38 | 38.90 | 39.42 | 39.94 | 40.46 | 40.97 | 41.49 |
| 2.45 | 37.47 | 38.00 | 38.53 | 39.06 | 39.59 | 40.11 | 40.64 | 41.17 | 41.70 | 42.23 |
| 2.50 | 38.12 | 38.66 | 39.19 | 39.73 | 40.27 | 40.80 | 41.34 | 41.88 | 42.42 | 42.95 |

|      | 40.5  | 41.0  | 41.5  | 42.0  | 42.5  | 43.0  | 43.5  | 44.0  | 44.5  | 45.0  |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| .05  | 1.01  | 1.02  | 1.03  | 1.05  | 1.06  | 1.07  | 1.08  | 1.10  | 1.11  | 1.12  |
| .10  | 2.01  | 2.04  | 2.06  | 2.09  | 2.11  | 2.14  | 2.16  | 2.19  | 2.21  | 2.24  |
| .15  | 3.01  | 3.05  | 3.09  | 3.12  | 3.16  | 3.20  | 3.23  | 3.27  | 3.31  | 3.35  |
| .20  | 4.00  | 4.05  | 4.10  | 4.15  | 4.20  | 4.25  | 4.30  | 4.35  | 4.40  | 4.45  |
| .25  | 4.99  | 5.05  | 5.11  | 5.17  | 5.24  | 5.30  | 5.36  | 5.42  | 5.48  | 5.54  |
| .30  | 5.97  | 6.04  | 6.12  | 6.19  | 6.26  | 6.34  | 6.41  | 6.49  | 6.56  | 6.63  |
| .35  | 6.94  | 7.03  | 7.12  | 7.20  | 7.29  | 7.37  | 7.46  | 7.54  | 7.63  | 7.72  |
| .40  | 7.91  | 8.01  | 8.11  | 8.21  | 8.30  | 8.40  | 8.50  | 8.60  | 8.69  | 8.79  |
| .45  | 8.88  | 8.99  | 9.09  | 9.20  | 9.31  | 9.42  | 9.53  | 9.64  | 9.75  | 9.86  |
| .50  | 9.83  | 9.95  | 10.08 | 10.20 | 10.32 | 10.44 | 10.56 | 10.68 | 10.80 | 10.93 |
| .55  | 10.78 | 10.92 | 11.05 | 11.18 | 11.32 | 11.45 | 11.58 | 11.72 | 11.85 | 11.98 |
| .60  | 11.73 | 11.87 | 12.02 | 12.16 | 12.31 | 12.45 | 12.60 | 12.74 | 12.89 | 13.03 |
| .65  | 12.67 | 12.83 | 12.98 | 13.14 | 13.29 | 13.45 | 13.61 | 13.76 | 13.92 | 14.08 |
| .70  | 13.60 | 13.77 | 13.94 | 14.11 | 14.27 | 14.44 | 14.61 | 14.79 | 14.95 | 15.11 |
| .75  | 14.53 | 14.71 | 14.89 | 15.07 | 15.25 | 15.43 | 15.61 | 15.79 | 15.97 | 16.15 |
| .80  | 15.45 | 15.64 | 15.83 | 16.03 | 16.22 | 16.41 | 16.60 | 16.79 | 16.98 | 17.17 |
| .85  | 16.37 | 16.57 | 16.77 | 16.98 | 17.18 | 17.38 | 17.58 | 17.78 | 17.99 | 18.19 |
| .90  | 17.28 | 17.49 | 17.71 | 17.92 | 18.13 | 18.35 | 18.56 | 18.77 | 18.99 | 19.20 |
| .95  | 18.19 | 18.41 | 18.63 | 18.86 | 19.08 | 19.31 | 19.53 | 19.76 | 19.98 | 20.21 |
| 1.00 | 19.08 | 19.32 | 19.56 | 19.79 | 20.03 | 20.26 | 20.50 | 20.73 | 20.97 | 21.21 |
| 1.05 | 19.98 | 20.23 | 20.47 | 20.72 | 20.97 | 21.21 | 21.46 | 21.71 | 21.95 | 22.20 |
| 1.10 | 20.87 | 21.12 | 21.38 | 21.64 | 21.90 | 22.15 | 22.41 | 22.67 | 22.93 | 23.18 |
| 1.15 | 21.75 | 22.02 | 22.29 | 22.55 | 22.82 | 23.09 | 23.36 | 23.63 | 23.90 | 24.17 |
