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# ONE-SIDED TOLERANCE LIMIT TABLES

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## ABSTRACT

The tables list  $K$  factors used to compute one-sided tolerance limits which can be represented by  $\bar{x} + Ks$  or  $\bar{x} - Ks$  (upper or lower limits, respectively). Tables are presented with entry by sample size, proportion of population covered, and confidence coefficient. The tables list  $K$  factors for  $n = 3$  (1) 50 (5) 100 (10) 200, 250, 300 (100) 1000, 9999, and 50000; for proportion of population covered of .50 (.01) .99, .995, .999; and for confidence coefficients of .90, .95, and .99. Examples of the use of the tables are also included.

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## ONE-SIDED TOLERANCE LIMIT TABLES

I. INTRODUCTION

Upper and lower 100 (1- $\alpha$ ) percent confidence limits may be constructed with the property that when we say these limits include the true value of the parameter, 100 (1- $\alpha$ ) percent of all such statements will be correct [1]. For example, the case of the mean [for sample size (n) larger than 29] can be represented as  $\bar{x} \pm ks$  where  $\bar{x}$  is the mean, k is the corresponding normal deviate divided by  $\sqrt{n}$ , and s is the sample standard deviation.

Sometimes it is useful to obtain an interval that covers a fixed proportion of the population distribution with a desired confidence. These intervals are called tolerance intervals and may be constructed such that the interval covers a proportion of the population with a desired confidence. This can be represented by  $\bar{x} \pm Ks$  where K is the tolerance factor. As the sample size increases the value of k for confidence intervals approaches zero while K for tolerance intervals approaches the normal deviate that includes the desired proportion of the universe.

Tolerance limits are based on the assumption that the underlying statistical universe is normally distributed. Since  $\mu$  (the population mean) and  $\sigma$  (the population standard deviation) are not known, the tolerance limits must be based on  $\bar{x}$  and s from a random sample of n observations. The quantities  $\bar{x}$  and s are random variables and hence the limit depends on the particular outcome of the sample. Different samples

may lead to different limits. Some situations necessitate the use of one-sided tolerance limits (upper or lower) which can be represented by  $\bar{x} + Ks$  or  $\bar{x} - Ks$ . These K values are given in Tables I, II, and III.

Various approximations have been used to calculate K values. Owen [4] [5] discusses the accuracy of four different approximation methods. The enclosed tables are based on the non-central t-distribution and make the use of approximations unnecessary.

**II. COVERAGE OF TABLES**

Factors  $K$  such that  $\bar{x} + Ks$  or  $\bar{x} - Ks$  is a one-sided tolerance limit for a normally distributed population are given in Table I for 90% confidence, Table II for 95% confidence, and Table III for 99% confidence. These are given for  $n = 3$  (1) 50, 55 (5) 100, 110 (10) 200, 250, 300 (100) 1000, 9999, 50000 and for proportion of population covered of .50 (.01) .99, .995, .999.

### III. EXAMPLE OF USE OF TABLES

A manufacturer of fuzes would like to specify a single lower limit above which he can be assured with a probability of 95% that at least 99% of his production will lie. A random sample of 30 fuzes is taken and the sample mean and standard deviation are found to be 605.1 and 12.65, respectively. A value of  $K = 3.064$  corresponding to  $n = 30$  with 95% probability and 99% of population covered is obtained from Table II. The required lower tolerance limit is given by  $\bar{x} - Ks = 605.1 - (3.064)(12.65) = 566.3$ .

The manufacturer would also like to know with 95% probability what percent of his production will lie above 579.8 using the above data. The  $K$  value will be  $\frac{\bar{x} - L}{s} = \frac{605.1 - 579.8}{12.65} = \frac{25.3}{12.65} = 2.00$ . Table II is searched at  $n = 30$  for 2.00. The .93 proportion of population covered column has  $K = 2.013$  and the .92 column has  $K = 1.927$ . A conservative statement would be that the manufacturer can be assured with a probability of 95% that at least 92% of his production will lie above 579.8. Linear interpolation, if necessary, with respect to the proportion of population covered is considered appropriate to use since only small errors can result. More accurate interpolation is accomplished by interpolating with respect to the normal deviate corresponding to the proportion of population covered.



#### IV. CONSTRUCTION OF TABLES

The values of  $K$  given in the tables correspond to percentage points (divided by the square root of  $n$ ) of the non-central  $t$ -distribution. The non-central  $t$  statistic,  $t_{n-1, \sqrt{nk_\alpha}}$  has  $n-1$  degrees of freedom and non-centrality parameter  $\sqrt{nk_\alpha}$ .  $k_\alpha$  is defined by

$$\frac{1}{\sqrt{2\pi}} \int_{k_\alpha}^{\infty} e^{-z^2/2} dz = \alpha.$$

To find  $K$ , determine  $t_0$  such that  $P[t_{n-1, \sqrt{nk_\alpha}} > t_0] = 1 - \gamma$ . Let  $K = t_0/\sqrt{n}$  [3]. Then  $\bar{x} + Ks$  and  $\bar{x} - Ks$  are upper one-sided and lower one-sided tolerance limits, respectively. It can be stated with  $100\gamma\%$  confidence that at least  $100(1-\alpha)\%$  of the distribution will be less than  $\bar{x} + Ks$  (or greater than  $\bar{x} - Ks$ ).

Table IV of Johnson and Welch [2] was used to compute the non-centrality parameter of the non-central  $t$ -distribution. An iteration method was necessary and this was performed, in single precision, on a Honeywell 2200 Computer (65K storage). The value  $\infty$  was replaced by 100,000 so interpolation could be performed. The following steps were used:

- A. Determine  $k_\alpha$ , the normal deviate exceeded with probability  $\alpha$ .
- B. Calculate  $\delta = \sqrt{nk_\alpha}$ , the non-centrality parameter of the non-central  $t$ -distribution, and  $f = n-1$ , the number of degrees of freedom.
- C. Determine  $Z_{(1-\gamma)}$ , the normal deviate exceeded with probability  $1-\gamma$ .
- D. Calculate the first approximation  $t_1$  by

$$\frac{\delta + Z_{(1-\gamma)} \sqrt{1 + \frac{\delta^2}{2f} - \frac{Z_{(1-\gamma)}^2}{2f}}}{1 - \frac{Z_{(1-\gamma)}^2}{2f}}$$

E. Calculate  $\frac{t_1}{\sqrt{2f}}$

F. Find  $y = \frac{1}{\sqrt{1 + \frac{t_1^2}{2f}}}$  if  $\left| \frac{t_1}{\sqrt{2f}} \right|$  is greater than 0.75 or

$y' = \frac{t_1/\sqrt{2f}}{\sqrt{1 + \frac{t_1^2}{2f}}}$  if  $\left| \frac{t_1}{\sqrt{2f}} \right|$  is less than 0.75.

G. Obtain  $\lambda_1 = \lambda(f, t_1, 1-\gamma)$  from Table IV of Johnson and Welch

H. Calculate a second approximation  $t_2$  where

$$t_2 = \frac{\delta + \lambda_1 \sqrt{1 + \frac{\delta^2}{2f} - \frac{\lambda_1^2}{2f}}}{1 - \frac{\lambda_1^2}{2f}}$$

I. Repeat steps (E) through (H) replacing  $t_1$  by  $t_2$  and calculate a third approximation. Repeat these steps until two successive approximations are the same. Take for  $t(f, \delta, 1-\gamma)$  the value so obtained.

J. Calculate  $K = \frac{t(f, \delta, 1-\gamma)}{\sqrt{n}}$ .

V. ACCURACY

The results in the enclosed tables should be accurate to within .005 and rarely more than .002 from the true value.

ACKNOWLEDGEMENTS

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TABLE I  
FACTORS OF ONE-SIDED TOLERANCE LIMITS FOR A NORMAL DISTRIBUTION

90% CONFIDENCE

Proportion of Population Covered —>

|       | .50   | .51   | .52   | .53   | .54   | .55   | .56   | .57   | .58   | .59   | .60   | .61   | .62   | .63   | .64   | .65   | .66   | .67   |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| N= 3  | 1.089 | 1.136 | 1.184 | 1.234 | 1.283 | 1.334 | 1.386 | 1.439 | 1.492 | 1.547 | 1.602 | 1.659 | 1.717 | 1.776 | 1.836 | 1.898 | 1.961 | 2.025 |
| N= 4  | .819  | .856  | .895  | .933  | .972  | 1.012 | 1.052 | 1.093 | 1.135 | 1.177 | 1.219 | 1.263 | 1.307 | 1.352 | 1.398 | 1.445 | 1.492 | 1.541 |
| N= 5  | .686  | .719  | .753  | .788  | .823  | .858  | .894  | .930  | .967  | 1.004 | 1.042 | 1.080 | 1.119 | 1.158 | 1.198 | 1.239 | 1.281 | 1.323 |
| N= 6  | .602  | .634  | .666  | .698  | .731  | .764  | .797  | .831  | .865  | .900  | .935  | .970  | 1.006 | 1.043 | 1.080 | 1.118 | 1.156 | 1.195 |
| N= 7  | .544  | .575  | .605  | .636  | .667  | .699  | .731  | .763  | .795  | .828  | .862  | .896  | .930  | .965  | 1.000 | 1.036 | 1.072 | 1.109 |
| N= 8  | .500  | .530  | .560  | .590  | .620  | .650  | .681  | .712  | .744  | .776  | .808  | .841  | .874  | .907  | .941  | .976  | 1.011 | 1.047 |
| N= 9  | .466  | .494  | .524  | .553  | .583  | .612  | .643  | .673  | .704  | .731  | .766  | .798  | .830  | .863  | .896  | .930  | .964  | .999  |
| N= 10 | .437  | .466  | .494  | .523  | .552  | .582  | .611  | .641  | .671  | .702  | .732  | .764  | .795  | .827  | .860  | .893  | .926  | .960  |
| N= 11 | .414  | .442  | .470  | .499  | .527  | .556  | .585  | .615  | .644  | .674  | .705  | .735  | .766  | .798  | .830  | .862  | .895  | .928  |
| N= 12 | .394  | .421  | .449  | .478  | .506  | .534  | .563  | .592  | .622  | .651  | .681  | .711  | .742  | .773  | .804  | .836  | .869  | .902  |
| N= 13 | .376  | .404  | .431  | .459  | .487  | .516  | .544  | .573  | .602  | .631  | .661  | .691  | .721  | .752  | .783  | .814  | .846  | .879  |
| N= 14 | .361  | .388  | .416  | .443  | .471  | .499  | .528  | .556  | .585  | .614  | .643  | .673  | .703  | .733  | .764  | .795  | .827  | .859  |
| N= 15 | .347  | .374  | .402  | .429  | .457  | .485  | .513  | .541  | .570  | .598  | .628  | .657  | .687  | .717  | .747  | .778  | .810  | .841  |
| N= 16 | .335  | .362  | .389  | .417  | .444  | .472  | .500  | .528  | .556  | .585  | .614  | .643  | .672  | .702  | .733  | .763  | .794  | .825  |
| N= 17 | .324  | .351  | .378  | .405  | .433  | .460  | .488  | .516  | .544  | .572  | .601  | .630  | .660  | .689  | .719  | .750  | .781  | .812  |
| N= 18 | .314  | .341  | .368  | .395  | .422  | .450  | .477  | .505  | .533  | .561  | .590  | .619  | .648  | .678  | .707  | .738  | .769  | .800  |
| N= 19 | .305  | .332  | .359  | .386  | .413  | .440  | .468  | .495  | .523  | .550  | .580  | .608  | .638  | .667  | .697  | .727  | .757  | .788  |
| N= 20 | .297  | .324  | .350  | .377  | .404  | .431  | .459  | .486  | .514  | .542  | .570  | .599  | .628  | .657  | .687  | .717  | .747  | .778  |
| N= 21 | .289  | .316  | .342  | .369  | .396  | .423  | .450  | .478  | .506  | .534  | .562  | .590  | .619  | .648  | .678  | .708  | .738  | .769  |
| N= 22 | .282  | .309  | .335  | .362  | .389  | .416  | .443  | .470  | .498  | .526  | .554  | .582  | .611  | .640  | .669  | .699  | .729  | .760  |
| N= 23 | .276  | .302  | .328  | .355  | .382  | .409  | .436  | .463  | .491  | .518  | .546  | .575  | .603  | .632  | .662  | .691  | .721  | .752  |
| N= 24 | .270  | .296  | .322  | .349  | .375  | .402  | .429  | .457  | .484  | .512  | .540  | .568  | .596  | .625  | .654  | .684  | .714  | .744  |
| N= 25 | .264  | .290  | .316  | .343  | .369  | .396  | .423  | .450  | .478  | .505  | .533  | .561  | .590  | .618  | .648  | .677  | .707  | .737  |
| N= 26 | .258  | .284  | .311  | .337  | .364  | .391  | .417  | .445  | .472  | .499  | .527  | .555  | .584  | .612  | .641  | .670  | .700  | .730  |
| N= 27 | .253  | .279  | .306  | .332  | .358  | .385  | .412  | .439  | .466  | .494  | .522  | .550  | .578  | .606  | .635  | .665  | .694  | .724  |
| N= 28 | .248  | .274  | .301  | .327  | .354  | .380  | .407  | .434  | .461  | .489  | .516  | .544  | .572  | .601  | .630  | .659  | .689  | .719  |
| N= 29 | .244  | .270  | .296  | .322  | .349  | .375  | .402  | .429  | .456  | .484  | .511  | .539  | .567  | .596  | .625  | .654  | .683  | .713  |
| N= 30 | .239  | .266  | .292  | .318  | .344  | .371  | .398  | .424  | .452  | .479  | .506  | .534  | .562  | .591  | .620  | .649  | .678  | .708  |
| N= 31 | .235  | .261  | .288  | .314  | .340  | .367  | .393  | .420  | .447  | .474  | .502  | .530  | .558  | .586  | .615  | .644  | .673  | .703  |
| N= 32 | .231  | .257  | .284  | .310  | .336  | .363  | .389  | .416  | .443  | .470  | .498  | .525  | .553  | .581  | .610  | .639  | .669  | .699  |
| N= 33 | .228  | .254  | .280  | .306  | .332  | .359  | .385  | .412  | .439  | .466  | .494  | .521  | .549  | .578  | .606  | .635  | .664  | .694  |
| N= 34 | .224  | .250  | .276  | .302  | .329  | .355  | .382  | .408  | .435  | .462  | .490  | .517  | .545  | .574  | .602  | .631  | .660  | .690  |
| N= 35 | .221  | .247  | .273  | .299  | .325  | .352  | .378  | .405  | .432  | .459  | .486  | .514  | .542  | .570  | .598  | .627  | .656  | .686  |
| N= 36 | .218  | .244  | .270  | .296  | .322  | .348  | .375  | .401  | .428  | .455  | .483  | .510  | .538  | .566  | .595  | .623  | .653  | .682  |
| N= 37 | .215  | .240  | .266  | .292  | .319  | .345  | .371  | .398  | .425  | .452  | .479  | .505  | .533  | .561  | .590  | .620  | .650  | .680  |
| N= 38 | .212  | .237  | .263  | .289  | .316  | .342  | .368  | .395  | .422  | .449  | .476  | .504  | .531  | .559  | .588  | .616  | .646  | .675  |
| N= 39 | .209  | .235  | .261  | .287  | .313  | .339  | .365  | .392  | .419  | .446  | .473  | .500  | .528  | .556  | .584  | .613  | .642  | .672  |
| N= 40 | .206  | .232  | .258  | .284  | .310  | .336  | .363  | .389  | .416  | .443  | .470  | .497  | .525  | .553  | .581  | .610  | .639  | .668  |
| N= 41 | .203  | .229  | .255  | .281  | .307  | .333  | .360  | .386  | .413  | .440  | .467  | .495  | .522  | .550  | .578  | .607  | .636  | .665  |
| N= 42 | .201  | .227  | .253  | .279  | .305  | .331  | .357  | .384  | .410  | .437  | .464  | .492  | .519  | .547  | .576  | .604  | .633  | .662  |
| N= 43 | .199  | .224  | .250  | .276  | .302  | .328  | .355  | .381  | .408  | .435  | .462  | .489  | .517  | .545  | .573  | .601  | .630  | .660  |
| N= 44 | .196  | .222  | .248  | .274  | .300  | .326  | .352  | .379  | .405  | .432  | .459  | .487  | .514  | .542  | .570  | .599  | .628  | .658  |
| N= 45 | .194  | .220  | .245  | .271  | .297  | .324  | .350  | .376  | .403  | .430  | .457  | .484  | .512  | .540  | .568  | .596  | .625  | .654  |
| N= 46 | .192  | .217  | .243  | .269  | .295  | .321  | .348  | .374  | .401  | .427  | .454  | .482  | .509  | .537  | .565  | .594  | .622  | .652  |
| N= 47 | .190  | .215  | .241  | .267  | .293  | .319  | .345  | .372  | .398  | .425  | .452  | .479  | .507  | .535  | .563  | .591  | .620  | .649  |
| N= 48 | .188  | .213  | .239  | .265  | .291  | .317  | .343  | .370  | .396  | .423  | .450  | .477  | .505  | .532  | .561  | .589  | .618  | .647  |
| N= 49 | .186  | .211  | .237  | .263  | .289  | .315  | .341  | .368  | .394  | .421  | .448  | .475  | .502  | .530  | .558  | .587  | .615  | .645  |
| N= 50 | .184  | .209  | .235  | .261  | .287  | .313  | .339  | .365  | .392  | .419  | .446  | .473  | .500  | .528  | .556  | .585  | .613  | .642  |
| N= 55 | .175  | .201  | .226  | .252  | .278  | .304  | .330  | .356  | .383  | .409  | .436  | .463  | .491  | .518  | .546  | .575  | .603  | .632  |
| N= 60 | .167  | .193  | .219  | .244  | .270  | .296  | .322  | .348  | .375  | .401  | .428  | .455  | .482  | .510  | .538  | .565  | .595  | .623  |
| N= 65 | .161  | .186  | .212  | .237  | .263  | .289  | .315  | .341  | .368  | .394  | .421  | .448  | .475  | .502  | .530  | .558  | .587  | .616  |
| N= 70 | .155  | .180  | .206  | .231  | .257  | .283  | .309  | .335  | .361  | .388  | .415  | .441  | .469  | .496  | .524  | .552  | .580  | .609  |
| N= 75 | .149  | .175  | .200  | .226  | .252  | .277  | .303  | .329  | .356  | .382  | .409  | .436  | .463  | .490  | .518  | .546  | .574  | .603  |
| N= 80 | .144  | .170  | .195  | .221  | .247  | .273  | .299  | .325  | .351  | .377  | .404  | .430  | .457  | .484  | .511  | .538  | .565  | .592  |



Proportion of Population Covered →

|        | .58   | .59   | .70   | .71   | .72   | .73   | .74   | .75   | .76   | .77   | .78   | .79   | .80   | .81   | .82   | .83   | .84   | .85   |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| N= 3   | 2.091 | 2.159 | 2.228 | 2.299 | 2.372 | 2.447 | 2.524 | 2.603 | 2.684 | 2.769 | 2.856 | 2.946 | 3.039 | 3.136 | 3.237 | 3.343 | 3.453 | 3.569 |
| N= 4   | 1.590 | 1.641 | 1.693 | 1.746 | 1.800 | 1.856 | 1.913 | 1.972 | 2.033 | 2.095 | 2.159 | 2.226 | 2.295 | 2.366 | 2.441 | 2.518 | 2.599 | 2.684 |
| N= 5   | 1.365 | 1.411 | 1.456 | 1.502 | 1.549 | 1.597 | 1.647 | 1.698 | 1.750 | 1.804 | 1.859 | 1.917 | 1.976 | 2.038 | 2.101 | 2.168 | 2.237 | 2.310 |
| N= 6   | 1.235 | 1.276 | 1.317 | 1.360 | 1.403 | 1.448 | 1.494 | 1.540 | 1.588 | 1.637 | 1.688 | 1.740 | 1.795 | 1.850 | 1.909 | 1.970 | 2.033 | 2.100 |
| N= 7   | 1.147 | 1.186 | 1.225 | 1.265 | 1.306 | 1.348 | 1.391 | 1.435 | 1.480 | 1.527 | 1.575 | 1.624 | 1.676 | 1.728 | 1.783 | 1.841 | 1.900 | 1.963 |
| N= 8   | 1.083 | 1.120 | 1.158 | 1.197 | 1.236 | 1.276 | 1.319 | 1.360 | 1.403 | 1.448 | 1.494 | 1.541 | 1.590 | 1.641 | 1.693 | 1.748 | 1.805 | 1.865 |
| N= 9   | 1.034 | 1.070 | 1.107 | 1.144 | 1.182 | 1.221 | 1.261 | 1.302 | 1.344 | 1.388 | 1.432 | 1.478 | 1.525 | 1.574 | 1.625 | 1.678 | 1.734 | 1.791 |
| N= 10  | .995  | 1.030 | 1.066 | 1.102 | 1.139 | 1.178 | 1.217 | 1.257 | 1.298 | 1.340 | 1.383 | 1.428 | 1.474 | 1.522 | 1.572 | 1.623 | 1.677 | 1.733 |
| N= 11  | .962  | .997  | 1.032 | 1.068 | 1.104 | 1.142 | 1.180 | 1.219 | 1.260 | 1.301 | 1.343 | 1.387 | 1.432 | 1.479 | 1.528 | 1.578 | 1.631 | 1.686 |
| N= 12  | .935  | .969  | 1.005 | 1.041 | 1.077 | 1.112 | 1.150 | 1.188 | 1.228 | 1.268 | 1.310 | 1.353 | 1.398 | 1.444 | 1.491 | 1.541 | 1.593 | 1.647 |
| N= 13  | .912  | .945  | .980  | 1.014 | 1.050 | 1.086 | 1.123 | 1.162 | 1.201 | 1.241 | 1.282 | 1.324 | 1.368 | 1.414 | 1.461 | 1.509 | 1.560 | 1.614 |
| N= 14  | .892  | .925  | .959  | .993  | 1.028 | 1.064 | 1.101 | 1.139 | 1.177 | 1.217 | 1.258 | 1.299 | 1.343 | 1.388 | 1.434 | 1.482 | 1.532 | 1.585 |
| N= 15  | .874  | .907  | .940  | .974  | 1.009 | 1.045 | 1.081 | 1.119 | 1.157 | 1.196 | 1.236 | 1.278 | 1.321 | 1.365 | 1.411 | 1.458 | 1.504 | 1.560 |
| N= 16  | .858  | .891  | .924  | .958  | .992  | 1.028 | 1.064 | 1.101 | 1.139 | 1.177 | 1.217 | 1.258 | 1.301 | 1.345 | 1.390 | 1.438 | 1.487 | 1.538 |
| N= 17  | .844  | .876  | .909  | .943  | .977  | 1.012 | 1.048 | 1.085 | 1.122 | 1.161 | 1.201 | 1.241 | 1.283 | 1.327 | 1.372 | 1.419 | 1.468 | 1.519 |
| N= 18  | .831  | .864  | .896  | .930  | .964  | .999  | 1.034 | 1.071 | 1.108 | 1.146 | 1.185 | 1.226 | 1.268 | 1.311 | 1.356 | 1.402 | 1.451 | 1.501 |
| N= 19  | .820  | .852  | .885  | .918  | .952  | .986  | 1.021 | 1.058 | 1.095 | 1.133 | 1.172 | 1.212 | 1.254 | 1.296 | 1.341 | 1.387 | 1.435 | 1.485 |
| N= 20  | .809  | .841  | .874  | .907  | .940  | .975  | 1.010 | 1.046 | 1.083 | 1.120 | 1.159 | 1.199 | 1.241 | 1.283 | 1.327 | 1.373 | 1.421 | 1.471 |
| N= 21  | .800  | .831  | .864  | .897  | .930  | .964  | .999  | 1.035 | 1.072 | 1.109 | 1.148 | 1.188 | 1.229 | 1.271 | 1.315 | 1.361 | 1.408 | 1.458 |
| N= 22  | .791  | .822  | .855  | .887  | .921  | .954  | .990  | 1.025 | 1.062 | 1.099 | 1.137 | 1.177 | 1.218 | 1.260 | 1.304 | 1.349 | 1.396 | 1.446 |
| N= 23  | .783  | .814  | .846  | .879  | .912  | .946  | .981  | 1.016 | 1.052 | 1.090 | 1.128 | 1.167 | 1.208 | 1.250 | 1.293 | 1.338 | 1.385 | 1.435 |
| N= 24  | .775  | .806  | .838  | .871  | .904  | .938  | .972  | 1.007 | 1.044 | 1.081 | 1.119 | 1.158 | 1.198 | 1.240 | 1.284 | 1.329 | 1.375 | 1.424 |
| N= 25  | .768  | .799  | .831  | .863  | .896  | .930  | .964  | 1.000 | 1.036 | 1.072 | 1.110 | 1.150 | 1.190 | 1.231 | 1.275 | 1.319 | 1.366 | 1.415 |
| N= 26  | .761  | .792  | .824  | .856  | .889  | .923  | .957  | .992  | 1.028 | 1.065 | 1.103 | 1.142 | 1.182 | 1.223 | 1.266 | 1.311 | 1.357 | 1.406 |
| N= 27  | .755  | .786  | .818  | .850  | .883  | .916  | .950  | .984  | 1.019 | 1.055 | 1.093 | 1.132 | 1.174 | 1.218 | 1.264 | 1.309 | 1.357 | 1.406 |
| N= 28  | .749  | .780  | .812  | .844  | .876  | .910  | .944  | .979  | 1.014 | 1.051 | 1.089 | 1.127 | 1.167 | 1.208 | 1.251 | 1.295 | 1.341 | 1.390 |
| N= 29  | .744  | .775  | .806  | .838  | .871  | .904  | .938  | .973  | 1.008 | 1.045 | 1.082 | 1.121 | 1.160 | 1.202 | 1.244 | 1.288 | 1.334 | 1.382 |
| N= 30  | .738  | .769  | .801  | .832  | .865  | .898  | .932  | .967  | 1.002 | 1.039 | 1.076 | 1.114 | 1.154 | 1.195 | 1.238 | 1.282 | 1.327 | 1.375 |
| N= 31  | .733  | .764  | .795  | .827  | .860  | .893  | .927  | .961  | .997  | 1.033 | 1.070 | 1.109 | 1.148 | 1.189 | 1.231 | 1.275 | 1.321 | 1.369 |
| N= 32  | .729  | .759  | .791  | .822  | .855  | .888  | .922  | .956  | .991  | 1.028 | 1.065 | 1.103 | 1.143 | 1.183 | 1.226 | 1.269 | 1.315 | 1.363 |
| N= 33  | .724  | .755  | .786  | .818  | .850  | .883  | .917  | .951  | .986  | 1.023 | 1.060 | 1.098 | 1.137 | 1.178 | 1.220 | 1.264 | 1.309 | 1.357 |
| N= 34  | .720  | .751  | .782  | .813  | .846  | .879  | .912  | .946  | .982  | 1.018 | 1.055 | 1.093 | 1.132 | 1.173 | 1.215 | 1.258 | 1.304 | 1.351 |
| N= 35  | .716  | .747  | .778  | .809  | .841  | .874  | .908  | .942  | .977  | 1.013 | 1.050 | 1.088 | 1.127 | 1.168 | 1.210 | 1.253 | 1.299 | 1.346 |
| N= 36  | .712  | .743  | .774  | .805  | .837  | .870  | .904  | .938  | .973  | 1.009 | 1.046 | 1.084 | 1.123 | 1.163 | 1.205 | 1.248 | 1.294 | 1.341 |
| N= 37  | .708  | .739  | .770  | .801  | .833  | .866  | .899  | .934  | .969  | 1.005 | 1.041 | 1.079 | 1.118 | 1.159 | 1.200 | 1.244 | 1.289 | 1.336 |
| N= 38  | .705  | .735  | .766  | .798  | .830  | .862  | .896  | .930  | .965  | 1.001 | 1.037 | 1.075 | 1.114 | 1.154 | 1.196 | 1.239 | 1.284 | 1.331 |
| N= 39  | .702  | .732  | .763  | .794  | .826  | .859  | .892  | .926  | .961  | .997  | 1.033 | 1.071 | 1.110 | 1.150 | 1.192 | 1.235 | 1.280 | 1.327 |
| N= 40  | .698  | .729  | .759  | .791  | .823  | .855  | .889  | .923  | .957  | .993  | 1.030 | 1.067 | 1.106 | 1.146 | 1.188 | 1.231 | 1.276 | 1.323 |
| N= 41  | .695  | .726  | .756  | .788  | .819  | .852  | .885  | .919  | .954  | .990  | 1.026 | 1.064 | 1.103 | 1.143 | 1.184 | 1.227 | 1.272 | 1.319 |
| N= 42  | .692  | .722  | .753  | .784  | .816  | .849  | .882  | .916  | .951  | .986  | 1.023 | 1.060 | 1.099 | 1.139 | 1.180 | 1.223 | 1.268 | 1.315 |
| N= 43  | .689  | .720  | .750  | .782  | .813  | .846  | .879  | .913  | .947  | .982  | 1.019 | 1.057 | 1.096 | 1.136 | 1.177 | 1.220 | 1.264 | 1.311 |
| N= 44  | .687  | .717  | .747  | .779  | .810  | .843  | .876  | .910  | .944  | .980  | 1.016 | 1.054 | 1.093 | 1.132 | 1.173 | 1.216 | 1.261 | 1.307 |
| N= 45  | .684  | .714  | .745  | .776  | .808  | .840  | .874  | .907  | .941  | .977  | 1.013 | 1.051 | 1.089 | 1.129 | 1.170 | 1.213 | 1.257 | 1.304 |
| N= 46  | .681  | .711  | .742  | .773  | .805  | .837  | .870  | .904  | .938  | .974  | 1.010 | 1.048 | 1.086 | 1.126 | 1.167 | 1.210 | 1.254 | 1.301 |
| N= 47  | .679  | .709  | .740  | .771  | .802  | .835  | .868  | .901  | .936  | .971  | 1.007 | 1.045 | 1.083 | 1.123 | 1.164 | 1.207 | 1.251 | 1.297 |
| N= 48  | .676  | .707  | .737  | .768  | .800  | .832  | .865  | .899  | .933  | .968  | 1.005 | 1.042 | 1.080 | 1.120 | 1.161 | 1.204 | 1.248 | 1.294 |
| N= 49  | .674  | .704  | .735  | .766  | .797  | .830  | .862  | .896  | .930  | .966  | 1.002 | 1.039 | 1.078 | 1.117 | 1.158 | 1.201 | 1.245 | 1.291 |
| N= 50  | .672  | .702  | .732  | .763  | .795  | .827  | .860  | .894  | .928  | .963  | .999  | 1.037 | 1.075 | 1.114 | 1.155 | 1.198 | 1.242 | 1.288 |
| N= 55  | .662  | .692  | .722  | .753  | .784  | .816  | .849  | .882  | .917  | .952  | .988  | 1.025 | 1.062 | 1.102 | 1.143 | 1.185 | 1.229 | 1.275 |
| N= 60  | .653  | .683  | .713  | .744  | .775  | .807  | .839  | .873  | .907  | .942  | .978  | 1.014 | 1.052 | 1.092 | 1.132 | 1.174 | 1.218 | 1.264 |
| N= 65  | .645  | .675  | .705  | .735  | .767  | .799  | .831  | .864  | .898  | .933  | .969  | 1.005 | 1.043 | 1.082 | 1.123 | 1.165 | 1.208 | 1.254 |
| N= 70  | .638  | .668  | .698  | .728  | .760  | .791  | .824  | .857  | .891  | .925  | .961  | .998  | 1.035 | 1.074 | 1.114 | 1.156 | 1.200 | 1.245 |
| N= 75  | .632  | .661  | .691  | .721  | .752  | .783  | .815  | .848  | .881  | .915  | .950  | .987  | 1.024 | 1.063 | 1.103 | 1.144 | 1.187 | 1.232 |
| N= 80  | .626  | .655  | .685  | .715  | .746  | .777  | .809  | .841  | .874  | .907  | .941  | .976  | 1.012 | 1.050 | 1.089 | 1.129 | 1.171 | 1.215 |
| N= 85  | .621  | .650  | .680  | .711  | .742  | .773  | .805  | .837  | .870  | .904  | .938  | .974  | 1.010 | 1.048 | 1.086 | 1.126 | 1.167 | 1.210 |
| N= 90  | .616  | .645  | .675  | .706  | .737  | .768  | .800  | .832  | .865  | .899  | .933  | .968  | 1.005 | 1.042 | 1.080 | 1.120 | 1.161 | 1.204 |
| N= 95  | .611  | .640  | .670  | .701  | .732  | .763  | .795  | .827  | .859  | .892  | .926  | .961  | 1.000 | 1.037 | 1.075 | 1.114 | 1.155 | 1.200 |
| N= 100 | .606  | .635  | .665  | .696  | .727  | .758  | .789  | .821  | .853  | .886  | .919  | .952  | 1.000 | 1.037 | 1.075 | 1.114 | 1.155 | 1.200 |
| N= 105 | .601  | .630  | .660  | .691  | .722  | .753  | .784  | .816  | .849  | .882  | .916  | .951  | 1.000 | 1.037 | 1.075 | 1.114 | 1.155 | 1.200 |
| N= 110 | .596  | .625  | .655  | .686  | .717  | .748  | .779  | .811  | .844  | .878  | .912  | .947  | 1.000 | 1.037 | 1.075 | 1.114 | 1.155 | 1.200 |
| N= 115 | .591  | .620  | .650  | .681  | .712  | .743  | .774  | .806  | .839  | .872  | .906  | .941  | 1.000 | 1.037 | 1.075 | 1.114 | 1.155 | 1.200 |
| N= 120 | .586  | .615  | .645  | .676  | .707  | .738  | .769  | .801  | .834  | .867  | .901  | .936  | 1.000 | 1.037 | 1.075 | 1.114 | 1.155 | 1.200 |
| N= 125 | .581  | .610  | .640  | .671  | .702  | .733  | .764  | .796  | .829  | .862  | .896  | .931  | 1.000 | 1.037 | 1.075 | 1.114 | 1.155 | 1.200 |
| N= 130 | .576  | .605  | .635  | .666  | .697  | .728  | .759  | .791  | .824  | .857  | .891  | .926  | 1.000 | 1.037 | 1.075 | 1.114 | 1.155 | 1.200 |
| N= 135 | .571  | .600  | .630  | .661  | .692  | .723  | .754  | .786  | .819  | .852  | .886  | .921  | 1.000 | 1.037 | 1.075 | 1.114 | 1.155 | 1.200 |
| N= 140 | .566  | .595  | .625  | .656  | .687  | .718  | .749  | .781  | .814  | .847  | .881  | .916  | 1.000 | 1.037 | 1.075 | 1.114 | 1.155 | 1.200 |
| N= 145 | .561  | .590  | .620  | .651  | .682  | .713  | .744  | .776  | .809  | .842  | .876  | .911  | 1.000 | 1.037 | 1.075 | 1.114 | 1.155 | 1.200 |
| N= 150 | .556  | .585  | .615  | .646  | .677  | .708  | .739  | .771  | .804  | .837  | .871  | .906  | 1.000 |       |       |       |       |       |