| 1.20 | 22.63 | 22.90 | 23.18 | 23.46 | 23.74 | 24.02 | 24.30 | 24.58 | 24.86 | 25.14 |
| 1.25 | 23.50 | 23.79 | 24.08 | 24.37 | 24.66 | 24.95 | 25.24 | 25.53 | 25.82 | 26.11 |
| 1.30 | 24.36 | 24.66 | 24.96 | 25.26 | 25.56 | 25.87 | 26.17 | 26.47 | 26.77 | 27.07 |
| 1.35 | 25.22 | 25.53 | 25.84 | 26.16 | 26.47 | 26.78 | 27.09 | 27.40 | 27.71 | 28.02 |
| 1.40 | 26.08 | 26.40 | 26.72 | 27.04 | 27.36 | 27.68 | 28.01 | 28.33 | 28.65 | 28.97 |
| 1.45 | 26.92 | 27.26 | 27.59 | 27.92 | 28.25 | 28.59 | 28.92 | 29.25 | 29.58 | 29.92 |
| 1.50 | 27.77 | 28.11 | 28.45 | 28.79 | 29.14 | 29.48 | 29.82 | 30.17 | 30.51 | 30.85 |
| 1.55 | 28.60 | 28.96 | 29.31 | 29.66 | 30.02 | 30.37 | 30.72 | 31.08 | 31.43 | 31.78 |
| 1.60 | 29.44 | 29.80 | 30.16 | 30.53 | 30.89 | 31.25 | 31.62 | 31.99 | 32.34 | 32.71 |
| 1.65 | 30.26 | 30.64 | 31.01 | 31.38 | 31.76 | 32.13 | 32.50 | 32.88 | 33.25 | 33.62 |
| 1.70 | 31.08 | 31.47 | 31.85 | 32.23 | 32.62 | 33.00 | 33.39 | 33.77 | 34.15 | 34.54 |
| 1.75 | 31.90 | 32.29 | 32.69 | 33.08 | 33.47 | 33.87 | 34.26 | 34.65 | 35.05 | 35.44 |
| 1.80 | 32.71 | 33.11 | 33.52 | 33.92 | 34.32 | 34.73 | 35.13 | 35.53 | 35.94 | 36.34 |
| 1.85 | 33.51 | 33.93 | 34.34 | 34.75 | 35.17 | 35.58 | 36.00 | 36.41 | 36.82 | 37.24 |
| 1.90 | 34.31 | 34.74 | 35.16 | 35.58 | 36.01 | 36.43 | 36.85 | 37.28 | 37.70 | 38.12 |
| 1.95 | 35.11 | 35.54 | 35.97 | 36.41 | 36.84 | 37.27 | 37.71 | 38.14 | 38.57 | 39.01 |
| 2.00 | 35.89 | 36.34 | 36.78 | 37.22 | 37.67 | 38.11 | 38.55 | 39.00 | 39.44 | 39.88 |
| 2.05 | 36.68 | 37.13 | 37.58 | 38.04 | 38.49 | 38.94 | 39.39 | 39.85 | 40.30 | 40.75 |
| 2.10 | 37.45 | 37.92 | 38.38 | 38.84 | 39.30 | 39.77 | 40.23 | 40.69 | 41.15 | 41.62 |
| 2.15 | 38.23 | 38.70 | 39.17 | 39.64 | 40.12 | 40.59 | 41.06 | 41.53 | 42.00 | 42.47 |
| 2.20 | 38.99 | 39.48 | 39.96 | 40.44 | 40.92 | 41.40 | 41.88 | 42.36 | 42.85 | 43.33 |
| 2.25 | 39.76 | 40.25 | 40.74 | 41.23 | 41.72 | 42.21 | 42.70 | 43.19 | 43.68 | 44.17 |
| 2.30 | 40.51 | 41.01 | 41.51 | 42.01 | 42.51 | 43.01 | 43.51 | 44.01 | 44.51 | 45.01 |
| 2.35 | 41.27 | 41.77 | 42.28 | 42.79 | 43.30 | 43.81 | 44.32 | 44.83 | 45.34 | 45.85 |
| 2.40 | 42.01 | 42.53 | 43.05 | 43.57 | 44.09 | 44.60 | 45.12 | 45.64 | 46.15 | 46.68 |
| 2.45 | 42.75 | 43.28 | 43.81 | 44.34 | 44.86 | 45.39 | 45.92 | 46.45 | 46.98 | 47.50 |
| 2.50 | 43.49 | 44.03 | 44.56 | 45.10 | 45.64 | 46.17 | 46.71 | 47.25 | 47.78 | 48.32 |