|         |      |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|---------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| N= 13   | .912 | .945 | .980 | 1.014 | 1.050 | 1.086 | 1.123 | 1.162 | 1.201 | 1.241 | 1.282 | 1.324 | 1.368 | 1.414 | 1.461 | 1.509 | 1.560 | 1.614 |
| N= 14   | .892 | .925 | .959 | 1.028 | 1.064 | 1.101 | 1.139 | 1.177 | 1.217 | 1.258 | 1.299 | 1.343 | 1.388 | 1.434 | 1.482 | 1.532 | 1.585 | 1.643 |
| N= 15   | .874 | .907 | .940 | .974  | 1.009 | 1.045 | 1.081 | 1.119 | 1.157 | 1.196 | 1.236 | 1.278 | 1.321 | 1.365 | 1.411 | 1.458 | 1.508 | 1.560 |
| N= 16   | .858 | .891 | .924 | .958  | .992  | 1.028 | 1.064 | 1.101 | 1.139 | 1.177 | 1.215 | 1.254 | 1.294 | 1.335 | 1.378 | 1.423 | 1.470 | 1.519 |
| N= 17   | .844 | .876 | .909 | .943  | .977  | 1.012 | 1.048 | 1.085 | 1.122 | 1.161 | 1.201 | 1.241 | 1.282 | 1.324 | 1.367 | 1.412 | 1.459 | 1.509 |
| N= 18   | .831 | .864 | .896 | .930  | .964  | .999  | 1.034 | 1.071 | 1.108 | 1.146 | 1.185 | 1.226 | 1.268 | 1.311 | 1.356 | 1.402 | 1.451 | 1.501 |
| N= 19   | .820 | .852 | .885 | .918  | .952  | .986  | 1.021 | 1.058 | 1.095 | 1.133 | 1.172 | 1.212 | 1.254 | 1.296 | 1.341 | 1.387 | 1.435 | 1.485 |
| N= 20   | .809 | .841 | .874 | .907  | .940  | .975  | 1.010 | 1.046 | 1.083 | 1.120 | 1.159 | 1.199 | 1.241 | 1.283 | 1.327 | 1.373 | 1.421 | 1.471 |
| N= 21   | .800 | .831 | .864 | .897  | .930  | .964  | .999  | 1.035 | 1.072 | 1.109 | 1.148 | 1.188 | 1.229 | 1.271 | 1.315 | 1.361 | 1.408 | 1.458 |
| N= 22   | .791 | .822 | .855 | .887  | .921  | .955  | .990  | 1.025 | 1.062 | 1.099 | 1.137 | 1.177 | 1.218 | 1.260 | 1.304 | 1.349 | 1.396 | 1.446 |
| N= 23   | .783 | .814 | .846 | .879  | .912  | .946  | .981  | 1.016 | 1.052 | 1.089 | 1.128 | 1.167 | 1.208 | 1.250 | 1.293 | 1.338 | 1.385 | 1.435 |
| N= 24   | .775 | .805 | .838 | .871  | .904  | .938  | .972  | 1.007 | 1.043 | 1.081 | 1.119 | 1.158 | 1.198 | 1.240 | 1.284 | 1.329 | 1.375 | 1.424 |
| N= 25   | .768 | .799 | .831 | .863  | .896  | .930  | .964  | 1.000 | 1.036 | 1.072 | 1.110 | 1.150 | 1.190 | 1.231 | 1.275 | 1.319 | 1.366 | 1.415 |
| N= 26   | .761 | .792 | .824 | .856  | .888  | .922  | .956  | .992  | 1.028 | 1.065 | 1.103 | 1.143 | 1.182 | 1.223 | 1.266 | 1.311 | 1.357 | 1.406 |
| N= 27   | .755 | .786 | .818 | .850  | .883  | .916  | .950  | .985  | 1.021 | 1.058 | 1.095 | 1.134 | 1.174 | 1.216 | 1.258 | 1.303 | 1.349 | 1.397 |
| N= 28   | .749 | .780 | .812 | .844  | .876  | .909  | .942  | .975  | 1.011 | 1.048 | 1.089 | 1.127 | 1.167 | 1.208 | 1.251 | 1.295 | 1.341 | 1.390 |
| N= 29   | .744 | .775 | .806 | .838  | .871  | .904  | .938  | .971  | 1.008 | 1.045 | 1.082 | 1.121 | 1.160 | 1.202 | 1.244 | 1.288 | 1.334 | 1.382 |
| N= 30   | .738 | .769 | .801 | .832  | .865  | .898  | .932  | .967  | 1.002 | 1.039 | 1.076 | 1.114 | 1.154 | 1.195 | 1.238 | 1.282 | 1.327 | 1.375 |
| N= 31   | .733 | .764 | .795 | .827  | .859  | .892  | .925  | .958  | .991  | 1.028 | 1.065 | 1.103 | 1.143 | 1.183 | 1.226 | 1.269 | 1.315 | 1.363 |
| N= 32   | .729 | .759 | .791 | .822  | .855  | .888  | .922  | .956  | .991  | 1.028 | 1.065 | 1.103 | 1.143 | 1.183 | 1.226 | 1.269 | 1.315 | 1.363 |
| N= 33   | .724 | .755 | .786 | .818  | .850  | .883  | .917  | .951  | .986  | 1.023 | 1.060 | 1.098 | 1.137 | 1.178 | 1.220 | 1.264 | 1.309 | 1.357 |
| N= 34   | .720 | .751 | .782 | .813  | .845  | .876  | .908  | .940  | .972  | 1.005 | 1.038 | 1.071 | 1.104 | 1.137 | 1.171 | 1.205 | 1.240 | 1.284 |
| N= 35   | .716 | .747 | .778 | .809  | .841  | .874  | .906  | .938  | .970  | 1.003 | 1.036 | 1.069 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 36   | .712 | .743 | .774 | .805  | .837  | .869  | .901  | .933  | .965  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 37   | .708 | .739 | .770 | .801  | .833  | .865  | .896  | .928  | .960  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 38   | .705 | .735 | .766 | .798  | .830  | .862  | .894  | .926  | .958  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 39   | .702 | .732 | .763 | .794  | .826  | .859  | .892  | .925  | .958  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 40   | .698 | .729 | .759 | .791  | .823  | .855  | .889  | .923  | .957  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 41   | .695 | .726 | .756 | .788  | .820  | .852  | .885  | .919  | .954  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 42   | .692 | .722 | .753 | .784  | .816  | .848  | .881  | .915  | .950  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 43   | .689 | .720 | .750 | .782  | .813  | .846  | .879  | .913  | .947  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 44   | .687 | .717 | .747 | .779  | .810  | .843  | .876  | .910  | .944  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 45   | .684 | .714 | .745 | .776  | .808  | .840  | .873  | .907  | .941  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 46   | .681 | .711 | .742 | .773  | .805  | .837  | .870  | .904  | .938  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 47   | .679 | .709 | .740 | .771  | .802  | .835  | .868  | .901  | .936  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 48   | .676 | .707 | .737 | .768  | .800  | .832  | .865  | .899  | .933  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 49   | .674 | .704 | .735 | .766  | .797  | .830  | .862  | .896  | .930  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 50   | .672 | .702 | .732 | .763  | .795  | .827  | .860  | .894  | .928  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 55   | .662 | .692 | .722 | .753  | .784  | .816  | .849  | .882  | .917  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 60   | .653 | .683 | .713 | .743  | .773  | .803  | .833  | .863  | .893  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 65   | .645 | .675 | .705 | .735  | .765  | .795  | .825  | .855  | .885  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 70   | .638 | .668 | .698 | .728  | .758  | .788  | .818  | .848  | .878  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 75   | .632 | .661 | .691 | .721  | .751  | .781  | .811  | .841  | .871  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 80   | .626 | .656 | .686 | .716  | .746  | .776  | .806  | .836  | .866  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 85   | .621 | .651 | .681 | .711  | .741  | .771  | .801  | .831  | .861  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 90   | .617 | .646 | .676 | .706  | .736  | .766  | .796  | .826  | .856  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 95   | .613 | .642 | .672 | .702  | .732  | .762  | .792  | .822  | .852  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 100  | .609 | .638 | .668 | .698  | .728  | .758  | .788  | .818  | .848  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 110  | .602 | .631 | .661 | .691  | .721  | .751  | .781  | .811  | .841  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 120  | .596 | .625 | .655 | .685  | .715  | .745  | .775  | .805  | .835  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 130  | .591 | .620 | .649 | .679  | .709  | .739  | .769  | .799  | .829  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 140  | .586 | .615 | .645 | .675  | .705  | .735  | .765  | .795  | .825  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 150  | .582 | .611 | .640 | .670  | .700  | .730  | .760  | .790  | .820  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 160  | .578 | .607 | .636 | .666  | .696  | .726  | .756  | .786  | .816  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 170  | .575 | .604 | .633 | .663  | .693  | .723  | .753  | .783  | .813  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 180  | .571 | .600 | .629 | .659  | .689  | .719  | .749  | .779  | .809  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 190  | .569 | .598 | .627 | .657  | .687  | .717  | .747  | .777  | .807  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 200  | .566 | .595 | .624 | .654  | .684  | .714  | .744  | .774  | .804  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 250  | .555 | .584 | .613 | .643  | .673  | .703  | .733  | .763  | .793  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 300  | .547 | .576 | .605 | .635  | .665  | .695  | .725  | .755  | .785  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 400  | .537 | .565 | .594 | .624  | .654  | .684  | .714  | .744  | .774  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 500  | .529 | .558 | .587 | .616  | .646  | .676  | .706  | .736  | .766  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 600  | .524 | .552 | .581 | .611  | .640  | .670  | .700  | .730  | .760  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 700  | .519 | .548 | .577 | .606  | .636  | .666  | .696  | .726  | .756  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 800  | .516 | .545 | .573 | .603  | .633  | .663  | .693  | .723  | .753  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 900  | .513 | .542 | .571 | .600  | .630  | .660  | .690  | .720  | .750  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 1000 | .511 | .539 | .568 | .597  | .627  | .657  | .687  | .717  | .747  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N= 999  | .481 | .509 | .538 | .567  | .597  | .627  | .657  | .687  | .717  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |
| N=50000 | .474 | .502 | .530 | .559  | .589  | .619  | .649  | .679  | .709  | 1.000 | 1.034 | 1.068 | 1.102 | 1.135 | 1.168 | 1.201 | 1.234 | 1.268 |

B

TABLE I (Cont'd.)  
FACTORS OF ONE-SIDED T-TESTS FOR A NORMAL DISTRIBUTION

| N    | 90% CONFIDENCE |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|      | .86            | .87   | .88   | .89   | .90   | .91   | .92   | .93   | .94   | .95   | .96   | .97   | .98   | .99   | .995  | .999  |
| N=3  | 3.090          | 3.819 | 3.954 | 4.102 | 4.256 | 4.426 | 4.613 | 4.818 | 5.048 | 5.311 | 5.623 | 6.008 | 6.523 | 7.340 | 8.092 | 9.651 |
| N=4  | 2.773          | 2.867 | 2.966 | 3.073 | 3.188 | 3.312 | 3.447 | 3.596 | 3.764 | 3.957 | 4.184 | 4.465 | 4.841 | 5.438 | 5.986 | 7.129 |
| N=5  | 2.587          | 2.667 | 2.752 | 2.844 | 2.942 | 3.048 | 3.164 | 3.292 | 3.434 | 3.592 | 3.768 | 3.957 | 4.156 | 4.666 | 5.136 | 6.111 |
| N=6  | 2.470          | 2.543 | 2.620 | 2.702 | 2.789 | 2.882 | 2.981 | 3.087 | 3.200 | 3.329 | 3.466 | 3.611 | 3.764 | 4.242 | 4.669 | 5.555 |
| N=7  | 2.398          | 2.467 | 2.542 | 2.623 | 2.708 | 2.796 | 2.889 | 2.987 | 3.091 | 3.204 | 3.327 | 3.464 | 3.607 | 4.072 | 4.472 | 5.202 |
| N=8  | 2.348          | 2.414 | 2.487 | 2.567 | 2.651 | 2.738 | 2.828 | 2.921 | 3.017 | 3.114 | 3.211 | 3.308 | 3.405 | 3.862 | 4.242 | 4.955 |
| N=9  | 2.308          | 2.372 | 2.444 | 2.523 | 2.605 | 2.690 | 2.777 | 2.866 | 2.956 | 3.047 | 3.138 | 3.228 | 3.318 | 3.764 | 4.144 | 4.855 |
| N=10 | 2.276          | 2.338 | 2.409 | 2.488 | 2.568 | 2.650 | 2.734 | 2.819 | 2.905 | 2.991 | 3.077 | 3.162 | 3.247 | 3.692 | 4.072 | 4.771 |
| N=11 | 2.250          | 2.311 | 2.381 | 2.459 | 2.538 | 2.619 | 2.701 | 2.783 | 2.865 | 2.947 | 3.028 | 3.108 | 3.188 | 3.633 | 4.012 | 4.711 |
| N=12 | 2.228          | 2.288 | 2.357 | 2.435 | 2.513 | 2.594 | 2.674 | 2.754 | 2.834 | 2.914 | 2.993 | 3.072 | 3.151 | 3.596 | 3.976 | 4.675 |
| N=13 | 2.210          | 2.269 | 2.337 | 2.414 | 2.491 | 2.570 | 2.648 | 2.726 | 2.804 | 2.882 | 2.959 | 3.036 | 3.113 | 3.558 | 3.938 | 4.637 |
| N=14 | 2.194          | 2.252 | 2.319 | 2.395 | 2.471 | 2.548 | 2.624 | 2.700 | 2.776 | 2.851 | 2.926 | 3.001 | 3.076 | 3.521 | 3.901 | 4.601 |
| N=15 | 2.180          | 2.237 | 2.303 | 2.378 | 2.453 | 2.528 | 2.602 | 2.676 | 2.749 | 2.822 | 2.895 | 2.968 | 3.041 | 3.486 | 3.866 | 4.566 |
| N=16 | 2.167          | 2.223 | 2.288 | 2.362 | 2.436 | 2.509 | 2.581 | 2.653 | 2.725 | 2.796 | 2.867 | 2.938 | 3.009 | 3.454 | 3.834 | 4.531 |
| N=17 | 2.155          | 2.210 | 2.274 | 2.347 | 2.420 | 2.491 | 2.562 | 2.632 | 2.702 | 2.771 | 2.841 | 2.910 | 2.979 | 3.424 | 3.804 | 4.496 |
| N=18 | 2.144          | 2.198 | 2.261 | 2.333 | 2.404 | 2.474 | 2.543 | 2.612 | 2.680 | 2.748 | 2.816 | 2.884 | 2.951 | 3.396 | 3.776 | 4.461 |
| N=19 | 2.134          | 2.187 | 2.249 | 2.320 | 2.390 | 2.459 | 2.527 | 2.594 | 2.661 | 2.728 | 2.794 | 2.860 | 2.926 | 3.371 | 3.751 | 4.426 |
| N=20 | 2.125          | 2.177 | 2.238 | 2.308 | 2.377 | 2.445 | 2.512 | 2.578 | 2.644 | 2.709 | 2.774 | 2.839 | 2.903 | 3.348 | 3.728 | 4.391 |
| N=21 | 2.117          | 2.168 | 2.228 | 2.297 | 2.365 | 2.432 | 2.498 | 2.563 | 2.628 | 2.692 | 2.756 | 2.819 | 2.882 | 3.327 | 3.707 | 4.356 |
| N=22 | 2.110          | 2.160 | 2.219 | 2.287 | 2.354 | 2.420 | 2.484 | 2.548 | 2.611 | 2.674 | 2.736 | 2.798 | 2.860 | 3.306 | 3.686 | 4.321 |
| N=23 | 2.103          | 2.152 | 2.210 | 2.277 | 2.343 | 2.408 | 2.471 | 2.533 | 2.595 | 2.656 | 2.717 | 2.778 | 2.839 | 3.276 | 3.656 | 4.286 |
| N=24 | 2.097          | 2.145 | 2.202 | 2.268 | 2.333 | 2.397 | 2.459 | 2.520 | 2.581 | 2.641 | 2.701 | 2.760 | 2.819 | 3.251 | 3.631 | 4.251 |
| N=25 | 2.091          | 2.138 | 2.194 | 2.259 | 2.323 | 2.386 | 2.447 | 2.507 | 2.567 | 2.626 | 2.685 | 2.743 | 2.801 | 3.226 | 3.606 | 4.216 |
| N=26 | 2.085          | 2.131 | 2.186 | 2.250 | 2.313 | 2.375 | 2.435 | 2.494 | 2.553 | 2.611 | 2.669 | 2.726 | 2.783 | 3.201 | 3.581 | 4.181 |
| N=27 | 2.080          | 2.125 | 2.179 | 2.242 | 2.304 | 2.365 | 2.424 | 2.482 | 2.539 | 2.596 | 2.653 | 2.709 | 2.765 | 3.176 | 3.556 | 4.146 |
| N=28 | 2.075          | 2.119 | 2.172 | 2.234 | 2.295 | 2.355 | 2.413 | 2.470 | 2.526 | 2.582 | 2.638 | 2.693 | 2.748 | 3.151 | 3.531 | 4.111 |
| N=29 | 2.070          | 2.113 | 2.165 | 2.226 | 2.286 | 2.345 | 2.402 | 2.458 | 2.513 | 2.568 | 2.623 | 2.677 | 2.731 | 3.124 | 3.504 | 4.076 |
| N=30 | 2.065          | 2.107 | 2.158 | 2.218 | 2.277 | 2.335 | 2.391 | 2.446 | 2.501 | 2.555 | 2.609 | 2.662 | 2.715 | 3.097 | 3.477 | 4.041 |
| N=31 | 2.060          | 2.101 | 2.151 | 2.210 | 2.268 | 2.325 | 2.380 | 2.434 | 2.487 | 2.540 | 2.592 | 2.644 | 2.696 | 3.070 | 3.450 | 4.006 |
| N=32 | 2.055          | 2.095 | 2.144 | 2.202 | 2.259 | 2.315 | 2.369 | 2.422 | 2.474 | 2.526 | 2.577 | 2.628 | 2.679 | 3.044 | 3.424 | 3.971 |
| N=33 | 2.050          | 2.089 | 2.137 | 2.194 | 2.250 | 2.305 | 2.358 | 2.410 | 2.461 | 2.512 | 2.562 | 2.612 | 2.662 | 3.018 | 3.398 | 3.936 |
| N=34 | 2.045          | 2.083 | 2.130 | 2.186 | 2.241 | 2.295 | 2.347 | 2.398 | 2.448 | 2.498 | 2.547 | 2.596 | 2.645 | 2.991 | 3.371 | 3.901 |
| N=35 | 2.040          | 2.077 | 2.123 | 2.178 | 2.232 | 2.285 | 2.336 | 2.386 | 2.435 | 2.484 | 2.532 | 2.580 | 2.628 | 2.964 | 3.344 | 3.866 |
| N=36 | 2.035          | 2.071 | 2.116 | 2.170 | 2.223 | 2.275 | 2.325 | 2.374 | 2.422 | 2.469 | 2.516 | 2.563 | 2.610 | 2.939 | 3.317 | 3.831 |
| N=37 | 2.030          | 2.065 | 2.109 | 2.162 | 2.214 | 2.265 | 2.314 | 2.362 | 2.409 | 2.455 | 2.501 | 2.547 | 2.593 | 2.914 | 3.290 | 3.796 |
| N=38 | 2.025          | 2.059 | 2.102 | 2.154 | 2.205 | 2.255 | 2.303 | 2.350 | 2.396 | 2.441 | 2.486 | 2.531 | 2.576 | 2.897 | 3.265 | 3.761 |
| N=39 | 2.020          | 2.053 | 2.095 | 2.146 | 2.196 | 2.245 | 2.292 | 2.338 | 2.383 | 2.427 | 2.471 | 2.515 | 2.558 | 2.870 | 3.230 | 3.726 |
| N=40 | 2.015          | 2.047 | 2.088 | 2.138 | 2.187 | 2.235 | 2.281 | 2.326 | 2.370 | 2.413 | 2.456 | 2.498 | 2.540 | 2.852 | 3.200 | 3.691 |
| N=41 | 2.010          | 2.041 | 2.081 | 2.130 | 2.178 | 2.225 | 2.270 | 2.314 | 2.357 | 2.399 | 2.441 | 2.482 | 2.523 | 2.834 | 3.165 | 3.656 |
| N=42 | 2.005          | 2.035 | 2.074 | 2.122 | 2.169 | 2.215 | 2.259 | 2.301 | 2.343 | 2.384 | 2.424 | 2.464 | 2.504 | 2.816 | 3.130 | 3.621 |
| N=43 | 2.000          | 2.029 | 2.067 | 2.114 | 2.160 | 2.205 | 2.248 | 2.289 | 2.329 | 2.368 | 2.407 | 2.445 | 2.483 | 2.796 | 3.095 | 3.586 |
| N=44 | 1.995          | 2.023 | 2.060 | 2.106 | 2.151 | 2.195 | 2.237 | 2.277 | 2.316 | 2.354 | 2.391 | 2.428 | 2.465 | 2.778 | 3.067 | 3.551 |
| N=45 | 1.990          | 2.017 | 2.053 | 2.098 | 2.142 | 2.185 | 2.226 | 2.265 | 2.303 | 2.340 | 2.376 | 2.412 | 2.447 | 2.760 | 3.032 | 3.516 |
| N=46 | 1.985          | 2.011 | 2.046 | 2.090 | 2.133 | 2.175 | 2.215 | 2.253 | 2.290 | 2.326 | 2.361 | 2.396 | 2.430 | 2.742 | 3.007 | 3.481 |
| N=47 | 1.980          | 2.005 | 2.039 | 2.082 | 2.124 | 2.165 | 2.204 | 2.241 | 2.277 | 2.312 | 2.346 | 2.379 | 2.412 | 2.724 | 2.972 | 3.446 |
| N=48 | 1.975          | 2.000 | 2.033 | 2.075 | 2.116 | 2.155 | 2.193 | 2.229 | 2.264 | 2.298 | 2.331 | 2.363 | 2.395 | 2.706 | 2.944 | 3.411 |
| N=49 | 1.970          | 1.994 | 2.026 | 2.067 | 2.107 | 2.145 | 2.182 | 2.217 | 2.251 | 2.284 | 2.316 | 2.347 | 2.378 | 2.688 | 2.916 | 3.376 |
| N=50 | 1.965          | 1.988 | 2.019 | 2.059 | 2.098 | 2.135 | 2.171 | 2.205 | 2.238 | 2.270 | 2.301 | 2.331 | 2.360 | 2.670 | 2.888 | 3.341 |
| N=51 | 1.960          | 1.981 | 2.011 | 2.050 | 2.088 | 2.124 | 2.159 | 2.192 | 2.224 | 2.255 | 2.285 | 2.314 | 2.342 | 2.652 | 2.860 | 3.306 |
| N=52 | 1.955          | 1.975 | 2.004 | 2.042 | 2.079 | 2.114 | 2.148 | 2.180 | 2.211 | 2.241 | 2.269 | 2.296 | 2.323 | 2.632 | 2.830 | 3.271 |
| N=53 | 1.950          | 1.969 | 1.997 | 2.034 | 2.070 | 2.104 | 2.137 | 2.168 | 2.198 | 2.227 | 2.254 | 2.280 | 2.306 | 2.614 | 2.802 | 3.236 |
| N=54 | 1.945          | 1.963 | 1.990 | 2.026 | 2.061 | 2.094 | 2.126 | 2.156 | 2.185 | 2.213 | 2.239 | 2.264 | 2.288 | 2.596 | 2.774 | 3.201 |
| N=55 | 1.940          | 1.957 | 1.983 | 2.018 | 2.052 | 2.084 | 2.115 | 2.144 | 2.172 | 2.199 | 2.225 | 2.250 | 2.274 | 2.582 | 2.750 | 3.166 |
| N=56 | 1.935          | 1.951 | 1.976 | 2.010 | 2.043 | 2.074 | 2.104 | 2.132 | 2.159 | 2.185 | 2.210 | 2.234 | 2.257 | 2.564 | 2.722 | 3.131 |
| N=57 | 1.930          | 1.945 | 1.969 | 2.002 | 2.034 | 2.064 | 2.092 | 2.119 | 2.145 | 2.170 | 2.194 | 2.217 | 2.239 | 2.546 | 2.694 | 3.096 |
| N=58 | 1.925          | 1.939 | 1.962 | 1.994 | 2.025 | 2.054 | 2.081 | 2.107 | 2.132 | 2.156 | 2.179 | 2.201 | 2.222 | 2.528 | 2.666 | 3.061 |
| N=59 | 1.920          | 1.933 | 1.955 | 1.986 | 2.016 | 2.044 | 2.070 | 2.095 | 2.119 | 2.142 | 2.164 | 2.185 | 2.205 | 2.511 | 2.640 | 3.026 |
| N=60 | 1.915          | 1.927 | 1.948 | 1.978 | 2.007 | 2.034 | 2.059 | 2.083 | 2.106 | 2.128 | 2.149 | 2.169 | 2.188 | 2.494 | 2.613 | 2.991 |
| N=61 | 1.910          | 1.921 | 1.941 | 1.970 | 1.998 | 2.024 | 2.048 | 2.071 | 2.093 | 2.114 | 2.134 | 2.153 | 2.171 | 2.476 | 2.585 | 2.956 |
| N=62 | 1.905          | 1.915 | 1.934 | 1.962 | 1.989 | 2.014 | 2.037 | 2.058 | 2.079 | 2.098 | 2.117 | 2.135 | 2.152 | 2.456 | 2.555 | 2.921 |
| N=63 | 1.900          | 1.909 | 1.927 | 1.954 | 1.980 | 2.004 | 2.026 | 2.046 | 2.065 | 2.083 | 2.101 | 2.118 | 2.134 | 2.437 | 2.526 | 2.886 |
| N=64 | 1.895          | 1.903 | 1.920 | 1.946 | 1.971 | 1.994 | 2.015 | 2.034 | 2.052 | 2.069 | 2.086 | 2.102 | 2.117 | 2.420 | 2.499 | 2.851 |
| N=65 | 1.890          | 1.897 | 1.913 | 1.938 | 1.962 | 1.984 | 2.004 | 2.022 | 2.039 | 2.055 | 2.071 | 2.086 | 2.101 | 2.402 | 2.471 | 2.816 |
| N=66 | 1.885          | 1.891 | 1.906 | 1.930 | 1.953 | 1.974 | 1.993 | 2.010 | 2.026 | 2.041 | 2.056 | 2.070 | 2.084 | 2.384 | 2.443 | 2.781 |
| N=67 | 1.880          | 1.885 | 1.899 | 1.922 | 1.944 | 1.964 | 1.981 | 1.997 | 2.012 | 2.026 | 2.040 | 2.053 | 2.066 | 2.367 | 2.416 | 2.746 |
| N=68 | 1.875          | 1.879 | 1.892 | 1.914 | 1.935 | 1.954 | 1.970 | 1.985 | 1.999 | 2.012 | 2.025 | 2.037 | 2.049 | 2.349 | 2.388 | 2.711 |
| N=69 | 1.870          | 1.873 | 1.885 | 1.906 | 1.925 | 1.943 | 1.958 | 1.972 | 1.985 | 1.997 | 2.009 | 2.020 | 2.031 | 2.331 | 2.360 | 2.676 |
| N=70 | 1.865          | 1.867 | 1.878 | 1.898 | 1.916 | 1.932 | 1.946 | 1.959 | 1.971 | 1.982 | 1.993 | 2.003 | 2.013 | 2.293 | 2.312 | 2.641 |
| N=71 | 1.860          | 1.861 | 1.871 | 1.890 | 1.907 | 1.922 | 1.935 | 1.947 | 1.958 | 1.968 | 1.978 | 1.987 | 1.996 | 2.274 | 2.283 | 2.606 |
| N=72 | 1.855          | 1.855 | 1.864 | 1.882 | 1.898 | 1.912 | 1.924 | 1.935 | 1.945 | 1.954 | 1.962 | 1.970 | 1.978 | 2.255 | 2.254 | 2.571 |
|      |                |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |

|          |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| N# 1     | 1.060 | 1.698 | 1.759 | 1.825 | 1.895 | 1.971 | 2.053 | 2.144 | 2.246 | 2.363 | 2.500 | 2.670 | 2.897 | 3.257 | 3.587 | 4.273 |
| N# 15    | 1.615 | 1.672 | 1.732 | 1.797 | 1.867 | 1.941 | 2.023 | 2.113 | 2.213 | 2.329 | 2.465 | 2.633 | 2.857 | 3.212 | 3.538 | 4.215 |
| N# 16    | 1.592 | 1.649 | 1.709 | 1.773 | 1.842 | 1.916 | 1.996 | 2.085 | 2.185 | 2.299 | 2.433 | 2.599 | 2.821 | 3.172 | 3.495 | 4.164 |
| N# 17    | 1.572 | 1.629 | 1.688 | 1.752 | 1.819 | 1.893 | 1.973 | 2.061 | 2.159 | 2.272 | 2.406 | 2.570 | 2.789 | 3.137 | 3.456 | 4.118 |
| N# 18    | 1.554 | 1.610 | 1.669 | 1.732 | 1.799 | 1.872 | 1.951 | 2.039 | 2.137 | 2.249 | 2.381 | 2.543 | 2.761 | 3.105 | 3.422 | 4.078 |
| N# 19    | 1.538 | 1.593 | 1.652 | 1.715 | 1.781 | 1.854 | 1.932 | 2.019 | 2.116 | 2.227 | 2.358 | 2.520 | 2.737 | 3.077 | 3.391 | 4.042 |
| N# 20    | 1.523 | 1.578 | 1.636 | 1.699 | 1.765 | 1.837 | 1.915 | 2.001 | 2.097 | 2.208 | 2.338 | 2.498 | 2.712 | 3.031 | 3.363 | 4.009 |
| N# 21    | 1.510 | 1.565 | 1.622 | 1.684 | 1.750 | 1.821 | 1.899 | 1.984 | 2.080 | 2.190 | 2.319 | 2.479 | 2.691 | 3.028 | 3.338 | 3.979 |
| N# 22    | 1.497 | 1.552 | 1.609 | 1.671 | 1.736 | 1.804 | 1.874 | 1.956 | 2.052 | 2.174 | 2.302 | 2.461 | 2.672 | 3.007 | 3.314 | 3.951 |
| N# 23    | 1.486 | 1.540 | 1.597 | 1.659 | 1.724 | 1.794 | 1.871 | 1.956 | 2.050 | 2.174 | 2.296 | 2.454 | 2.665 | 2.987 | 3.293 | 3.926 |
| N# 24    | 1.476 | 1.530 | 1.586 | 1.647 | 1.712 | 1.782 | 1.859 | 1.943 | 2.037 | 2.145 | 2.272 | 2.429 | 2.638 | 2.969 | 3.273 | 3.903 |
| N# 25    | 1.466 | 1.519 | 1.576 | 1.637 | 1.701 | 1.771 | 1.847 | 1.931 | 2.025 | 2.132 | 2.259 | 2.415 | 2.623 | 2.952 | 3.255 | 3.882 |
| N# 26    | 1.457 | 1.510 | 1.566 | 1.627 | 1.691 | 1.761 | 1.836 | 1.920 | 2.013 | 2.120 | 2.246 | 2.401 | 2.609 | 2.937 | 3.238 | 3.862 |
| N# 27    | 1.448 | 1.501 | 1.557 | 1.618 | 1.682 | 1.751 | 1.826 | 1.910 | 2.003 | 2.109 | 2.235 | 2.389 | 2.595 | 2.922 | 3.222 | 3.843 |
| N# 28    | 1.440 | 1.493 | 1.549 | 1.609 | 1.673 | 1.742 | 1.817 | 1.900 | 1.993 | 2.099 | 2.224 | 2.378 | 2.583 | 2.908 | 3.207 | 3.826 |
| N# 29    | 1.433 | 1.486 | 1.541 | 1.601 | 1.663 | 1.734 | 1.808 | 1.891 | 1.983 | 2.089 | 2.214 | 2.367 | 2.572 | 2.896 | 3.193 | 3.809 |
| N# 30    | 1.425 | 1.478 | 1.534 | 1.593 | 1.657 | 1.725 | 1.800 | 1.882 | 1.974 | 2.080 | 2.204 | 2.357 | 2.561 | 2.884 | 3.180 | 3.794 |
| N# 31    | 1.419 | 1.471 | 1.527 | 1.586 | 1.650 | 1.718 | 1.792 | 1.874 | 1.966 | 2.071 | 2.195 | 2.347 | 2.550 | 2.872 | 3.168 | 3.780 |
| N# 32    | 1.412 | 1.465 | 1.520 | 1.579 | 1.643 | 1.711 | 1.785 | 1.867 | 1.958 | 2.063 | 2.186 | 2.338 | 2.541 | 2.862 | 3.156 | 3.766 |
| N# 33    | 1.406 | 1.459 | 1.514 | 1.573 | 1.636 | 1.704 | 1.778 | 1.859 | 1.951 | 2.055 | 2.178 | 2.330 | 2.532 | 2.851 | 3.145 | 3.753 |
| N# 34    | 1.401 | 1.453 | 1.508 | 1.567 | 1.630 | 1.698 | 1.771 | 1.853 | 1.944 | 2.048 | 2.170 | 2.321 | 2.523 | 2.842 | 3.135 | 3.741 |
| N# 35    | 1.395 | 1.447 | 1.502 | 1.561 | 1.624 | 1.691 | 1.765 | 1.846 | 1.937 | 2.041 | 2.163 | 2.314 | 2.515 | 2.833 | 3.125 | 3.729 |
| N# 36    | 1.390 | 1.442 | 1.497 | 1.556 | 1.618 | 1.686 | 1.759 | 1.840 | 1.930 | 2.034 | 2.156 | 2.306 | 2.507 | 2.824 | 3.115 | 3.718 |
| N# 37    | 1.385 | 1.437 | 1.491 | 1.550 | 1.613 | 1.680 | 1.753 | 1.834 | 1.924 | 2.028 | 2.149 | 2.299 | 2.499 | 2.816 | 3.106 | 3.708 |
| N# 38    | 1.381 | 1.432 | 1.487 | 1.545 | 1.608 | 1.675 | 1.748 | 1.828 | 1.918 | 2.022 | 2.143 | 2.293 | 2.492 | 2.808 | 3.098 | 3.698 |
| N# 39    | 1.376 | 1.428 | 1.482 | 1.540 | 1.603 | 1.670 | 1.743 | 1.823 | 1.913 | 2.016 | 2.137 | 2.286 | 2.485 | 2.800 | 3.090 | 3.698 |
| N# 40    | 1.372 | 1.423 | 1.477 | 1.536 | 1.598 | 1.665 | 1.738 | 1.818 | 1.908 | 2.010 | 2.131 | 2.280 | 2.479 | 2.793 | 3.082 | 3.679 |
| N# 41    | 1.368 | 1.419 | 1.473 | 1.531 | 1.593 | 1.660 | 1.733 | 1.813 | 1.902 | 2.005 | 2.126 | 2.274 | 2.473 | 2.786 | 3.074 | 3.670 |
| N# 42    | 1.364 | 1.415 | 1.469 | 1.527 | 1.589 | 1.656 | 1.728 | 1.808 | 1.897 | 2.000 | 2.120 | 2.269 | 2.468 | 2.780 | 3.067 | 3.662 |
| N# 43    | 1.360 | 1.411 | 1.465 | 1.523 | 1.585 | 1.651 | 1.724 | 1.803 | 1.893 | 1.995 | 2.115 | 2.263 | 2.461 | 2.773 | 3.060 | 3.653 |
| N# 44    | 1.356 | 1.407 | 1.461 | 1.519 | 1.581 | 1.647 | 1.719 | 1.799 | 1.888 | 1.990 | 2.110 | 2.258 | 2.455 | 2.767 | 3.053 | 3.646 |
| N# 45    | 1.353 | 1.404 | 1.457 | 1.515 | 1.577 | 1.643 | 1.715 | 1.795 | 1.884 | 1.986 | 2.105 | 2.253 | 2.450 | 2.761 | 3.047 | 3.638 |
| N# 46    | 1.349 | 1.400 | 1.454 | 1.512 | 1.573 | 1.639 | 1.711 | 1.791 | 1.880 | 1.981 | 2.101 | 2.249 | 2.445 | 2.756 | 3.041 | 3.631 |
| N# 47    | 1.346 | 1.397 | 1.450 | 1.508 | 1.569 | 1.636 | 1.708 | 1.787 | 1.876 | 1.977 | 2.096 | 2.244 | 2.440 | 2.750 | 3.035 | 3.624 |
| N# 48    | 1.343 | 1.394 | 1.447 | 1.505 | 1.566 | 1.632 | 1.704 | 1.783 | 1.872 | 1.973 | 2.092 | 2.239 | 2.435 | 2.745 | 3.029 | 3.617 |
| N# 49    | 1.340 | 1.391 | 1.444 | 1.502 | 1.563 | 1.629 | 1.700 | 1.779 | 1.868 | 1.969 | 2.088 | 2.235 | 2.430 | 2.740 | 3.024 | 3.611 |
| N# 50    | 1.337 | 1.388 | 1.441 | 1.498 | 1.559 | 1.625 | 1.697 | 1.776 | 1.866 | 1.965 | 2.084 | 2.231 | 2.426 | 2.735 | 3.018 | 3.605 |
| N# 51    | 1.323 | 1.374 | 1.427 | 1.484 | 1.545 | 1.610 | 1.681 | 1.760 | 1.848 | 1.948 | 2.066 | 2.212 | 2.406 | 2.713 | 2.994 | 3.576 |
| N# 52    | 1.312 | 1.362 | 1.415 | 1.472 | 1.532 | 1.597 | 1.668 | 1.746 | 1.833 | 1.933 | 2.051 | 2.195 | 2.388 | 2.693 | 2.973 | 3.552 |
| N# 53    | 1.302 | 1.352 | 1.404 | 1.461 | 1.521 | 1.586 | 1.656 | 1.734 | 1.821 | 1.920 | 2.037 | 2.181 | 2.373 | 2.677 | 2.955 | 3.531 |
| N# 54    | 1.293 | 1.343 | 1.395 | 1.451 | 1.511 | 1.576 | 1.646 | 1.723 | 1.810 | 1.909 | 2.025 | 2.169 | 2.360 | 2.662 | 2.939 | 3.513 |
| N# 55    | 1.285 | 1.334 | 1.386 | 1.443 | 1.502 | 1.567 | 1.637 | 1.714 | 1.800 | 1.899 | 2.015 | 2.158 | 2.349 | 2.651 | 2.925 | 3.496 |
| N# 56    | 1.277 | 1.327 | 1.379 | 1.435 | 1.495 | 1.559 | 1.629 | 1.706 | 1.792 | 1.890 | 2.005 | 2.148 | 2.338 | 2.638 | 2.913 | 3.481 |
| N# 57    | 1.271 | 1.320 | 1.372 | 1.428 | 1.488 | 1.552 | 1.621 | 1.698 | 1.784 | 1.882 | 1.997 | 2.139 | 2.328 | 2.627 | 2.901 | 3.468 |
| N# 58    | 1.265 | 1.314 | 1.366 | 1.422 | 1.481 | 1.545 | 1.614 | 1.691 | 1.776 | 1.874 | 1.989 | 2.131 | 2.319 | 2.618 | 2.891 | 3.456 |
| N# 59    | 1.260 | 1.309 | 1.360 | 1.416 | 1.475 | 1.539 | 1.608 | 1.685 | 1.770 | 1.867 | 1.982 | 2.123 | 2.312 | 2.609 | 2.881 | 3.445 |
| N# 60    | 1.255 | 1.304 | 1.355 | 1.411 | 1.470 | 1.534 | 1.603 | 1.679 | 1.764 | 1.861 | 1.976 | 2.117 | 2.304 | 2.601 | 2.873 | 3.435 |
| N# 61    | 1.246 | 1.295 | 1.346 | 1.402 | 1.460 | 1.524 | 1.593 | 1.668 | 1.753 | 1.850 | 1.964 | 2.104 | 2.291 | 2.587 | 2.857 | 3.417 |
| N# 62    | 1.238 | 1.287 | 1.338 | 1.394 | 1.452 | 1.515 | 1.584 | 1.659 | 1.744 | 1.841 | 1.954 | 2.094 | 2.280 | 2.574 | 2.844 | 3.402 |
| N# 63    | 1.232 | 1.280 | 1.331 | 1.387 | 1.445 | 1.508 | 1.576 | 1.652 | 1.736 | 1.832 | 1.945 | 2.085 | 2.270 | 2.564 | 2.833 | 3.388 |
| N# 64    | 1.226 | 1.274 | 1.325 | 1.380 | 1.439 | 1.501 | 1.570 | 1.645 | 1.729 | 1.825 | 1.938 | 2.077 | 2.262 | 2.554 | 2.822 | 3.376 |
| N# 65    | 1.220 | 1.269 | 1.320 | 1.375 | 1.433 | 1.495 | 1.564 | 1.639 | 1.722 | 1.818 | 1.931 | 2.069 | 2.254 | 2.546 | 2.813 | 3.365 |
| N# 66    | 1.216 | 1.264 | 1.315 | 1.370 | 1.428 | 1.490 | 1.558 | 1.633 | 1.717 | 1.812 | 1.925 | 2.063 | 2.247 | 2.538 | 2.805 | 3.356 |
| N# 67    | 1.211 | 1.260 | 1.310 | 1.365 | 1.423 | 1.485 | 1.553 | 1.628 | 1.711 | 1.807 | 1.919 | 2.057 | 2.241 | 2.531 | 2.797 | 3.347 |
| N# 68    | 1.208 | 1.256 | 1.306 | 1.361 | 1.419 | 1.481 | 1.549 | 1.623 | 1.707 | 1.802 | 1.914 | 2.052 | 2.235 | 2.525 | 2.791 | 3.339 |
| N# 69    | 1.204 | 1.252 | 1.303 | 1.357 | 1.415 | 1.477 | 1.545 | 1.619 | 1.702 | 1.797 | 1.909 | 2.047 | 2.230 | 2.519 | 2.784 | 3.332 |
| N# 70    | 1.201 | 1.249 | 1.299 | 1.354 | 1.411 | 1.473 | 1.541 | 1.615 | 1.698 | 1.793 | 1.905 | 2.042 | 2.225 | 2.514 | 2.779 | 3.326 |
| N# 71    | 1.197 | 1.235 | 1.285 | 1.339 | 1.397 | 1.459 | 1.526 | 1.600 | 1.682 | 1.777 | 1.888 | 2.024 | 2.206 | 2.493 | 2.756 | 3.299 |
| N# 72    | 1.177 | 1.225 | 1.275 | 1.329 | 1.386 | 1.448 | 1.515 | 1.588 | 1.671 | 1.764 | 1.875 | 2.011 | 2.192 | 2.477 | 2.739 | 3.279 |
| N# 73    | 1.164 | 1.211 | 1.261 | 1.315 | 1.372 | 1.433 | 1.499 | 1.572 | 1.654 | 1.746 | 1.857 | 1.993 | 2.172 | 2.456 | 2.716 | 3.253 |
| N# 74    | 1.155 | 1.202 | 1.252 | 1.305 | 1.362 | 1.423 | 1.489 | 1.562 | 1.643 | 1.736 | 1.846 | 1.980 | 2.159 | 2.442 | 2.700 | 3.235 |
| N# 75    | 1.148 | 1.195 | 1.245 | 1.298 | 1.354 | 1.415 | 1.481 | 1.554 | 1.635 | 1.728 | 1.837 | 1.971 | 2.150 | 2.431 | 2.689 | 3.221 |
| N# 76    | 1.143 | 1.190 | 1.239 | 1.293 | 1.349 | 1.410 | 1.475 | 1.548 | 1.629 | 1.722 | 1.830 | 1.964 | 2.142 | 2.423 | 2.680 | 3.211 |
| N# 77    | 1.139 | 1.186 | 1.235 | 1.288 | 1.344 | 1.405 | 1.471 | 1.543 | 1.624 | 1.717 | 1.825 | 1.959 | 2.136 | 2.417 | 2.673 | 3.203 |
| N# 78    | 1.135 | 1.182 | 1.231 | 1.285 | 1.341 | 1.401 | 1.467 | 1.539 | 1.620 | 1.712 | 1.820 | 1.954 | 2.131 | 2.411 | 2.668 | 3.196 |
| N# 79    | 1.132 | 1.179 | 1.228 | 1.281 | 1.338 | 1.398 | 1.464 | 1.536 | 1.617 | 1.709 | 1.817 | 1.950 | 2.127 | 2.407 | 2.663 | 3.191 |
| N# 80    | 1.097 | 1.143 | 1.191 | 1.244 | 1.299 | 1.359 | 1.423 | 1.494 | 1.574 | 1.665 | 1.771 | 1.902 | 2.076 | 2.351 | 2.603 | 3.121 |
| N# 50000 | 1.088 | 1.134 | 1.182 | 1.234 | 1.289 | 1.349 | 1.413 | 1.484 | 1.563 | 1.654 | 1.760 | 1.890 | 2.064 | 2.337 | 2.588 | 3.104 |