|      | 45.5  | 46.0  | 46.5  | 47.0  | 47.5  | 48.0  | 48.5  | 49.0  | 49.5  | 50.0  |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| .05  | 1.13  | 1.15  | 1.16  | 1.17  | 1.18  | 1.20  | 1.21  | 1.22  | 1.23  | 1.25  |
| .10  | 2.26  | 2.29  | 2.31  | 2.34  | 2.36  | 2.39  | 2.41  | 2.44  | 2.46  | 2.49  |
| .15  | 3.38  | 3.42  | 3.45  | 3.49  | 3.53  | 3.57  | 3.61  | 3.64  | 3.68  | 3.72  |
| .20  | 4.50  | 4.55  | 4.60  | 4.65  | 4.70  | 4.74  | 4.79  | 4.84  | 4.89  | 4.94  |
| .25  | 5.61  | 5.67  | 5.73  | 5.79  | 5.85  | 5.91  | 5.97  | 6.04  | 6.10  | 6.16  |
| .30  | 6.71  | 6.78  | 6.85  | 6.93  | 7.00  | 7.08  | 7.15  | 7.22  | 7.30  | 7.37  |
| .35  | 7.80  | 7.89  | 7.97  | 8.06  | 8.14  | 8.23  | 8.32  | 8.40  | 8.49  | 8.57  |
| .40  | 8.89  | 8.99  | 9.09  | 9.18  | 9.28  | 9.38  | 9.48  | 9.57  | 9.67  | 9.77  |
| .45  | 9.97  | 10.08 | 10.19 | 10.30 | 10.41 | 10.52 | 10.63 | 10.74 | 10.85 | 10.96 |
| .50  | 11.05 | 11.17 | 11.29 | 11.41 | 11.53 | 11.65 | 11.79 | 11.92 | 12.02 | 12.14 |
| .55  | 12.12 | 12.25 | 12.38 | 12.51 | 12.65 | 12.78 | 12.91 | 13.05 | 13.18 | 13.31 |
| .60  | 13.18 | 13.32 | 13.47 | 13.61 | 13.76 | 13.90 | 14.05 | 14.19 | 14.34 | 14.48 |
| .65  | 14.23 | 14.39 | 14.55 | 14.70 | 14.86 | 15.02 | 15.17 | 15.33 | 15.48 | 15.64 |
| .70  | 15.28 | 15.45 | 15.62 | 15.79 | 15.95 | 16.12 | 16.29 | 16.46 | 16.63 | 16.79 |
| .75  | 16.32 | 16.50 | 16.68 | 16.86 | 17.04 | 17.22 | 17.40 | 17.58 | 17.76 | 17.94 |
| .80  | 17.36 | 17.55 | 17.74 | 17.93 | 18.12 | 18.32 | 18.51 | 18.70 | 18.89 | 19.08 |
| .85  | 18.39 | 18.59 | 18.79 | 19.00 | 19.20 | 19.40 | 19.60 | 19.81 | 20.01 | 20.21 |
| .90  | 19.41 | 19.63 | 19.84 | 20.05 | 20.27 | 20.48 | 20.69 | 20.91 | 21.12 | 21.33 |
| .95  | 20.43 | 20.66 | 20.88 | 21.10 | 21.33 | 21.55 | 21.78 | 22.00 | 22.23 | 22.45 |
| 1.00 | 21.44 | 21.68 | 21.91 | 22.15 | 22.38 | 22.62 | 22.85 | 23.09 | 23.33 | 23.56 |
| 1.05 | 22.45 | 22.69 | 22.94 | 23.18 | 23.43 | 23.68 | 23.92 | 24.17 | 24.42 | 24.66 |
| 1.10 | 23.44 | 23.70 | 23.96 | 24.22 | 24.47 | 24.73 | 24.99 | 25.25 | 25.50 | 25.76 |
| 1.15 | 24.43 | 24.70 | 24.97 | 25.24 | 25.51 | 25.78 | 26.04 | 26.31 | 26.58 | 26.85 |
| 1.20 | 25.42 | 25.70 | 25.98 | 26.26 | 26.54 | 26.82 | 27.09 | 27.37 | 27.65 | 27.93 |
| 1.25 | 26.40 | 26.69 | 26.98 | 27.27 | 27.56 | 27.85 | 28.14 | 28.43 | 28.72 | 29.01 |
| 1.30 | 27.37 | 27.67 | 27.97 | 28.27 | 28.57 | 28.87 | 29.17 | 29.47 | 29.78 | 30.08 |
| 1.35 | 28.33 | 28.65 | 28.96 | 29.27 | 29.58 | 29.89 | 30.20 | 30.51 | 30.83 | 31.14 |
| 1.40 | 29.29 | 29.62 | 29.94 | 30.26 | 30.58 | 30.90 | 31.23 | 31.55 | 31.87 | 32.19 |
| 1.45 | 30.25 | 30.58 | 30.91 | 31.24 | 31.58 | 31.91 | 32.24 | 32.57 | 32.91 | 33.24 |
| 1.50 | 31.19 | 31.54 | 31.88 | 32.22 | 32.57 | 32.91 | 33.25 | 33.59 | 33.94 | 34.28 |
| 1.55 | 32.14 | 32.49 | 32.84 | 33.19 | 33.55 | 33.90 | 34.25 | 34.61 | 34.96 | 35.31 |
| 1.60 | 33.07 | 33.43 | 33.80 | 34.16 | 34.52 | 34.89 | 35.25 | 35.61 | 35.98 | 36.34 |
| 1.65 | 34.00 | 34.37 | 34.75 | 35.12 | 35.49 | 35.87 | 36.24 | 36.61 | 36.99 | 37.36 |
| 1.70 | 34.92 | 35.30 | 35.69 | 36.07 | 36.46 | 36.84 | 37.22 | 37.61 | 37.99 | 38.37 |
| 1.75 | 35.84 | 36.23 | 36.62 | 37.02 | 37.41 | 37.81 | 38.20 | 38.59 | 38.99 | 39.38 |
| 1.80 | 36.75 | 37.15 | 37.55 | 37.96 | 38.36 | 38.77 | 39.17 | 39.57 | 39.98 | 40.38 |
| 1.85 | 37.65 | 38.06 | 38.48 | 38.89 | 39.31 | 39.72 | 40.13 | 40.55 | 40.96 | 41.37 |
| 1.90 | 38.55 | 38.97 | 39.40 | 39.82 | 40.24 | 40.67 | 41.09 | 41.51 | 41.94 | 42.36 |
| 1.95 | 39.44 | 39.87 | 40.31 | 40.74 | 41.17 | 41.61 | 42.04 | 42.47 | 42.91 | 43.34 |
| 2.00 | 40.33 | 40.77 | 41.21 | 41.65 | 42.09 | 42.54 | 42.98 | 43.43 | 43.87 | 44.31 |
| 2.05 | 41.21 | 41.66 | 42.11 | 42.56 | 43.02 | 43.47 | 43.92 | 44.37 | 44.82 | 45.28 |
| 2.10 | 42.08 | 42.54 | 43.00 | 43.47 | 43.93 | 44.39 | 44.85 | 45.32 | 45.78 | 46.24 |
| 2.15 | 42.95 | 43.42 | 43.89 | 44.36 | 44.83 | 45.31 | 45.78 | 46.25 | 46.72 | 47.19 |
| 2.20 | 43.81 | 44.29 | 44.77 | 45.25 | 45.73 | 46.22 | 46.70 | 47.18 | 47.66 | 48.14 |
| 2.25 | 44.66 | 45.16 | 45.65 | 46.14 | 46.63 | 47.12 | 47.61 | 48.10 | 48.59 | 49.08 |
| 2.30 | 45.52 | 46.02 | 46.52 | 47.02 | 47.52 | 48.02 | 48.52 | 49.02 | 49.52 | 50.02 |
| 2.35 | 46.36 | 46.87 | 47.38 | 47.89 | 48.40 | 48.91 | 49.42 | 49.93 | 50.44 | 50.94 |
| 2.40 | 47.20 | 47.72 | 48.24 | 48.75 | 49.27 | 49.79 | 50.31 | 50.83 | 51.35 | 51.87 |
| 2.45 | 48.03 | 48.56 | 49.09 | 49.61 | 50.14 | 50.67 | 51.20 | 51.73 | 52.25 | 52.78 |
| 2.50 | 48.86 | 49.40 | 49.93 | 50.47 | 51.01 | 51.54 | 52.08 | 52.62 | 53.15 | 53.69 |

|      | 50.5  | 51.0  | 51.5  | 52.0  | 52.5  | 53.0  | 53.5  | 54.0  | 54.5  | 55.0  |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| .05  | 1.26  | 1.27  | 1.28  | 1.30  | 1.31  | 1.32  | 1.33  | 1.35  | 1.36  | 1.37  |
| .10  | 2.51  | 2.54  | 2.56  | 2.58  | 2.61  | 2.63  | 2.66  | 2.68  | 2.71  | 2.73  |
| .15  | 3.75  | 3.79  | 3.83  | 3.87  | 3.90  | 3.94  | 3.98  | 4.01  | 4.05  | 4.09  |
| .20  | 4.99  | 5.04  | 5.09  | 5.14  | 5.19  | 5.24  | 5.29  | 5.34  | 5.39  | 5.44  |
| .25  | 6.22  | 6.28  | 6.34  | 6.41  | 6.47  | 6.53  | 6.59  | 6.65  | 6.71  | 6.78  |
| .30  | 7.44  | 7.52  | 7.59  | 7.66  | 7.74  | 7.81  | 7.89  | 7.96  | 8.03  | 8.11  |
| .35  | 8.66  | 8.74  | 8.83  | 8.92  | 9.00  | 9.09  | 9.17  | 9.26  | 9.34  | 9.43  |
| .40  | 9.87  | 9.96  | 10.06 | 10.16 | 10.26 | 10.36 | 10.45 | 10.55 | 10.65 | 10.75 |
| .45  | 11.07 | 11.18 | 11.29 | 11.40 | 11.51 | 11.62 | 11.72 | 11.83 | 11.94 | 12.05 |
| .50  | 12.26 | 12.38 | 12.50 | 12.62 | 12.75 | 12.87 | 12.99 | 13.11 | 13.23 | 13.35 |
| .55  | 13.45 | 13.58 | 13.71 | 13.85 | 13.98 | 14.11 | 14.25 | 14.38 | 14.51 | 14.65 |
| .60  | 14.63 | 14.77 | 14.92 | 15.06 | 15.20 | 15.35 | 15.49 | 15.64 | 15.78 | 15.93 |
| .65  | 15.80 | 15.95 | 16.11 | 16.27 | 16.42 | 16.58 | 16.74 | 16.89 | 17.05 | 17.21 |
| .70  | 16.96 | 17.13 | 17.30 | 17.47 | 17.63 | 17.80 | 17.97 | 18.14 | 18.31 | 18.47 |
| .75  | 18.12 | 18.30 | 18.48 | 18.66 | 18.84 | 19.02 | 19.20 | 19.37 | 19.55 | 19.73 |
| .80  | 19.27 | 19.46 | 19.65 | 19.84 | 20.03 | 20.22 | 20.41 | 20.60 | 20.80 | 20.99 |
| .85  | 20.41 | 20.61 | 20.82 | 21.02 | 21.22 | 21.42 | 21.62 | 21.83 | 22.03 | 22.23 |
| .90  | 21.55 | 21.76 | 21.97 | 22.19 | 22.40 | 22.61 | 22.82 | 23.04 | 23.25 | 23.47 |
| .95  | 22.68 | 22.90 | 23.12 | 23.35 | 23.57 | 23.80 | 24.02 | 24.25 | 24.47 | 24.70 |
| 1.00 | 23.80 | 24.03 | 24.27 | 24.50 | 24.74 | 24.98 | 25.21 | 25.45 | 25.69 | 25.92 |
| 1.05 | 24.91 | 25.16 | 25.40 | 25.65 | 25.90 | 26.14 | 26.39 | 26.64 | 26.88 | 27.12 |
| 1.10 | 26.02 | 26.28 | 26.53 | 26.79 | 27.05 | 27.31 | 27.56 | 27.82 | 28.08 | 28.34 |
| 1.15 | 27.12 | 27.39 | 27.66 | 27.92 | 28.19 | 28.46 | 28.73 | 29.00 | 29.27 | 29.54 |
| 1.20 | 28.21 | 28.49 | 28.77 | 29.05 | 29.33 | 29.61 | 29.89 | 30.17 | 30.45 | 30.73 |