B

TABLE II  
FACTORS OF ONE-SIDED TOLERANCE LIMITS FOR A NORMAL DISTRIBUTION

95% CONFIDENCE

Proportion of Population Covered →

|       | .50   | .51   | .52   | .53   | .54   | .55   | .56   | .57   | .58   | .59   | .60   | .61   | .62   | .63   | .64   | .65   | .66   | .67   |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| N= 3  | 1.686 | 1.751 | 1.818 | 1.886 | 1.955 | 2.025 | 2.097 | 2.170 | 2.245 | 2.321 | 2.399 | 2.478 | 2.559 | 2.642 | 2.727 | 2.813 | 2.901 | 2.992 |
| N= 4  | 1.177 | 1.223 | 1.270 | 1.317 | 1.366 | 1.415 | 1.464 | 1.515 | 1.566 | 1.619 | 1.672 | 1.726 | 1.781 | 1.838 | 1.895 | 1.953 | 2.013 | 2.074 |
| N= 5  | .953  | .993  | 1.032 | 1.072 | 1.113 | 1.154 | 1.196 | 1.239 | 1.282 | 1.325 | 1.370 | 1.415 | 1.461 | 1.507 | 1.555 | 1.603 | 1.653 | 1.703 |
| N= 6  | .823  | .858  | .894  | .931  | .968  | 1.005 | 1.043 | 1.081 | 1.117 | 1.159 | 1.199 | 1.239 | 1.281 | 1.323 | 1.365 | 1.408 | 1.453 | 1.498 |
| N= 7  | .734  | .768  | .802  | .836  | .870  | .905  | .941  | .977  | 1.013 | 1.049 | 1.087 | 1.124 | 1.163 | 1.202 | 1.241 | 1.282 | 1.323 | 1.364 |
| N= 8  | .670  | .702  | .734  | .767  | .800  | .833  | .867  | .901  | .936  | .971  | 1.006 | 1.042 | 1.078 | 1.115 | 1.153 | 1.191 | 1.230 | 1.270 |
| N= 9  | .620  | .651  | .682  | .714  | .746  | .778  | .811  | .843  | .877  | .910  | .945  | .979  | 1.014 | 1.050 | 1.086 | 1.123 | 1.160 | 1.198 |
| N= 10 | .580  | .610  | .640  | .671  | .702  | .734  | .765  | .798  | .830  | .863  | .896  | .929  | .964  | .998  | 1.033 | 1.069 | 1.105 | 1.142 |
| N= 11 | .546  | .576  | .606  | .636  | .667  | .697  | .728  | .760  | .791  | .823  | .856  | .889  | .922  | .956  | .990  | 1.025 | 1.060 | 1.096 |
| N= 12 | .518  | .548  | .577  | .607  | .637  | .667  | .697  | .728  | .759  | .791  | .822  | .855  | .887  | .920  | .954  | .988  | 1.023 | 1.058 |
| N= 13 | .494  | .523  | .552  | .581  | .611  | .641  | .671  | .701  | .732  | .763  | .794  | .826  | .858  | .890  | .923  | .957  | .991  | 1.026 |
| N= 14 | .473  | .502  | .531  | .559  | .589  | .618  | .648  | .678  | .708  | .738  | .769  | .801  | .832  | .864  | .897  | .930  | .964  | .998  |
| N= 15 | .455  | .483  | .511  | .540  | .569  | .598  | .627  | .657  | .687  | .717  | .748  | .779  | .810  | .842  | .874  | .907  | .940  | .973  |
| N= 16 | .438  | .466  | .494  | .523  | .552  | .580  | .609  | .638  | .668  | .698  | .729  | .759  | .790  | .822  | .854  | .886  | .919  | .952  |
| N= 17 | .423  | .451  | .479  | .507  | .536  | .565  | .593  | .622  | .652  | .682  | .712  | .742  | .773  | .804  | .835  | .867  | .900  | .933  |
| N= 18 | .410  | .438  | .466  | .494  | .522  | .550  | .579  | .608  | .637  | .666  | .696  | .726  | .757  | .788  | .819  | .851  | .883  | .916  |
| N= 19 | .398  | .425  | .453  | .481  | .509  | .537  | .566  | .594  | .623  | .653  | .682  | .712  | .742  | .773  | .804  | .836  | .867  | .900  |
| N= 20 | .387  | .414  | .442  | .469  | .497  | .525  | .554  | .582  | .611  | .640  | .669  | .699  | .729  | .760  | .791  | .822  | .854  | .886  |
| N= 21 | .376  | .404  | .431  | .459  | .486  | .514  | .543  | .571  | .600  | .629  | .658  | .687  | .717  | .747  | .778  | .809  | .841  | .873  |
| N= 22 | .367  | .394  | .421  | .449  | .476  | .504  | .532  | .561  | .589  | .618  | .647  | .676  | .706  | .736  | .767  | .798  | .829  | .861  |
| N= 23 | .358  | .385  | .412  | .440  | .467  | .495  | .523  | .551  | .579  | .608  | .637  | .666  | .696  | .726  | .756  | .787  | .818  | .850  |
| N= 24 | .350  | .377  | .404  | .431  | .459  | .486  | .514  | .542  | .570  | .599  | .628  | .657  | .686  | .716  | .746  | .777  | .808  | .840  |
| N= 25 | .342  | .369  | .396  | .423  | .451  | .478  | .506  | .534  | .562  | .590  | .619  | .648  | .677  | .707  | .737  | .768  | .799  | .830  |
| N= 26 | .335  | .362  | .389  | .416  | .443  | .471  | .498  | .526  | .554  | .582  | .610  | .640  | .669  | .699  | .729  | .759  | .790  | .821  |
| N= 27 | .328  | .355  | .382  | .409  | .436  | .463  | .491  | .519  | .547  | .575  | .603  | .632  | .661  | .691  | .721  | .751  | .782  | .813  |
| N= 28 | .322  | .349  | .375  | .402  | .429  | .457  | .484  | .512  | .540  | .568  | .596  | .625  | .654  | .684  | .713  | .743  | .774  | .805  |
| N= 29 | .316  | .343  | .369  | .396  | .423  | .450  | .478  | .505  | .533  | .561  | .590  | .618  | .647  | .677  | .706  | .736  | .767  | .798  |
| N= 30 | .310  | .337  | .363  | .390  | .417  | .444  | .472  | .499  | .527  | .555  | .583  | .612  | .641  | .670  | .700  | .730  | .760  | .791  |
| N= 31 | .305  | .331  | .358  | .385  | .412  | .439  | .466  | .493  | .521  | .549  | .577  | .606  | .635  | .664  | .693  | .723  | .753  | .784  |
| N= 32 | .300  | .326  | .353  | .379  | .406  | .433  | .461  | .488  | .516  | .544  | .572  | .600  | .629  | .658  | .687  | .717  | .747  | .778  |
| N= 33 | .295  | .321  | .348  | .374  | .401  | .428  | .455  | .483  | .510  | .538  | .566  | .595  | .623  | .652  | .682  | .711  | .742  | .772  |
| N= 34 | .290  | .317  | .343  | .370  | .396  | .423  | .451  | .478  | .505  | .533  | .561  | .589  | .618  | .647  | .676  | .706  | .736  | .767  |
| N= 35 | .286  | .312  | .339  | .365  | .392  | .419  | .446  | .473  | .501  | .528  | .556  | .585  | .613  | .642  | .671  | .701  | .731  | .761  |
| N= 36 | .282  | .308  | .334  | .361  | .387  | .414  | .441  | .469  | .496  | .524  | .552  | .580  | .608  | .637  | .666  | .695  | .726  | .756  |
| N= 37 | .278  | .304  | .330  | .357  | .383  | .410  | .437  | .464  | .492  | .519  | .547  | .575  | .604  | .632  | .662  | .691  | .721  | .751  |
| N= 38 | .274  | .300  | .326  | .353  | .379  | .406  | .433  | .460  | .487  | .515  | .543  | .571  | .599  | .628  | .657  | .687  | .716  | .747  |
| N= 39 | .270  | .296  | .322  | .349  | .375  | .402  | .429  | .456  | .483  | .511  | .539  | .567  | .595  | .624  | .653  | .682  | .712  | .742  |
| N= 40 | .266  | .293  | .319  | .345  | .372  | .398  | .425  | .452  | .480  | .507  | .535  | .563  | .591  | .620  | .649  | .678  | .708  | .738  |
| N= 41 | .263  | .289  | .315  | .342  | .368  | .395  | .422  | .449  | .476  | .503  | .531  | .559  | .587  | .616  | .645  | .674  | .704  | .734  |
| N= 42 | .260  | .286  | .312  | .338  | .365  | .391  | .418  | .445  | .472  | .500  | .527  | .555  | .584  | .612  | .641  | .670  | .700  | .730  |
| N= 43 | .256  | .283  | .309  | .335  | .362  | .388  | .415  | .442  | .469  | .496  | .524  | .552  | .580  | .609  | .637  | .667  | .696  | .726  |
| N= 44 | .253  | .280  | .306  | .332  | .358  | .385  | .412  | .439  | .466  | .493  | .521  | .549  | .577  | .605  | .634  | .663  | .693  | .723  |
| N= 45 | .250  | .277  | .303  | .329  | .355  | .382  | .409  | .435  | .463  | .490  | .517  | .545  | .573  | .601  | .631  | .660  | .690  | .720  |
| N= 46 | .248  | .274  | .300  | .326  | .352  | .379  | .406  | .432  | .459  | .487  | .514  | .542  | .570  | .599  | .627  | .656  | .685  | .715  |
| N= 47 | .245  | .271  | .297  | .323  | .350  | .376  | .403  | .430  | .457  | .484  | .511  | .539  | .567  | .595  | .624  | .653  | .683  | .712  |
| N= 48 | .242  | .268  | .294  | .320  | .347  | .373  | .400  | .427  | .454  | .481  | .508  | .536  | .564  | .592  | .621  | .650  | .679  | .709  |
| N= 49 | .240  | .266  | .292  | .318  | .344  | .371  | .397  | .424  | .451  | .478  | .506  | .533  | .561  | .589  | .618  | .647  | .676  | .706  |
| N= 50 | .237  | .263  | .289  | .315  | .342  | .368  | .395  | .421  | .448  | .475  | .503  | .530  | .558  | .587  | .615  | .644  | .674  | .703  |
| N= 55 | .226  | .252  | .278  | .304  | .330  | .356  | .383  | .409  | .436  | .463  | .490  | .518  | .546  | .574  | .602  | .631  | .660  | .690  |
| N= 60 | .216  | .242  | .267  | .293  | .320  | .346  | .372  | .399  | .425  | .452  | .480  | .507  | .535  | .563  | .591  | .620  | .649  | .678  |
| N= 65 | .207  | .233  | .259  | .285  | .311  | .337  | .363  | .390  | .416  | .443  | .470  | .498  | .525  | .553  | .581  | .610  | .639  | .668  |
| N= 70 | .199  | .225  | .251  | .277  | .303  | .329  | .355  | .381  | .408  | .435  | .462  | .489  | .517  | .544  | .573  | .601  | .630  | .659  |
| N= 75 | .192  | .218  | .244  | .270  | .295  | .322  | .348  | .374  | .401  | .427  | .454  | .482  | .509  | .537  | .565  | .593  | .622  | .651  |
| N= 80 | .186  | .212  | .237  | .263  | .289  | .315  | .341  | .368  | .394  | .421  | .448  | .475  | .502  | .530  | .558  | .586  | .615  | .644  |
| N= 85 | .180  | .206  | .232  | .257  | .283  | .309  | .335  | .362  | .388  | .415  | .442  | .469  | .496  | .524  | .552  | .580  | .608  | .637  |





TABLE II (Cont.)  
FACTORS OF ONE-STANDARD DEVIATION FOR A NORMAL DISTRIBUTION

95% CONFIDENCE

Proportion of Population Covered →

|       | .68   | .69   | .70   | .71   | .72   | .73   | .74   | .75   | .76   | .77   | .78   | .79   | .80   | .81   | .82   | .83   | .84   | .85   |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| N= 3  | 3.085 | 3.180 | 3.277 | 3.377 | 3.480 | 3.586 | 3.694 | 3.806 | 3.922 | 4.041 | 4.164 | 4.292 | 4.424 | 4.562 | 4.705 | 4.854 | 5.011 | 5.175 |
| N= 4  | 2.136 | 2.200 | 2.265 | 2.332 | 2.401 | 2.471 | 2.543 | 2.618 | 2.694 | 2.773 | 2.854 | 2.939 | 3.026 | 3.117 | 3.211 | 3.309 | 3.412 | 3.520 |
| N= 5  | 1.755 | 1.807 | 1.861 | 1.916 | 1.972 | 2.030 | 2.089 | 2.150 | 2.212 | 2.277 | 2.343 | 2.412 | 2.483 | 2.557 | 2.634 | 2.714 | 2.798 | 2.885 |
| N= 6  | 1.543 | 1.593 | 1.638 | 1.687 | 1.737 | 1.788 | 1.841 | 1.895 | 1.951 | 2.008 | 2.067 | 2.128 | 2.191 | 2.256 | 2.324 | 2.395 | 2.469 | 2.546 |
| N= 7  | 1.407 | 1.450 | 1.495 | 1.540 | 1.586 | 1.634 | 1.682 | 1.732 | 1.784 | 1.836 | 1.891 | 1.947 | 2.005 | 2.065 | 2.128 | 2.193 | 2.261 | 2.332 |
| N= 8  | 1.310 | 1.351 | 1.393 | 1.436 | 1.480 | 1.525 | 1.571 | 1.618 | 1.666 | 1.716 | 1.767 | 1.820 | 1.875 | 1.932 | 1.991 | 2.053 | 2.117 | 2.184 |
| N= 9  | 1.237 | 1.276 | 1.317 | 1.358 | 1.400 | 1.443 | 1.487 | 1.532 | 1.579 | 1.626 | 1.675 | 1.726 | 1.779 | 1.833 | 1.889 | 1.948 | 2.009 | 2.074 |
| N= 10 | 1.179 | 1.218 | 1.257 | 1.297 | 1.337 | 1.379 | 1.421 | 1.465 | 1.510 | 1.556 | 1.604 | 1.653 | 1.703 | 1.755 | 1.810 | 1.867 | 1.926 | 1.988 |
| N= 11 | 1.133 | 1.170 | 1.208 | 1.247 | 1.286 | 1.327 | 1.368 | 1.411 | 1.454 | 1.499 | 1.546 | 1.593 | 1.642 | 1.693 | 1.746 | 1.801 | 1.859 | 1.919 |
| N= 12 | 1.094 | 1.130 | 1.167 | 1.205 | 1.244 | 1.284 | 1.324 | 1.366 | 1.409 | 1.452 | 1.498 | 1.544 | 1.592 | 1.642 | 1.694 | 1.748 | 1.804 | 1.862 |
| N= 13 | 1.061 | 1.097 | 1.133 | 1.170 | 1.208 | 1.247 | 1.287 | 1.328 | 1.370 | 1.413 | 1.457 | 1.503 | 1.550 | 1.599 | 1.652 | 1.707 | 1.763 | 1.815 |
| N= 14 | 1.032 | 1.068 | 1.104 | 1.140 | 1.178 | 1.216 | 1.255 | 1.296 | 1.337 | 1.379 | 1.423 | 1.468 | 1.514 | 1.562 | 1.612 | 1.664 | 1.718 | 1.774 |
| N= 15 | 1.008 | 1.042 | 1.078 | 1.114 | 1.151 | 1.189 | 1.228 | 1.267 | 1.308 | 1.350 | 1.393 | 1.437 | 1.483 | 1.530 | 1.579 | 1.630 | 1.683 | 1.739 |
| N= 16 | .986  | 1.020 | 1.055 | 1.091 | 1.128 | 1.165 | 1.203 | 1.242 | 1.283 | 1.324 | 1.366 | 1.410 | 1.455 | 1.502 | 1.550 | 1.601 | 1.653 | 1.708 |
| N= 17 | .966  | 1.000 | 1.035 | 1.071 | 1.107 | 1.144 | 1.182 | 1.220 | 1.260 | 1.301 | 1.343 | 1.386 | 1.431 | 1.477 | 1.525 | 1.575 | 1.627 | 1.681 |
| N= 18 | .949  | .983  | 1.017 | 1.052 | 1.088 | 1.125 | 1.162 | 1.201 | 1.240 | 1.280 | 1.322 | 1.365 | 1.409 | 1.455 | 1.502 | 1.551 | 1.603 | 1.656 |
| N= 19 | .933  | .967  | 1.001 | 1.036 | 1.071 | 1.107 | 1.145 | 1.183 | 1.222 | 1.262 | 1.303 | 1.345 | 1.389 | 1.434 | 1.481 | 1.530 | 1.581 | 1.634 |
| N= 20 | .919  | .952  | .986  | 1.020 | 1.056 | 1.092 | 1.129 | 1.166 | 1.205 | 1.245 | 1.286 | 1.328 | 1.371 | 1.416 | 1.463 | 1.511 | 1.562 | 1.614 |
| N= 21 | .905  | .938  | .972  | 1.006 | 1.042 | 1.077 | 1.114 | 1.151 | 1.190 | 1.229 | 1.270 | 1.312 | 1.355 | 1.399 | 1.446 | 1.494 | 1.544 | 1.596 |
| N= 22 | .893  | .926  | .960  | .994  | 1.029 | 1.064 | 1.101 | 1.138 | 1.176 | 1.215 | 1.255 | 1.297 | 1.340 | 1.384 | 1.430 | 1.478 | 1.527 | 1.579 |
| N= 23 | .882  | .915  | .948  | .982  | 1.017 | 1.052 | 1.088 | 1.125 | 1.163 | 1.202 | 1.242 | 1.283 | 1.326 | 1.370 | 1.416 | 1.463 | 1.512 | 1.564 |
| N= 24 | .872  | .904  | .937  | .971  | 1.006 | 1.041 | 1.077 | 1.114 | 1.151 | 1.190 | 1.230 | 1.271 | 1.313 | 1.357 | 1.402 | 1.450 | 1.499 | 1.550 |
| N= 25 | .862  | .894  | .927  | .961  | .995  | 1.030 | 1.066 | 1.103 | 1.140 | 1.179 | 1.218 | 1.259 | 1.301 | 1.345 | 1.393 | 1.437 | 1.486 | 1.537 |
| N= 26 | .853  | .885  | .918  | .952  | .986  | 1.021 | 1.056 | 1.093 | 1.130 | 1.168 | 1.208 | 1.248 | 1.290 | 1.334 | 1.379 | 1.425 | 1.474 | 1.525 |
| N= 27 | .844  | .877  | .909  | .943  | .977  | 1.011 | 1.047 | 1.083 | 1.120 | 1.159 | 1.198 | 1.238 | 1.280 | 1.323 | 1.368 | 1.414 | 1.463 | 1.513 |
| N= 28 | .837  | .869  | .901  | .934  | .968  | 1.003 | 1.038 | 1.074 | 1.112 | 1.150 | 1.189 | 1.229 | 1.270 | 1.313 | 1.358 | 1.404 | 1.452 | 1.503 |
| N= 29 | .829  | .861  | .894  | .927  | .960  | .995  | 1.032 | 1.066 | 1.103 | 1.141 | 1.180 | 1.220 | 1.261 | 1.304 | 1.349 | 1.395 | 1.442 | 1.493 |
| N= 30 | .822  | .854  | .886  | .919  | .953  | .987  | 1.022 | 1.058 | 1.095 | 1.133 | 1.172 | 1.212 | 1.253 | 1.296 | 1.340 | 1.385 | 1.433 | 1.483 |
| N= 31 | .815  | .847  | .880  | .912  | .946  | .980  | 1.015 | 1.051 | 1.088 | 1.125 | 1.164 | 1.204 | 1.245 | 1.287 | 1.331 | 1.377 | 1.425 | 1.474 |
| N= 32 | .809  | .841  | .873  | .906  | .939  | .973  | 1.008 | 1.044 | 1.081 | 1.118 | 1.157 | 1.196 | 1.237 | 1.280 | 1.323 | 1.369 | 1.416 | 1.466 |
| N= 33 | .803  | .835  | .867  | .900  | .933  | .967  | 1.002 | 1.037 | 1.074 | 1.111 | 1.150 | 1.189 | 1.230 | 1.272 | 1.316 | 1.361 | 1.409 | 1.458 |
| N= 34 | .798  | .829  | .861  | .894  | .927  | .961  | .996  | 1.031 | 1.067 | 1.105 | 1.143 | 1.183 | 1.223 | 1.265 | 1.309 | 1.354 | 1.401 | 1.450 |
| N= 35 | .792  | .824  | .856  | .888  | .921  | .955  | .990  | 1.025 | 1.061 | 1.099 | 1.137 | 1.176 | 1.217 | 1.259 | 1.302 | 1.347 | 1.394 | 1.443 |
| N= 36 | .787  | .818  | .850  | .883  | .916  | .950  | .984  | 1.019 | 1.056 | 1.093 | 1.131 | 1.170 | 1.210 | 1.252 | 1.296 | 1.341 | 1.387 | 1.436 |
| N= 37 | .782  | .813  | .845  | .878  | .911  | .944  | .979  | 1.014 | 1.050 | 1.087 | 1.125 | 1.164 | 1.205 | 1.246 | 1.290 | 1.334 | 1.381 | 1.430 |
| N= 38 | .777  | .809  | .840  | .873  | .906  | .939  | .974  | 1.009 | 1.045 | 1.082 | 1.120 | 1.159 | 1.199 | 1.241 | 1.284 | 1.328 | 1.375 | 1.424 |
| N= 39 | .773  | .804  | .836  | .868  | .901  | .934  | .969  | 1.004 | 1.040 | 1.077 | 1.114 | 1.153 | 1.194 | 1.235 | 1.278 | 1.323 | 1.369 | 1.418 |
| N= 40 | .769  | .800  | .831  | .863  | .896  | .930  | .964  | .999  | 1.035 | 1.072 | 1.109 | 1.148 | 1.188 | 1.230 | 1.273 | 1.317 | 1.364 | 1.412 |
| N= 41 | .764  | .795  | .827  | .859  | .892  | .925  | .959  | .994  | 1.030 | 1.067 | 1.105 | 1.143 | 1.183 | 1.225 | 1.268 | 1.312 | 1.358 | 1.407 |
| N= 42 | .760  | .791  | .823  | .855  | .888  | .921  | .955  | .990  | 1.026 | 1.062 | 1.100 | 1.139 | 1.179 | 1.220 | 1.263 | 1.307 | 1.353 | 1.401 |
| N= 43 | .757  | .788  | .819  | .851  | .884  | .917  | .951  | .986  | 1.021 | 1.058 | 1.096 | 1.134 | 1.174 | 1.215 | 1.258 | 1.302 | 1.348 | 1.396 |
| N= 44 | .753  | .784  | .815  | .847  | .880  | .913  | .947  | .982  | 1.017 | 1.054 | 1.091 | 1.130 | 1.170 | 1.211 | 1.253 | 1.297 | 1.343 | 1.391 |
| N= 45 | .749  | .780  | .812  | .844  | .876  | .909  | .943  | .978  | 1.013 | 1.050 | 1.087 | 1.126 | 1.165 | 1.206 | 1.249 | 1.293 | 1.339 | 1.387 |
| N= 46 | .746  | .777  | .808  | .840  | .872  | .906  | .939  | .974  | 1.010 | 1.046 | 1.083 | 1.122 | 1.161 | 1.202 | 1.245 | 1.289 | 1.335 | 1.382 |
| N= 47 | .743  | .774  | .805  | .837  | .869  | .902  | .936  | .970  | 1.006 | 1.042 | 1.079 | 1.118 | 1.157 | 1.198 | 1.241 | 1.285 | 1.330 | 1.378 |
| N= 48 | .739  | .770  | .801  | .833  | .866  | .899  | .932  | .967  | 1.002 | 1.039 | 1.076 | 1.114 | 1.154 | 1.194 | 1.237 | 1.281 | 1.326 | 1.374 |
| N= 49 | .736  | .767  | .798  | .830  | .862  | .895  | .929  | .964  | .999  | 1.035 | 1.072 | 1.110 | 1.150 | 1.191 | 1.233 | 1.277 | 1.322 | 1.370 |
| N= 50 | .733  | .764  | .795  | .827  | .859  | .892  | .926  | .960  | .996  | 1.032 | 1.069 | 1.107 | 1.146 | 1.187 | 1.229 | 1.273 | 1.318 | 1.366 |
| N= 55 | .720  | .750  | .781  | .813  | .845  | .878  | .911  | .945  | .980  | 1.016 | 1.053 | 1.091 | 1.130 | 1.171 | 1.213 | 1.256 | 1.301 | 1.348 |
| N= 60 | .707  | .738  | .769  | .801  | .833  | .865  | .897  | .933  | .967  | 1.003 | 1.040 | 1.078 | 1.116 | 1.157 | 1.198 | 1.241 | 1.285 | 1.330 |
| N= 65 | .694  | .725  | .756  | .789  | .821  | .854  | .887  | .921  | .956  | 1.001 | 1.038 | 1.076 | 1.114 | 1.154 | 1.196 | 1.239 | 1.283 | 1.328 |
| N= 70 | .689  | .719  | .749  | .781  | .812  | .845  | .878  | .911  | .946  | .981  | 1.018 | 1.055 | 1.094 | 1.133 | 1.176 | 1.219 | 1.262 | 1.308 |