| 1.25 | 29.30 | 29.59 | 29.88 | 30.17 | 30.46 | 30.75 | 31.04 | 31.33 | 31.62 | 31.91 |
| 1.30 | 30.38 | 30.68 | 30.98 | 31.28 | 31.58 | 31.88 | 32.18 | 32.48 | 32.78 | 33.08 |
| 1.35 | 31.45 | 31.76 | 32.07 | 32.38 | 32.69 | 33.01 | 33.32 | 33.63 | 33.94 | 34.25 |
| 1.40 | 32.51 | 32.84 | 33.16 | 33.48 | 33.80 | 34.12 | 34.44 | 34.77 | 35.09 | 35.41 |
| 1.45 | 33.57 | 33.90 | 34.24 | 34.57 | 34.90 | 35.23 | 35.57 | 35.90 | 36.23 | 36.56 |
| 1.50 | 34.62 | 34.97 | 35.31 | 35.65 | 35.99 | 36.34 | 36.68 | 37.02 | 37.36 | 37.71 |
| 1.55 | 35.67 | 36.02 | 36.37 | 36.73 | 37.08 | 37.43 | 37.79 | 38.14 | 38.49 | 38.94 |
| 1.60 | 36.70 | 37.07 | 37.43 | 37.79 | 38.16 | 38.52 | 38.88 | 39.25 | 39.61 | 39.97 |
| 1.65 | 37.73 | 38.11 | 38.48 | 38.85 | 39.23 | 39.60 | 39.98 | 40.35 | 40.72 | 41.10 |
| 1.70 | 38.76 | 39.14 | 39.53 | 39.91 | 40.29 | 40.68 | 41.06 | 41.44 | 41.83 | 42.21 |
| 1.75 | 39.77 | 40.17 | 40.56 | 40.96 | 41.35 | 41.74 | 42.14 | 42.53 | 42.92 | 43.32 |
| 1.80 | 40.78 | 41.19 | 41.59 | 42.00 | 42.40 | 42.80 | 43.21 | 43.61 | 44.01 | 44.42 |
| 1.85 | 41.79 | 42.20 | 42.61 | 43.03 | 43.44 | 43.86 | 44.27 | 44.68 | 45.10 | 45.51 |
| 1.90 | 42.78 | 43.21 | 43.63 | 44.05 | 44.48 | 44.90 | 45.32 | 45.75 | 46.17 | 46.60 |
| 1.95 | 43.77 | 44.21 | 44.64 | 45.07 | 45.51 | 45.94 | 46.37 | 46.81 | 47.24 | 47.67 |
| 2.00 | 44.76 | 45.20 | 45.64 | 46.09 | 46.53 | 46.97 | 47.42 | 47.86 | 48.30 | 48.74 |
| 2.05 | 45.73 | 46.19 | 46.64 | 47.09 | 47.54 | 48.00 | 48.45 | 48.90 | 49.36 | 49.91 |
| 2.10 | 46.70 | 47.17 | 47.63 | 48.09 | 48.55 | 49.01 | 49.48 | 49.94 | 50.40 | 50.86 |
| 2.15 | 47.67 | 48.14 | 48.61 | 49.08 | 49.55 | 50.02 | 50.50 | 50.97 | 51.44 | 51.91 |
| 2.20 | 48.62 | 49.10 | 49.59 | 50.07 | 50.55 | 51.03 | 51.51 | 51.99 | 52.47 | 52.96 |
| 2.25 | 49.57 | 50.06 | 50.55 | 51.05 | 51.54 | 52.03 | 52.52 | 53.01 | 53.50 | 53.99 |
| 2.30 | 50.52 | 51.02 | 51.52 | 52.02 | 52.52 | 53.02 | 53.52 | 54.02 | 54.52 | 55.02 |
| 2.35 | 51.45 | 51.96 | 52.47 | 52.98 | 53.49 | 54.00 | 54.51 | 55.02 | 55.53 | 56.04 |
| 2.40 | 52.38 | 52.90 | 53.42 | 53.94 | 54.46 | 54.98 | 55.50 | 56.02 | 56.53 | 57.05 |
| 2.45 | 53.31 | 53.84 | 54.36 | 54.89 | 55.42 | 55.95 | 56.48 | 57.00 | 57.53 | 58.06 |
| 2.50 | 54.23 | 54.76 | 55.30 | 55.84 | 56.37 | 56.91 | 57.45 | 57.99 | 58.52 | 59.06 |

|      | 55.5  | 56.0  | 56.5  | 57.0  | 57.5  | 58.0  | 58.5  | 59.0  | 59.5  | 60.0  |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| .05  | 1.38  | 1.40  | 1.41  | 1.42  | 1.43  | 1.45  | 1.46  | 1.47  | 1.48  | 1.50  |
| .10  | 2.76  | 2.78  | 2.81  | 2.83  | 2.86  | 2.88  | 2.91  | 2.93  | 2.96  | 2.98  |
| .15  | 4.13  | 4.16  | 4.20  | 4.24  | 4.28  | 4.31  | 4.35  | 4.39  | 4.42  | 4.46  |
| .20  | 5.49  | 5.54  | 5.58  | 5.63  | 5.68  | 5.73  | 5.78  | 5.83  | 5.88  | 5.93  |
| .25  | 6.84  | 6.90  | 6.96  | 7.02  | 7.08  | 7.15  | 7.21  | 7.27  | 7.33  | 7.39  |
| .30  | 8.18  | 8.25  | 8.33  | 8.40  | 8.48  | 8.55  | 8.62  | 8.70  | 8.77  | 8.84  |
| .35  | 9.52  | 9.60  | 9.69  | 9.77  | 9.86  | 9.94  | 10.03 | 10.12 | 10.20 | 10.29 |
| .40  | 10.84 | 10.94 | 11.04 | 11.14 | 11.23 | 11.32 | 11.43 | 11.53 | 11.63 | 11.72 |
| .45  | 12.16 | 12.27 | 12.38 | 12.49 | 12.60 | 12.71 | 12.82 | 12.93 | 13.04 | 13.15 |
| .50  | 13.47 | 13.60 | 13.72 | 13.84 | 13.96 | 14.08 | 14.20 | 14.32 | 14.45 | 14.57 |
| .55  | 14.78 | 14.91 | 15.04 | 15.18 | 15.31 | 15.44 | 15.58 | 15.71 | 15.84 | 15.98 |
| .60  | 16.07 | 16.22 | 16.36 | 16.51 | 16.65 | 16.80 | 16.94 | 17.09 | 17.23 | 17.38 |
| .65  | 17.36 | 17.52 | 17.67 | 17.83 | 17.99 | 18.14 | 18.30 | 18.46 | 18.61 | 18.77 |
| .70  | 18.64 | 18.81 | 18.98 | 19.14 | 19.31 | 19.48 | 19.65 | 19.82 | 19.98 | 20.15 |
| .75  | 19.91 | 20.09 | 20.27 | 20.45 | 20.63 | 20.81 | 20.99 | 21.17 | 21.35 | 21.53 |
| .80  | 21.18 | 21.37 | 21.56 | 21.75 | 21.94 | 22.13 | 22.32 | 22.51 | 22.70 | 22.89 |
| .85  | 22.43 | 22.63 | 22.84 | 23.04 | 23.24 | 23.44 | 23.65 | 23.85 | 24.05 | 24.25 |
| .90  | 23.68 | 23.89 | 24.11 | 24.32 | 24.53 | 24.75 | 24.96 | 25.17 | 25.39 | 25.61 |
| .95  | 24.92 | 25.15 | 25.37 | 25.59 | 25.82 | 26.04 | 26.27 | 26.49 | 26.72 | 26.94 |
| 1.00 | 26.15 | 26.39 | 26.62 | 26.86 | 27.10 | 27.33 | 27.57 | 27.80 | 28.04 | 28.27 |
| 1.05 | 27.38 | 27.62 | 27.87 | 28.12 | 28.36 | 28.61 | 28.86 | 29.10 | 29.35 | 29.60 |
| 1.10 | 28.59 | 28.85 | 29.11 | 29.37 | 29.63 | 29.88 | 30.14 | 30.40 | 30.66 | 30.91 |
| 1.15 | 29.80 | 30.07 | 30.34 | 30.61 | 30.88 | 31.15 | 31.41 | 31.68 | 31.95 | 32.22 |
| 1.20 | 31.00 | 31.28 | 31.56 | 31.84 | 32.12 | 32.40 | 32.68 | 32.96 | 33.24 | 33.52 |