|         |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| N# 14   | 1.032 | 1.068 | 1.104 | 1.140 | 1.178 | 1.216 | 1.255 | 1.296 | 1.337 | 1.379 | 1.423 | 1.468 | 1.514 | 1.562 | 1.612 | 1.664 | 1.718 | 1.774 |
| N# 15   | 1.009 | 1.042 | 1.078 | 1.114 | 1.151 | 1.189 | 1.228 | 1.267 | 1.308 | 1.350 | 1.393 | 1.437 | 1.483 | 1.530 | 1.579 | 1.630 | 1.683 | 1.739 |
| N# 16   | 985   | 1.020 | 1.055 | 1.091 | 1.128 | 1.165 | 1.203 | 1.242 | 1.283 | 1.324 | 1.366 | 1.410 | 1.455 | 1.502 | 1.550 | 1.601 | 1.653 | 1.708 |
| N# 17   | 966   | 1.000 | 1.035 | 1.071 | 1.107 | 1.144 | 1.182 | 1.220 | 1.260 | 1.301 | 1.343 | 1.386 | 1.431 | 1.477 | 1.525 | 1.575 | 1.627 | 1.681 |
| N# 18   | 949   | 983   | 1.017 | 1.052 | 1.088 | 1.125 | 1.162 | 1.201 | 1.240 | 1.280 | 1.322 | 1.365 | 1.409 | 1.455 | 1.502 | 1.551 | 1.603 | 1.656 |
| N# 19   | 933   | 967   | 1.001 | 1.036 | 1.071 | 1.107 | 1.145 | 1.183 | 1.222 | 1.262 | 1.303 | 1.345 | 1.389 | 1.434 | 1.481 | 1.530 | 1.581 | 1.634 |
| N# 20   | 919   | 952   | 986   | 1.020 | 1.056 | 1.092 | 1.129 | 1.166 | 1.205 | 1.245 | 1.286 | 1.328 | 1.371 | 1.416 | 1.463 | 1.511 | 1.562 | 1.614 |
| N# 21   | 905   | 938   | 972   | 1.006 | 1.042 | 1.077 | 1.114 | 1.151 | 1.190 | 1.229 | 1.270 | 1.312 | 1.355 | 1.399 | 1.446 | 1.494 | 1.544 | 1.596 |
| N# 22   | 893   | 926   | 960   | 994   | 1.029 | 1.064 | 1.101 | 1.138 | 1.176 | 1.215 | 1.255 | 1.297 | 1.340 | 1.384 | 1.430 | 1.478 | 1.527 | 1.579 |
| N# 23   | 882   | 915   | 948   | 982   | 1.017 | 1.052 | 1.088 | 1.125 | 1.163 | 1.202 | 1.242 | 1.283 | 1.326 | 1.370 | 1.416 | 1.463 | 1.512 | 1.564 |
| N# 24   | 872   | 904   | 937   | 971   | 1.006 | 1.041 | 1.077 | 1.114 | 1.151 | 1.190 | 1.230 | 1.271 | 1.313 | 1.357 | 1.402 | 1.450 | 1.499 | 1.550 |
| N# 25   | 862   | 894   | 927   | 961   | 995   | 1.030 | 1.066 | 1.103 | 1.140 | 1.179 | 1.218 | 1.259 | 1.301 | 1.345 | 1.390 | 1.437 | 1.486 | 1.537 |
| N# 26   | 853   | 885   | 918   | 952   | 986   | 1.021 | 1.056 | 1.093 | 1.130 | 1.168 | 1.208 | 1.248 | 1.290 | 1.334 | 1.379 | 1.425 | 1.474 | 1.525 |
| N# 27   | 844   | 877   | 909   | 943   | 977   | 1.011 | 1.047 | 1.083 | 1.120 | 1.159 | 1.198 | 1.238 | 1.280 | 1.323 | 1.368 | 1.414 | 1.463 | 1.513 |
| N# 28   | 837   | 869   | 901   | 934   | 968   | 1.003 | 1.038 | 1.074 | 1.112 | 1.150 | 1.189 | 1.229 | 1.270 | 1.313 | 1.358 | 1.404 | 1.452 | 1.503 |
| N# 29   | 829   | 861   | 894   | 927   | 960   | 995   | 1.030 | 1.066 | 1.103 | 1.141 | 1.180 | 1.220 | 1.261 | 1.304 | 1.349 | 1.395 | 1.442 | 1.493 |
| N# 30   | 822   | 854   | 886   | 919   | 953   | 987   | 1.022 | 1.058 | 1.095 | 1.133 | 1.172 | 1.212 | 1.253 | 1.296 | 1.340 | 1.385 | 1.433 | 1.483 |
| N# 31   | 815   | 847   | 880   | 912   | 946   | 980   | 1.015 | 1.051 | 1.088 | 1.125 | 1.164 | 1.204 | 1.245 | 1.287 | 1.331 | 1.377 | 1.425 | 1.474 |
| N# 32   | 809   | 841   | 873   | 906   | 939   | 973   | 1.008 | 1.044 | 1.081 | 1.118 | 1.157 | 1.196 | 1.237 | 1.280 | 1.323 | 1.369 | 1.416 | 1.465 |
| N# 33   | 803   | 835   | 867   | 900   | 933   | 967   | 1.002 | 1.037 | 1.074 | 1.111 | 1.150 | 1.189 | 1.230 | 1.272 | 1.316 | 1.361 | 1.409 | 1.459 |
| N# 34   | 798   | 829   | 861   | 894   | 927   | 961   | 996   | 1.031 | 1.067 | 1.105 | 1.143 | 1.183 | 1.222 | 1.265 | 1.309 | 1.354 | 1.401 | 1.450 |
| N# 35   | 792   | 824   | 856   | 888   | 921   | 955   | 990   | 1.025 | 1.061 | 1.099 | 1.137 | 1.176 | 1.217 | 1.259 | 1.302 | 1.347 | 1.394 | 1.443 |
| N# 36   | 787   | 818   | 850   | 883   | 916   | 950   | 984   | 1.019 | 1.056 | 1.093 | 1.131 | 1.170 | 1.210 | 1.252 | 1.296 | 1.341 | 1.387 | 1.436 |
| N# 37   | 782   | 813   | 845   | 878   | 911   | 944   | 979   | 1.014 | 1.050 | 1.087 | 1.125 | 1.164 | 1.205 | 1.246 | 1.290 | 1.334 | 1.381 | 1.430 |
| N# 38   | 777   | 809   | 840   | 873   | 906   | 939   | 974   | 1.009 | 1.045 | 1.082 | 1.120 | 1.159 | 1.199 | 1.241 | 1.284 | 1.328 | 1.375 | 1.424 |
| N# 39   | 773   | 804   | 836   | 868   | 901   | 934   | 969   | 1.004 | 1.040 | 1.077 | 1.114 | 1.153 | 1.194 | 1.235 | 1.278 | 1.323 | 1.369 | 1.418 |
| N# 40   | 769   | 800   | 831   | 863   | 896   | 930   | 964   | 999   | 1.035 | 1.072 | 1.109 | 1.148 | 1.188 | 1.230 | 1.273 | 1.317 | 1.364 | 1.412 |
| N# 41   | 764   | 795   | 827   | 859   | 892   | 925   | 959   | 994   | 1.030 | 1.067 | 1.105 | 1.143 | 1.183 | 1.225 | 1.268 | 1.312 | 1.358 | 1.407 |
| N# 42   | 760   | 791   | 823   | 855   | 888   | 921   | 955   | 990   | 1.026 | 1.062 | 1.100 | 1.139 | 1.179 | 1.220 | 1.263 | 1.307 | 1.353 | 1.401 |
| N# 43   | 757   | 788   | 819   | 851   | 884   | 917   | 951   | 986   | 1.021 | 1.058 | 1.096 | 1.134 | 1.174 | 1.215 | 1.258 | 1.302 | 1.348 | 1.396 |
| N# 44   | 753   | 784   | 815   | 847   | 880   | 913   | 947   | 982   | 1.017 | 1.054 | 1.091 | 1.130 | 1.170 | 1.211 | 1.253 | 1.297 | 1.343 | 1.391 |
| N# 45   | 749   | 780   | 812   | 844   | 876   | 909   | 943   | 978   | 1.013 | 1.050 | 1.087 | 1.126 | 1.165 | 1.206 | 1.245 | 1.289 | 1.339 | 1.387 |
| N# 46   | 746   | 777   | 808   | 840   | 872   | 906   | 939   | 974   | 1.010 | 1.046 | 1.083 | 1.122 | 1.161 | 1.202 | 1.245 | 1.289 | 1.334 | 1.382 |
| N# 47   | 743   | 773   | 805   | 837   | 869   | 902   | 936   | 970   | 1.006 | 1.042 | 1.079 | 1.118 | 1.157 | 1.198 | 1.241 | 1.285 | 1.330 | 1.378 |
| N# 48   | 739   | 770   | 801   | 833   | 866   | 899   | 932   | 967   | 1.002 | 1.039 | 1.076 | 1.114 | 1.154 | 1.194 | 1.237 | 1.281 | 1.326 | 1.374 |
| N# 49   | 736   | 767   | 798   | 830   | 862   | 895   | 929   | 964   | 999   | 1.035 | 1.072 | 1.110 | 1.150 | 1.191 | 1.233 | 1.277 | 1.322 | 1.370 |
| N# 50   | 733   | 764   | 795   | 827   | 859   | 892   | 926   | 960   | 996   | 1.032 | 1.069 | 1.107 | 1.146 | 1.187 | 1.229 | 1.273 | 1.318 | 1.366 |
| N# 55   | 720   | 750   | 781   | 813   | 845   | 878   | 911   | 945   | 980   | 1.016 | 1.053 | 1.091 | 1.130 | 1.171 | 1.213 | 1.256 | 1.301 | 1.346 |
| N# 60   | 708   | 738   | 769   | 801   | 833   | 865   | 899   | 933   | 967   | 1.003 | 1.040 | 1.078 | 1.116 | 1.157 | 1.198 | 1.241 | 1.285 | 1.330 |
| N# 65   | 698   | 728   | 759   | 790   | 822   | 854   | 887   | 921   | 956   | 992   | 1.028 | 1.066 | 1.104 | 1.144 | 1.186 | 1.229 | 1.273 | 1.320 |
| N# 70   | 689   | 719   | 749   | 781   | 812   | 845   | 878   | 911   | 946   | 981   | 1.018 | 1.055 | 1.094 | 1.133 | 1.175 | 1.217 | 1.262 | 1.308 |
| N# 75   | 681   | 711   | 741   | 772   | 804   | 836   | 869   | 903   | 937   | 972   | 1.009 | 1.046 | 1.084 | 1.124 | 1.165 | 1.207 | 1.252 | 1.298 |
| N# 80   | 673   | 703   | 734   | 765   | 796   | 828   | 861   | 895   | 929   | 964   | 1.000 | 1.037 | 1.076 | 1.115 | 1.156 | 1.198 | 1.243 | 1.289 |
| N# 85   | 667   | 697   | 727   | 758   | 789   | 821   | 854   | 888   | 922   | 957   | 993   | 1.030 | 1.068 | 1.107 | 1.148 | 1.190 | 1.234 | 1.280 |
| N# 90   | 661   | 691   | 721   | 752   | 783   | 815   | 848   | 881   | 915   | 950   | 986   | 1.023 | 1.061 | 1.100 | 1.141 | 1.183 | 1.227 | 1.273 |
| N# 95   | 655   | 685   | 715   | 746   | 777   | 809   | 842   | 875   | 909   | 944   | 980   | 1.017 | 1.055 | 1.094 | 1.134 | 1.176 | 1.220 | 1.266 |
| N# 100  | 650   | 680   | 710   | 741   | 772   | 804   | 836   | 870   | 904   | 938   | 974   | 1.011 | 1.049 | 1.088 | 1.128 | 1.170 | 1.214 | 1.259 |
| N# 110  | 641   | 671   | 701   | 732   | 763   | 794   | 827   | 860   | 894   | 928   | 964   | 1.001 | 1.038 | 1.077 | 1.117 | 1.159 | 1.203 | 1.248 |
| N# 120  | 633   | 663   | 693   | 723   | 754   | 786   | 818   | 851   | 885   | 920   | 955   | 992   | 1.029 | 1.068 | 1.108 | 1.150 | 1.193 | 1.238 |
| N# 130  | 627   | 656   | 686   | 716   | 747   | 779   | 811   | 844   | 878   | 912   | 947   | 984   | 1.021 | 1.060 | 1.100 | 1.141 | 1.185 | 1.230 |
| N# 140  | 621   | 650   | 680   | 710   | 741   | 772   | 805   | 837   | 871   | 905   | 941   | 977   | 1.014 | 1.053 | 1.093 | 1.134 | 1.177 | 1.222 |
| N# 150  | 615   | 644   | 674   | 704   | 735   | 767   | 799   | 832   | 865   | 899   | 935   | 971   | 1.008 | 1.046 | 1.086 | 1.128 | 1.170 | 1.215 |
| N# 160  | 610   | 639   | 669   | 699   | 730   | 762   | 794   | 826   | 860   | 894   | 929   | 965   | 1.002 | 1.041 | 1.080 | 1.122 | 1.164 | 1.209 |
| N# 170  | 606   | 635   | 665   | 695   | 726   | 757   | 789   | 821   | 855   | 889   | 924   | 960   | 997   | 1.036 | 1.075 | 1.116 | 1.159 | 1.204 |
| N# 180  | 602   | 631   | 661   | 691   | 721   | 753   | 785   | 817   | 850   | 885   | 920   | 956   | 993   | 1.031 | 1.070 | 1.111 | 1.154 | 1.198 |
| N# 190  | 598   | 627   | 657   | 687   | 717   | 749   | 781   | 813   | 846   | 880   | 915   | 951   | 988   | 1.026 | 1.066 | 1.107 | 1.149 | 1.194 |
| N# 200  | 595   | 624   | 653   | 683   | 714   | 745   | 777   | 809   | 843   | 877   | 912   | 947   | 984   | 1.022 | 1.062 | 1.103 | 1.145 | 1.190 |
| N# 250  | 581   | 610   | 639   | 669   | 700   | 731   | 762   | 794   | 828   | 862   | 896   | 932   | 969   | 1.006 | 1.046 | 1.086 | 1.128 | 1.172 |
| N# 300  | 571   | 599   | 629   | 659   | 689   | 720   | 751   | 784   | 817   | 850   | 885   | 920   | 957   | 995   | 1.034 | 1.074 | 1.116 | 1.160 |
| N# 400  | 556   | 585   | 614   | 644   | 674   | 705   | 736   | 768   | 801   | 835   | 869   | 904   | 941   | 978   | 1.017 | 1.057 | 1.099 | 1.143 |
| N# 500  | 547   | 576   | 605   | 634   | 664   | 695   | 726   | 758   | 791   | 824   | 859   | 894   | 930   | 967   | 1.006 | 1.046 | 1.088 | 1.131 |
| N# 600  | 540   | 568   | 597   | 627   | 657   | 688   | 719   | 751   | 783   | 817   | 851   | 886   | 922   | 959   | 998   | 1.038 | 1.079 | 1.122 |
| N# 700  | 534   | 563   | 592   | 621   | 651   | 682   | 713   | 745   | 777   | 811   | 845   | 880   | 916   | 953   | 992   | 1.031 | 1.073 | 1.116 |
| N# 800  | 530   | 558   | 588   | 617   | 647   | 677   | 709   | 740   | 773   | 806   | 840   | 875   | 911   | 948   | 986   | 1.026 | 1.068 | 1.111 |
| N# 900  | 526   | 555   | 584   | 613   | 643   | 674   | 705   | 736   | 769   | 802   | 836   | 871   | 907   | 944   | 982   | 1.022 | 1.063 | 1.106 |
| N# 1000 | 523   | 552   | 581   | 610   | 640   | 670   | 702   | 733   | 766   | 799   | 833   | 868   | 903   | 941   | 979   | 1.018 | 1.060 | 1.103 |
| N# 9999 | 485   | 513   | 542   | 571   | 601   | 631   | 661   | 693   | 725   | 757   | 791   | 825   | 861   | 897   | 935   | 974   | 1.015 | 1.057 |
| N#50000 | 475   | 504   | 532   | 561   | 591   | 621   | 651   | 683   | 714   | 747   | 781   | 815   | 850   | 887   | 924   | 963   | 1.003 | 1.046 |