| 1.25 | 32.20 | 32.49 | 32.78 | 33.07 | 33.36 | 33.65 | 33.94 | 34.23 | 34.52 | 34.81 |
| 1.30 | 33.38 | 33.68 | 33.99 | 34.29 | 34.59 | 34.89 | 35.19 | 35.49 | 35.79 | 36.09 |
| 1.35 | 34.56 | 34.87 | 35.18 | 35.50 | 35.81 | 36.12 | 36.43 | 36.74 | 37.05 | 37.36 |
| 1.40 | 35.73 | 36.05 | 36.38 | 36.70 | 37.02 | 37.34 | 37.66 | 37.99 | 38.31 | 38.63 |
| 1.45 | 36.90 | 37.23 | 37.56 | 37.89 | 38.22 | 38.56 | 38.89 | 39.22 | 39.55 | 39.89 |
| 1.50 | 38.05 | 38.39 | 38.74 | 39.08 | 39.42 | 39.76 | 40.11 | 40.45 | 40.79 | 41.14 |
| 1.55 | 39.20 | 39.55 | 39.90 | 40.26 | 40.61 | 40.96 | 41.32 | 41.67 | 42.02 | 42.38 |
| 1.60 | 40.34 | 40.70 | 41.06 | 41.43 | 41.79 | 42.15 | 42.52 | 42.88 | 43.25 | 43.61 |
| 1.65 | 41.47 | 41.84 | 42.22 | 42.59 | 42.96 | 43.34 | 43.71 | 44.09 | 44.46 | 44.83 |
| 1.70 | 42.60 | 42.98 | 43.36 | 43.75 | 44.13 | 44.51 | 44.90 | 45.28 | 45.66 | 46.05 |
| 1.75 | 43.71 | 44.11 | 44.50 | 44.89 | 45.29 | 45.68 | 46.08 | 46.47 | 46.86 | 47.26 |
| 1.80 | 44.82 | 45.23 | 45.63 | 46.03 | 46.44 | 46.84 | 47.25 | 47.65 | 48.05 | 48.46 |
| 1.85 | 45.92 | 46.34 | 46.75 | 47.17 | 47.58 | 47.99 | 48.41 | 48.82 | 49.23 | 49.65 |
| 1.90 | 47.02 | 47.44 | 47.87 | 48.29 | 48.71 | 49.14 | 49.56 | 49.99 | 50.41 | 50.83 |
| 1.95 | 48.11 | 48.54 | 48.97 | 49.41 | 49.84 | 50.27 | 50.71 | 51.14 | 51.57 | 52.01 |
| 2.00 | 49.19 | 49.63 | 50.07 | 50.52 | 50.96 | 51.40 | 51.85 | 52.29 | 52.73 | 53.18 |
| 2.05 | 50.26 | 50.71 | 51.17 | 51.62 | 52.07 | 52.53 | 52.98 | 53.43 | 53.89 | 54.34 |
| 2.10 | 51.33 | 51.79 | 52.25 | 52.71 | 53.18 | 53.64 | 54.10 | 54.56 | 55.02 | 55.49 |
| 2.15 | 52.39 | 52.86 | 53.33 | 53.80 | 54.27 | 54.75 | 55.22 | 55.69 | 56.16 | 56.63 |
| 2.20 | 53.44 | 53.92 | 54.40 | 54.88 | 55.36 | 55.84 | 56.32 | 56.81 | 57.29 | 57.77 |
| 2.25 | 54.48 | 54.97 | 55.46 | 55.95 | 56.44 | 56.94 | 57.43 | 57.92 | 58.41 | 58.90 |
| 2.30 | 55.52 | 56.02 | 56.52 | 57.02 | 57.52 | 58.02 | 58.52 | 59.02 | 59.52 | 60.02 |
| 2.35 | 56.55 | 57.06 | 57.57 | 58.08 | 58.59 | 59.10 | 59.61 | 60.11 | 60.62 | 61.13 |
| 2.40 | 57.57 | 58.09 | 58.61 | 59.13 | 59.65 | 60.16 | 60.68 | 61.20 | 61.72 | 62.24 |
| 2.45 | 58.59 | 59.12 | 59.64 | 60.17 | 60.70 | 61.22 | 61.75 | 62.28 | 62.81 | 63.34 |
| 2.50 | 59.60 | 60.13 | 60.67 | 61.21 | 61.74 | 62.28 | 62.82 | 63.35 | 63.89 | 64.43 |