B

TABLE II (Cont.)  
FACTORS OF ONE-SIDED TOLERANCE LIMITS FOR A NORMAL DISTRIBUTION

95% CONFIDENCE

Proportion of Population Covered →

|       | .86   | .87   | .88   | .89   | .90   | .91   | .92   | .93   | .94   | .95   | .96   | .97   | .98   | .99    | .995   | .999   |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|
| N= 3  | 5.348 | 5.531 | 5.723 | 5.932 | 6.155 | 6.397 | 6.660 | 6.952 | 7.280 | 7.656 | 8.100 | 8.650 | 9.385 | 10.553 | 11.628 | 13.857 |
| N= 4  | 3.633 | 3.753 | 3.879 | 4.016 | 4.162 | 4.320 | 4.492 | 4.683 | 4.898 | 5.144 | 5.435 | 5.795 | 6.277 | 7.041  | 7.748  | 9.214  |
| N= 5  | 2.977 | 3.075 | 3.177 | 3.288 | 3.407 | 3.535 | 3.675 | 3.829 | 4.003 | 4.203 | 4.438 | 4.730 | 5.121 | 5.741  | 6.313  | 7.502  |
| N= 6  | 2.627 | 2.713 | 2.804 | 2.902 | 3.006 | 3.119 | 3.242 | 3.379 | 3.532 | 3.708 | 3.915 | 4.172 | 4.516 | 5.062  | 5.565  | 6.612  |
| N= 7  | 2.407 | 2.485 | 2.569 | 2.659 | 2.755 | 2.859 | 2.972 | 3.098 | 3.238 | 3.399 | 3.590 | 3.826 | 4.141 | 4.642  | 5.103  | 6.063  |
| N= 8  | 2.254 | 2.329 | 2.407 | 2.492 | 2.582 | 2.679 | 2.786 | 2.904 | 3.036 | 3.187 | 3.366 | 3.588 | 3.884 | 4.354  | 4.787  | 5.687  |
| N= 9  | 2.141 | 2.212 | 2.287 | 2.368 | 2.454 | 2.544 | 2.648 | 2.761 | 2.887 | 3.031 | 3.202 | 3.413 | 3.695 | 4.143  | 4.556  | 5.413  |
| N= 10 | 2.053 | 2.122 | 2.193 | 2.272 | 2.355 | 2.444 | 2.542 | 2.650 | 2.772 | 2.911 | 3.075 | 3.278 | 3.550 | 3.981  | 4.378  | 5.203  |
| N= 11 | 1.982 | 2.049 | 2.118 | 2.194 | 2.275 | 2.362 | 2.457 | 2.562 | 2.679 | 2.814 | 2.974 | 3.170 | 3.434 | 3.851  | 4.236  | 5.035  |
| N= 12 | 1.924 | 1.989 | 2.057 | 2.131 | 2.209 | 2.294 | 2.387 | 2.489 | 2.604 | 2.735 | 2.891 | 3.083 | 3.339 | 3.746  | 4.121  | 4.899  |
| N= 13 | 1.875 | 1.939 | 2.005 | 2.078 | 2.155 | 2.238 | 2.329 | 2.429 | 2.541 | 2.670 | 2.822 | 3.009 | 3.260 | 3.658  | 4.025  | 4.785  |
| N= 14 | 1.833 | 1.896 | 1.961 | 2.033 | 2.108 | 2.190 | 2.279 | 2.377 | 2.487 | 2.614 | 2.763 | 2.947 | 3.193 | 3.584  | 3.943  | 4.689  |
| N= 15 | 1.797 | 1.859 | 1.923 | 1.994 | 2.068 | 2.148 | 2.236 | 2.333 | 2.441 | 2.566 | 2.712 | 2.893 | 3.135 | 3.520  | 3.873  | 4.607  |
| N= 16 | 1.764 | 1.827 | 1.890 | 1.959 | 2.033 | 2.112 | 2.198 | 2.294 | 2.401 | 2.523 | 2.668 | 2.847 | 3.085 | 3.464  | 3.812  | 4.535  |
| N= 17 | 1.733 | 1.798 | 1.861 | 1.929 | 2.002 | 2.080 | 2.165 | 2.260 | 2.365 | 2.486 | 2.629 | 2.805 | 3.041 | 3.414  | 3.758  | 4.471  |
| N= 18 | 1.713 | 1.772 | 1.834 | 1.902 | 1.974 | 2.051 | 2.135 | 2.229 | 2.333 | 2.453 | 2.594 | 2.768 | 3.001 | 3.370  | 3.710  | 4.414  |
| N= 19 | 1.690 | 1.749 | 1.811 | 1.877 | 1.948 | 2.025 | 2.109 | 2.201 | 2.304 | 2.423 | 2.562 | 2.735 | 2.965 | 3.330  | 3.667  | 4.364  |
| N= 20 | 1.670 | 1.728 | 1.789 | 1.855 | 1.926 | 2.002 | 2.084 | 2.176 | 2.278 | 2.396 | 2.534 | 2.705 | 2.933 | 3.295  | 3.628  | 4.318  |
| N= 21 | 1.651 | 1.709 | 1.769 | 1.835 | 1.905 | 1.980 | 2.062 | 2.153 | 2.255 | 2.371 | 2.508 | 2.678 | 2.904 | 3.262  | 3.592  | 4.278  |
| N= 22 | 1.634 | 1.691 | 1.752 | 1.817 | 1.886 | 1.961 | 2.042 | 2.132 | 2.233 | 2.349 | 2.485 | 2.653 | 2.877 | 3.233  | 3.560  | 4.238  |
| N= 23 | 1.618 | 1.675 | 1.735 | 1.800 | 1.869 | 1.943 | 2.024 | 2.113 | 2.213 | 2.328 | 2.463 | 2.630 | 2.853 | 3.206  | 3.530  | 4.203  |
| N= 24 | 1.604 | 1.660 | 1.720 | 1.784 | 1.853 | 1.926 | 2.007 | 2.096 | 2.195 | 2.309 | 2.443 | 2.609 | 2.830 | 3.181  | 3.503  | 4.171  |
| N= 25 | 1.590 | 1.647 | 1.706 | 1.770 | 1.838 | 1.911 | 1.991 | 2.079 | 2.178 | 2.291 | 2.425 | 2.589 | 2.809 | 3.157  | 3.478  | 4.142  |
| N= 26 | 1.578 | 1.634 | 1.693 | 1.756 | 1.824 | 1.897 | 1.976 | 2.064 | 2.162 | 2.275 | 2.408 | 2.571 | 2.790 | 3.136  | 3.454  | 4.114  |
| N= 27 | 1.566 | 1.622 | 1.680 | 1.742 | 1.811 | 1.884 | 1.963 | 2.051 | 2.148 | 2.260 | 2.392 | 2.554 | 2.772 | 3.116  | 3.433  | 4.089  |
| N= 28 | 1.555 | 1.611 | 1.669 | 1.732 | 1.799 | 1.871 | 1.950 | 2.037 | 2.134 | 2.245 | 2.377 | 2.539 | 2.755 | 3.097  | 3.412  | 4.065  |
| N= 29 | 1.545 | 1.600 | 1.658 | 1.721 | 1.788 | 1.860 | 1.938 | 2.024 | 2.121 | 2.232 | 2.363 | 2.524 | 2.739 | 3.080  | 3.393  | 4.043  |
| N= 30 | 1.535 | 1.591 | 1.648 | 1.711 | 1.777 | 1.849 | 1.927 | 2.013 | 2.109 | 2.220 | 2.350 | 2.510 | 2.724 | 3.064  | 3.376  | 4.022  |
| N= 31 | 1.526 | 1.581 | 1.639 | 1.701 | 1.767 | 1.838 | 1.916 | 2.002 | 2.098 | 2.208 | 2.337 | 2.497 | 2.710 | 3.048  | 3.359  | 4.002  |
| N= 32 | 1.518 | 1.572 | 1.630 | 1.692 | 1.758 | 1.829 | 1.906 | 1.992 | 2.087 | 2.197 | 2.326 | 2.485 | 2.697 | 3.034  | 3.343  | 3.984  |
| N= 33 | 1.510 | 1.564 | 1.621 | 1.683 | 1.749 | 1.820 | 1.897 | 1.982 | 2.077 | 2.186 | 2.315 | 2.473 | 2.685 | 3.020  | 3.328  | 3.966  |
| N= 34 | 1.502 | 1.556 | 1.613 | 1.675 | 1.740 | 1.811 | 1.888 | 1.972 | 2.067 | 2.176 | 2.304 | 2.462 | 2.673 | 3.007  | 3.314  | 3.949  |
| N= 35 | 1.495 | 1.549 | 1.605 | 1.667 | 1.732 | 1.803 | 1.879 | 1.964 | 2.058 | 2.167 | 2.294 | 2.452 | 2.662 | 2.994  | 3.300  | 3.934  |
| N= 36 | 1.488 | 1.542 | 1.598 | 1.659 | 1.724 | 1.795 | 1.871 | 1.955 | 2.050 | 2.158 | 2.285 | 2.442 | 2.651 | 2.983  | 3.287  | 3.919  |
| N= 37 | 1.481 | 1.535 | 1.591 | 1.652 | 1.717 | 1.787 | 1.863 | 1.947 | 2.041 | 2.149 | 2.276 | 2.432 | 2.641 | 2.972  | 3.275  | 3.904  |
| N= 38 | 1.475 | 1.528 | 1.585 | 1.646 | 1.710 | 1.780 | 1.856 | 1.940 | 2.033 | 2.141 | 2.267 | 2.423 | 2.631 | 2.961  | 3.264  | 3.891  |
| N= 39 | 1.469 | 1.522 | 1.578 | 1.639 | 1.703 | 1.773 | 1.849 | 1.932 | 2.026 | 2.133 | 2.259 | 2.415 | 2.622 | 2.951  | 3.253  | 3.879  |
| N= 40 | 1.463 | 1.516 | 1.572 | 1.633 | 1.697 | 1.766 | 1.842 | 1.925 | 2.019 | 2.125 | 2.251 | 2.406 | 2.613 | 2.941  | 3.242  | 3.865  |
| N= 41 | 1.457 | 1.510 | 1.566 | 1.627 | 1.691 | 1.760 | 1.836 | 1.919 | 2.012 | 2.118 | 2.244 | 2.398 | 2.605 | 2.931  | 3.232  | 3.853  |
| N= 42 | 1.452 | 1.505 | 1.561 | 1.621 | 1.685 | 1.754 | 1.829 | 1.912 | 2.005 | 2.111 | 2.236 | 2.391 | 2.597 | 2.923  | 3.222  | 3.842  |
| N= 43 | 1.447 | 1.500 | 1.555 | 1.616 | 1.679 | 1.748 | 1.823 | 1.906 | 1.999 | 2.105 | 2.230 | 2.383 | 2.589 | 2.914  | 3.213  | 3.831  |
| N= 44 | 1.442 | 1.495 | 1.550 | 1.610 | 1.674 | 1.743 | 1.818 | 1.900 | 1.993 | 2.098 | 2.223 | 2.376 | 2.581 | 2.906  | 3.204  | 3.821  |
| N= 45 | 1.437 | 1.490 | 1.545 | 1.605 | 1.669 | 1.737 | 1.812 | 1.894 | 1.987 | 2.092 | 2.216 | 2.370 | 2.574 | 2.898  | 3.195  | 3.810  |
| N= 46 | 1.432 | 1.485 | 1.540 | 1.600 | 1.664 | 1.732 | 1.807 | 1.889 | 1.981 | 2.086 | 2.210 | 2.363 | 2.567 | 2.890  | 3.187  | 3.801  |
| N= 47 | 1.428 | 1.481 | 1.536 | 1.596 | 1.659 | 1.727 | 1.802 | 1.884 | 1.976 | 2.081 | 2.204 | 2.357 | 2.561 | 2.883  | 3.179  | 3.791  |
| N= 48 | 1.424 | 1.476 | 1.531 | 1.591 | 1.654 | 1.723 | 1.797 | 1.879 | 1.970 | 2.075 | 2.199 | 2.351 | 2.554 | 2.876  | 3.171  | 3.782  |
| N= 49 | 1.420 | 1.472 | 1.527 | 1.587 | 1.650 | 1.718 | 1.792 | 1.874 | 1.965 | 2.070 | 2.193 | 2.345 | 2.548 | 2.869  | 3.164  | 3.774  |
| N= 50 | 1.416 | 1.468 | 1.523 | 1.582 | 1.645 | 1.713 | 1.787 | 1.869 | 1.960 | 2.065 | 2.188 | 2.340 | 2.542 | 2.862  | 3.156  | 3.765  |
| N= 55 | 1.398 | 1.450 | 1.504 | 1.563 | 1.626 | 1.693 | 1.767 | 1.848 | 1.938 | 2.042 | 2.164 | 2.316 | 2.517 | 2.832  | 3.124  | 3.727  |
| N= 60 | 1.382 | 1.434 | 1.488 | 1.547 | 1.609 | 1.676 | 1.749 | 1.829 | 1.919 | 2.022 | 2.143 | 2.293 | 2.492 | 2.807  | 3.096  | 3.695  |
| N= 65 | 1.369 | 1.420 | 1.474 | 1.532 | 1.594 | 1.661 | 1.733 | 1.813 | 1.903 | 2.005 | 2.125 | 2.274 | 2.472 | 2.785  | 3.072  | 3.667  |
| N= 70 | 1.357 | 1.408 | 1.462 | 1.520 | 1.581 | 1.647 | 1.720 | 1.799 | 1.888 | 1.990 | 2.109 | 2.257 | 2.454 | 2.765  | 3.051  | 3.642  |
| N= 75 | 1.346 | 1.397 | 1.451 | 1.508 | 1.568 | 1.636 | 1.707 | 1.787 | 1.875 | 1.976 | 2.096 | 2.242 | 2.438 | 2.748  | 3.032  | 3.620  |
| N= 80 | 1.337 | 1.388 | 1.441 | 1.498 | 1.559 | 1.625 | 1.696 | 1.775 | 1.863 | 1.964 | 2.083 | 2.229 | 2.424 | 2.732  | 3.015  | 3.601  |
| N= 85 | 1.328 | 1.379 | 1.432 | 1.489 | 1.550 | 1.615 | 1.687 | 1.765 | 1.853 | 1.953 | 2.072 | 2.217 | 2.412 | 2.719  | 3.000  | 3.583  |
| N= 90 | 1.321 | 1.371 | 1.424 | 1.481 | 1.542 | 1.607 | 1.678 | 1.755 | 1.843 | 1.943 | 2.062 | 2.207 | 2.402 | 2.709  | 3.000  | 3.583  |