Addendum to Intralaboratory Technical Report

A Table for Determining the True Time  
Representing an Observed Count Rate

by

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The accompanying table is an abbreviated form of the table presented with ITR-9.

As indicated in the section, "Use of the Tables", in the previous report, if one holds R, the ratio of count time to half-life, constant, then a true value of the time correction may be obtained by multiplying the time correction value at unit half-life by an appropriate factor to obtain the value at the actual half-life.

Example:

If one has,

Count Time = 4.00 min.

Half-Life = 4.00 min.

$R = 1.00$

Locate T on the table for  $R = 1.00$ . Then multiply this number by 4.00 to obtain the correction. In this case we have,

$T = 0.47122$ , and Half-Life = 4.00 min.

so,

$(4.00) \times (0.47122) = 1.88488$  minutes.

Thus if the count had been started at 1400 hours, the true time for the observed activity would be,

$1400 \text{ hours} + 1.88 \text{ min.} = 1401.88 \text{ hours.}$

# DECAY CORRECTION TABLE FOR DECAY DURING COUNTING

R = COUNT TIME/HALF LIFE  
T = TIME CORRECTION FACTOR

| R      | T      | R      | T       |
|--------|--------|--------|---------|
| .05--  | .02492 | 1.30-- | .60151  |
| .10--  | .04970 | 1.35-- | .62273  |
| .15--  | .07434 | 1.40-- | .64382  |
| .20--  | .09883 | 1.45-- | .66477  |
| .25--  | .12319 | 1.50-- | .68558  |
| .30--  | .14739 | 1.55-- | .70626  |
| .35--  | .17145 | 1.60-- | .72680  |
| .40--  | .19537 | 1.65-- | .74720  |
| .45--  | .21915 | 1.70-- | .76747  |
| .50--  | .24278 | 1.75-- | .78760  |
| .55--  | .26626 | 1.80-- | .80760  |
| .60--  | .28961 | 1.85-- | .82746  |
| .65--  | .31281 | 1.90-- | .84720  |
| .70--  | .33587 | 1.95-- | .86679  |
| .75--  | .35878 | 2.00-- | .88626  |
| .80--  | .38155 | 2.05-- | .90560  |
| .85--  | .40418 | 2.10-- | .92480  |
| .90--  | .42667 | 2.15-- | .94387  |
| .95--  | .44902 | 2.20-- | .96282  |
| 1.00-- | .47122 | 2.25-- | .98163  |
| 1.05-- | .49329 | 2.30-- | 1.00032 |
| 1.10-- | .51521 | 2.35-- | 1.01888 |
| 1.15-- | .53699 | 2.40-- | 1.03731 |
| 1.20-- | .55864 | 2.45-- | 1.05562 |
| 1.25-- | .58014 | 2.50-- | 1.07380 |

TIME CORRECTION FACTOR IS GIVEN FOR UNIT HALF LIFE.  
MULTIPLY CORRECTION FACTOR (T) BY HALF LIFE BEING  
CONSIDERED FOR DESIRED TIME CORRECTION.