|    |    |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|----|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| N= | 14 | 1.833 | 1.896 | 1.961 | 2.033 | 2.108 | 2.190 | 2.279 | 2.377 | 2.487 | 2.614 | 2.763 | 2.947 | 3.193 | 3.584 | 4.089 |
| N= | 15 | 1.797 | 1.859 | 1.923 | 1.994 | 2.068 | 2.148 | 2.236 | 2.333 | 2.441 | 2.566 | 2.712 | 2.893 | 3.135 | 3.520 | 4.077 |
| N= | 16 | 1.766 | 1.827 | 1.890 | 1.959 | 2.033 | 2.112 | 2.198 | 2.294 | 2.401 | 2.523 | 2.668 | 2.847 | 3.085 | 3.464 | 4.035 |
| N= | 17 | 1.738 | 1.798 | 1.861 | 1.929 | 2.002 | 2.080 | 2.165 | 2.260 | 2.365 | 2.486 | 2.629 | 2.805 | 3.041 | 3.414 | 4.071 |
| N= | 18 | 1.713 | 1.772 | 1.834 | 1.902 | 1.974 | 2.051 | 2.135 | 2.229 | 2.333 | 2.453 | 2.594 | 2.768 | 3.001 | 3.370 | 4.014 |
| N= | 19 | 1.690 | 1.749 | 1.811 | 1.877 | 1.948 | 2.025 | 2.109 | 2.201 | 2.304 | 2.423 | 2.562 | 2.735 | 2.965 | 3.330 | 4.064 |
| N= | 20 | 1.670 | 1.728 | 1.789 | 1.855 | 1.926 | 2.002 | 2.084 | 2.176 | 2.278 | 2.396 | 2.534 | 2.705 | 2.933 | 3.295 | 4.018 |
| N= | 21 | 1.651 | 1.709 | 1.769 | 1.835 | 1.905 | 1.980 | 2.062 | 2.153 | 2.255 | 2.371 | 2.508 | 2.678 | 2.904 | 3.262 | 4.076 |
| N= | 22 | 1.634 | 1.691 | 1.752 | 1.817 | 1.886 | 1.961 | 2.042 | 2.132 | 2.233 | 2.349 | 2.485 | 2.653 | 2.877 | 3.233 | 4.038 |
| N= | 23 | 1.618 | 1.675 | 1.735 | 1.800 | 1.869 | 1.943 | 2.024 | 2.113 | 2.213 | 2.328 | 2.463 | 2.630 | 2.853 | 3.206 | 4.023 |
| N= | 24 | 1.604 | 1.660 | 1.720 | 1.784 | 1.853 | 1.926 | 2.007 | 2.096 | 2.195 | 2.309 | 2.443 | 2.609 | 2.830 | 3.181 | 4.011 |
| N= | 25 | 1.590 | 1.647 | 1.706 | 1.770 | 1.838 | 1.911 | 1.991 | 2.079 | 2.178 | 2.291 | 2.425 | 2.589 | 2.809 | 3.157 | 4.042 |
| N= | 26 | 1.578 | 1.634 | 1.693 | 1.756 | 1.824 | 1.897 | 1.976 | 2.064 | 2.162 | 2.275 | 2.408 | 2.571 | 2.790 | 3.146 | 4.014 |
| N= | 27 | 1.566 | 1.622 | 1.680 | 1.744 | 1.811 | 1.884 | 1.963 | 2.050 | 2.148 | 2.260 | 2.392 | 2.554 | 2.772 | 3.116 | 4.089 |
| N= | 28 | 1.555 | 1.611 | 1.669 | 1.732 | 1.799 | 1.871 | 1.950 | 2.037 | 2.134 | 2.245 | 2.377 | 2.539 | 2.755 | 3.097 | 4.065 |
| N= | 29 | 1.545 | 1.600 | 1.658 | 1.721 | 1.788 | 1.860 | 1.938 | 2.024 | 2.121 | 2.232 | 2.363 | 2.524 | 2.739 | 3.080 | 4.043 |
| N= | 30 | 1.535 | 1.591 | 1.648 | 1.711 | 1.777 | 1.849 | 1.927 | 2.013 | 2.109 | 2.220 | 2.350 | 2.510 | 2.724 | 3.064 | 4.022 |
| N= | 31 | 1.526 | 1.581 | 1.639 | 1.701 | 1.767 | 1.838 | 1.916 | 2.002 | 2.098 | 2.208 | 2.337 | 2.497 | 2.710 | 3.048 | 4.002 |
| N= | 32 | 1.518 | 1.572 | 1.630 | 1.692 | 1.758 | 1.829 | 1.906 | 1.992 | 2.087 | 2.197 | 2.326 | 2.485 | 2.697 | 3.034 | 3.984 |
| N= | 33 | 1.510 | 1.564 | 1.621 | 1.683 | 1.749 | 1.820 | 1.897 | 1.982 | 2.077 | 2.186 | 2.315 | 2.473 | 2.685 | 3.020 | 3.966 |
| N= | 34 | 1.502 | 1.556 | 1.613 | 1.675 | 1.740 | 1.811 | 1.888 | 1.972 | 2.067 | 2.176 | 2.304 | 2.462 | 2.674 | 3.007 | 3.949 |
| N= | 35 | 1.495 | 1.549 | 1.605 | 1.667 | 1.732 | 1.803 | 1.879 | 1.964 | 2.058 | 2.167 | 2.294 | 2.452 | 2.662 | 2.994 | 3.934 |
| N= | 36 | 1.488 | 1.542 | 1.598 | 1.659 | 1.724 | 1.795 | 1.871 | 1.955 | 2.050 | 2.158 | 2.285 | 2.442 | 2.651 | 2.983 | 3.919 |
| N= | 37 | 1.481 | 1.535 | 1.591 | 1.652 | 1.717 | 1.787 | 1.863 | 1.947 | 2.041 | 2.149 | 2.276 | 2.432 | 2.641 | 2.972 | 3.904 |
| N= | 38 | 1.475 | 1.528 | 1.585 | 1.646 | 1.710 | 1.780 | 1.856 | 1.940 | 2.033 | 2.141 | 2.267 | 2.423 | 2.631 | 2.961 | 3.884 |
| N= | 39 | 1.469 | 1.522 | 1.578 | 1.639 | 1.703 | 1.773 | 1.849 | 1.932 | 2.025 | 2.133 | 2.259 | 2.415 | 2.622 | 2.951 | 3.878 |
| N= | 40 | 1.463 | 1.516 | 1.572 | 1.633 | 1.697 | 1.766 | 1.842 | 1.925 | 2.019 | 2.125 | 2.251 | 2.406 | 2.613 | 2.941 | 3.865 |
| N= | 41 | 1.457 | 1.510 | 1.566 | 1.627 | 1.691 | 1.760 | 1.836 | 1.919 | 2.012 | 2.118 | 2.244 | 2.398 | 2.605 | 2.931 | 3.853 |
| N= | 42 | 1.452 | 1.505 | 1.561 | 1.621 | 1.685 | 1.754 | 1.829 | 1.912 | 2.005 | 2.111 | 2.236 | 2.391 | 2.597 | 2.923 | 3.842 |
| N= | 43 | 1.447 | 1.500 | 1.555 | 1.616 | 1.679 | 1.748 | 1.823 | 1.906 | 1.999 | 2.105 | 2.230 | 2.383 | 2.589 | 2.914 | 3.831 |
| N= | 44 | 1.442 | 1.495 | 1.550 | 1.610 | 1.674 | 1.743 | 1.818 | 1.900 | 1.993 | 2.098 | 2.223 | 2.376 | 2.581 | 2.906 | 3.821 |
| N= | 45 | 1.437 | 1.490 | 1.545 | 1.605 | 1.669 | 1.737 | 1.812 | 1.894 | 1.987 | 2.092 | 2.216 | 2.370 | 2.574 | 2.898 | 3.810 |
| N= | 46 | 1.432 | 1.485 | 1.540 | 1.600 | 1.664 | 1.732 | 1.807 | 1.889 | 1.981 | 2.086 | 2.210 | 2.363 | 2.567 | 2.890 | 3.801 |
| N= | 47 | 1.428 | 1.481 | 1.536 | 1.596 | 1.659 | 1.727 | 1.802 | 1.884 | 1.976 | 2.081 | 2.204 | 2.357 | 2.561 | 2.883 | 3.791 |
| N= | 48 | 1.424 | 1.476 | 1.531 | 1.591 | 1.654 | 1.722 | 1.797 | 1.879 | 1.970 | 2.075 | 2.199 | 2.351 | 2.554 | 2.876 | 3.782 |
| N= | 49 | 1.420 | 1.472 | 1.527 | 1.587 | 1.650 | 1.718 | 1.792 | 1.874 | 1.965 | 2.070 | 2.193 | 2.345 | 2.548 | 2.869 | 3.774 |
| N= | 50 | 1.416 | 1.468 | 1.523 | 1.582 | 1.645 | 1.713 | 1.787 | 1.869 | 1.960 | 2.065 | 2.188 | 2.340 | 2.542 | 2.862 | 3.765 |
| N= | 51 | 1.412 | 1.464 | 1.519 | 1.578 | 1.641 | 1.709 | 1.782 | 1.864 | 1.955 | 2.060 | 2.182 | 2.334 | 2.536 | 2.856 | 3.756 |
| N= | 52 | 1.408 | 1.460 | 1.515 | 1.574 | 1.637 | 1.705 | 1.778 | 1.860 | 1.951 | 2.056 | 2.178 | 2.330 | 2.532 | 2.852 | 3.747 |
| N= | 53 | 1.404 | 1.456 | 1.511 | 1.570 | 1.633 | 1.701 | 1.774 | 1.856 | 1.947 | 2.052 | 2.174 | 2.326 | 2.528 | 2.848 | 3.738 |
| N= | 54 | 1.400 | 1.452 | 1.507 | 1.566 | 1.629 | 1.697 | 1.770 | 1.852 | 1.943 | 2.048 | 2.170 | 2.322 | 2.524 | 2.844 | 3.729 |
| N= | 55 | 1.396 | 1.448 | 1.503 | 1.562 | 1.625 | 1.693 | 1.766 | 1.848 | 1.939 | 2.044 | 2.166 | 2.318 | 2.520 | 2.840 | 3.720 |
| N= | 56 | 1.392 | 1.444 | 1.499 | 1.558 | 1.621 | 1.689 | 1.762 | 1.844 | 1.935 | 2.040 | 2.162 | 2.314 | 2.516 | 2.832 | 3.711 |
| N= | 57 | 1.388 | 1.440 | 1.495 | 1.554 | 1.617 | 1.685 | 1.758 | 1.840 | 1.931 | 2.036 | 2.158 | 2.310 | 2.512 | 2.832 | 3.702 |
| N= | 58 | 1.384 | 1.436 | 1.491 | 1.550 | 1.613 | 1.681 | 1.754 | 1.836 | 1.927 | 2.032 | 2.154 | 2.306 | 2.508 | 2.828 | 3.693 |
| N= | 59 | 1.380 | 1.432 | 1.487 | 1.546 | 1.609 | 1.677 | 1.750 | 1.832 | 1.923 | 2.028 | 2.150 | 2.302 | 2.504 | 2.824 | 3.684 |
| N= | 60 | 1.376 | 1.428 | 1.483 | 1.542 | 1.605 | 1.673 | 1.746 | 1.828 | 1.919 | 2.024 | 2.146 | 2.298 | 2.500 | 2.820 | 3.675 |
| N= | 61 | 1.372 | 1.424 | 1.479 | 1.538 | 1.601 | 1.669 | 1.742 | 1.824 | 1.915 | 2.020 | 2.142 | 2.294 | 2.496 | 2.816 | 3.666 |
| N= | 62 | 1.368 | 1.420 | 1.475 | 1.534 | 1.597 | 1.665 | 1.738 | 1.820 | 1.911 | 2.016 | 2.138 | 2.290 | 2.492 | 2.812 | 3.657 |
| N= | 63 | 1.364 | 1.416 | 1.471 | 1.530 | 1.593 | 1.661 | 1.734 | 1.816 | 1.907 | 2.012 | 2.134 | 2.286 | 2.488 | 2.808 | 3.648 |
| N= | 64 | 1.360 | 1.412 | 1.467 | 1.526 | 1.589 | 1.657 | 1.730 | 1.812 | 1.903 | 2.008 | 2.130 | 2.282 | 2.484 | 2.804 | 3.639 |
| N= | 65 | 1.356 | 1.408 | 1.463 | 1.522 | 1.585 | 1.653 | 1.726 | 1.808 | 1.899 | 2.004 | 2.126 | 2.278 | 2.480 | 2.800 | 3.630 |
| N= | 66 | 1.352 | 1.404 | 1.459 | 1.518 | 1.581 | 1.649 | 1.722 | 1.804 | 1.895 | 2.000 | 2.122 | 2.274 | 2.476 | 2.796 | 3.621 |
| N= | 67 | 1.348 | 1.400 | 1.455 | 1.514 | 1.577 | 1.645 | 1.718 | 1.800 | 1.891 | 2.000 | 2.122 | 2.274 | 2.476 | 2.792 | 3.612 |
| N= | 68 | 1.344 | 1.396 | 1.451 | 1.510 | 1.573 | 1.641 | 1.714 | 1.796 | 1.887 | 1.996 | 2.118 | 2.270 | 2.472 | 2.788 | 3.603 |
| N= | 69 | 1.340 | 1.392 | 1.447 | 1.506 | 1.569 | 1.637 | 1.710 | 1.792 | 1.883 | 1.992 | 2.114 | 2.266 | 2.468 | 2.784 | 3.594 |
| N= | 70 | 1.336 | 1.388 | 1.443 | 1.502 | 1.565 | 1.633 | 1.706 | 1.788 | 1.879 | 1.988 | 2.110 | 2.262 | 2.464 | 2.780 | 3.585 |
| N= | 71 | 1.332 | 1.384 | 1.439 | 1.498 | 1.561 | 1.629 | 1.702 | 1.784 | 1.875 | 1.984 | 2.106 | 2.258 | 2.460 | 2.776 | 3.576 |
| N= | 72 | 1.328 | 1.380 | 1.435 | 1.494 | 1.557 | 1.625 | 1.698 | 1.780 | 1.871 | 1.980 | 2.102 | 2.254 | 2.456 | 2.772 | 3.567 |
| N= | 73 | 1.324 | 1.376 | 1.431 | 1.490 | 1.553 | 1.621 | 1.694 | 1.776 | 1.867 | 1.976 | 2.098 | 2.250 | 2.452 | 2.768 | 3.558 |
| N= | 74 | 1.320 | 1.372 | 1.427 | 1.486 | 1.549 | 1.617 | 1.690 | 1.772 | 1.863 | 1.972 | 2.094 | 2.246 | 2.448 | 2.764 | 3.549 |
| N= | 75 | 1.316 | 1.368 | 1.423 | 1.482 | 1.545 | 1.613 | 1.686 | 1.768 | 1.859 | 1.968 | 2.090 | 2.242 | 2.444 | 2.760 | 3.540 |
| N= | 76 | 1.312 | 1.364 | 1.419 | 1.478 | 1.541 | 1.609 | 1.682 | 1.764 | 1.855 | 1.964 | 2.086 | 2.238 | 2.440 | 2.756 | 3.531 |
| N= | 77 | 1.308 | 1.360 | 1.415 | 1.474 | 1.537 | 1.605 | 1.678 | 1.760 | 1.851 | 1.960 | 2.082 | 2.234 | 2.436 | 2.752 | 3.522 |
| N= | 78 | 1.304 | 1.356 | 1.411 | 1.470 | 1.533 | 1.601 | 1.674 | 1.756 | 1.847 | 1.956 | 2.078 | 2.230 | 2.432 | 2.748 | 3.513 |
| N= | 79 | 1.300 | 1.352 | 1.407 | 1.466 | 1.529 | 1.597 | 1.670 | 1.752 | 1.843 | 1.952 | 2.074 | 2.226 | 2.428 | 2.744 | 3.504 |
| N= | 80 | 1.296 | 1.348 | 1.403 | 1.462 | 1.525 | 1.593 | 1.666 | 1.748 | 1.839 | 1.948 | 2.070 | 2.222 | 2.424 | 2.740 | 3.495 |
| N= | 81 | 1.292 | 1.344 | 1.399 | 1.458 | 1.521 | 1.589 | 1.662 | 1.744 | 1.835 | 1.944 | 2.066 | 2.218 | 2.420 | 2.736 | 3.486 |
| N= | 82 | 1.288 | 1.340 | 1.395 | 1.454 | 1.517 | 1.585 | 1.658 | 1.740 | 1.831 | 1.940 | 2.062 | 2.214 | 2.416 | 2.732 | 3.477 |
| N= | 83 | 1.284 | 1.336 | 1.391 | 1.450 | 1.513 | 1.581 | 1.654 | 1.736 | 1.827 | 1.936 | 2.058 | 2.210 | 2.412 | 2.728 | 3.468 |
| N= | 84 | 1.280 | 1.332 | 1.387 | 1.446 | 1.509 | 1.577 | 1.650 | 1.732 | 1.823 | 1.932 | 2.054 | 2.206 | 2.408 | 2.724 | 3.459 |
| N= | 85 | 1.276 | 1.328 | 1.383 | 1.442 | 1.505 | 1.573 | 1.646 | 1.728 | 1.819 | 1.928 | 2.050 | 2.202 | 2.404 | 2.720 | 3.450 |
| N= | 86 | 1.272 | 1.324 | 1.379 | 1.438 | 1.501 | 1.569 | 1.642 | 1.724 | 1.815 | 1.924 | 2.046 | 2.198 | 2.400 | 2.716 | 3.441 |
| N= | 87 | 1.268 | 1.320 | 1.375 | 1.434 | 1.497 | 1.565 | 1.638 |       |       |       |       |       |       |       |       |

TABLE III  
FACTORS OF ONE-SIDED TOLERANCE LIMITS FOR A NORMAL DISTRIBUTION  
99% CONFIDENCE

| N     | Proportion of Population Covered |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |
|-------|----------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|
|       | .50                              | .51   | .52   | .53   | .54   | .55   | .56   | .57   | .58   | .59   | .60   | .61   | .62   | .63   | .64   | .65   | .66   | .67   |  |
| N= 3  | 4.021                            | 4.165 | 4.311 | 4.460 | 4.612 | 4.768 | 4.926 | 5.088 | 5.253 | 5.421 | 5.593 | 5.769 | 5.949 | 6.133 | 6.320 | 6.513 | 6.710 | 6.911 |  |
| N= 4  | 2.270                            | 2.347 | 2.425 | 2.505 | 2.586 | 2.668 | 2.752 | 2.837 | 2.924 | 3.012 | 3.102 | 3.194 | 3.287 | 3.383 | 3.480 | 3.580 | 3.681 | 3.785 |  |
| N= 5  | 1.676                            | 1.733 | 1.791 | 1.849 | 1.909 | 1.969 | 2.031 | 2.093 | 2.157 | 2.221 | 2.287 | 2.354 | 2.422 | 2.492 | 2.562 | 2.635 | 2.708 | 2.783 |  |
| N= 6  | 1.374                            | 1.422 | 1.470 | 1.519 | 1.569 | 1.620 | 1.671 | 1.723 | 1.776 | 1.830 | 1.884 | 1.940 | 1.997 | 2.054 | 2.113 | 2.172 | 2.233 | 2.296 |  |
| N= 7  | 1.188                            | 1.231 | 1.274 | 1.318 | 1.362 | 1.407 | 1.453 | 1.499 | 1.546 | 1.593 | 1.642 | 1.691 | 1.741 | 1.792 | 1.843 | 1.896 | 1.950 | 2.005 |  |
| N= 8  | 1.060                            | 1.094 | 1.139 | 1.180 | 1.221 | 1.262 | 1.304 | 1.346 | 1.389 | 1.433 | 1.478 | 1.523 | 1.568 | 1.615 | 1.662 | 1.711 | 1.760 | 1.810 |  |
| N= 9  | 0.965                            | 1.003 | 1.040 | 1.078 | 1.117 | 1.156 | 1.195 | 1.235 | 1.275 | 1.316 | 1.358 | 1.400 | 1.443 | 1.487 | 1.531 | 1.576 | 1.622 | 1.669 |  |
| N= 10 | 0.892                            | 0.928 | 0.964 | 1.000 | 1.037 | 1.074 | 1.111 | 1.149 | 1.188 | 1.227 | 1.267 | 1.307 | 1.347 | 1.389 | 1.431 | 1.474 | 1.518 | 1.562 |  |
| N= 11 | 0.833                            | 0.867 | 0.901 | 0.936 | 0.972 | 1.007 | 1.043 | 1.080 | 1.117 | 1.154 | 1.192 | 1.231 | 1.270 | 1.310 | 1.350 | 1.391 | 1.433 | 1.476 |  |
| N= 12 | 0.784                            | 0.817 | 0.850 | 0.884 | 0.918 | 0.953 | 0.988 | 1.023 | 1.059 | 1.096 | 1.132 | 1.170 | 1.208 | 1.246 | 1.285 | 1.325 | 1.365 | 1.406 |  |
| N= 13 | 0.743                            | 0.775 | 0.808 | 0.841 | 0.874 | 0.908 | 0.942 | 0.976 | 1.011 | 1.047 | 1.083 | 1.119 | 1.156 | 1.193 | 1.231 | 1.270 | 1.309 | 1.349 |  |
| N= 14 | 0.708                            | 0.739 | 0.771 | 0.804 | 0.836 | 0.869 | 0.903 | 0.937 | 0.971 | 1.005 | 1.040 | 1.076 | 1.112 | 1.148 | 1.185 | 1.223 | 1.261 | 1.300 |  |
| N= 15 | 0.677                            | 0.708 | 0.740 | 0.772 | 0.804 | 0.836 | 0.869 | 0.902 | 0.936 | 0.969 | 1.004 | 1.039 | 1.074 | 1.110 | 1.146 | 1.183 | 1.220 | 1.259 |  |
| N= 16 | 0.650                            | 0.681 | 0.712 | 0.744 | 0.775 | 0.807 | 0.839 | 0.872 | 0.905 | 0.936 | 0.972 | 1.006 | 1.041 | 1.076 | 1.112 | 1.148 | 1.185 | 1.222 |  |
| N= 17 | 0.627                            | 0.657 | 0.688 | 0.719 | 0.750 | 0.781 | 0.813 | 0.845 | 0.878 | 0.910 | 0.944 | 0.977 | 1.012 | 1.046 | 1.081 | 1.117 | 1.154 | 1.190 |  |
| N= 18 | 0.605                            | 0.635 | 0.665 | 0.696 | 0.727 | 0.758 | 0.789 | 0.821 | 0.853 | 0.885 | 0.918 | 0.951 | 0.985 | 1.019 | 1.054 | 1.089 | 1.125 | 1.161 |  |
| N= 19 | 0.585                            | 0.615 | 0.645 | 0.675 | 0.706 | 0.737 | 0.768 | 0.799 | 0.831 | 0.863 | 0.895 | 0.928 | 0.961 | 0.995 | 1.029 | 1.064 | 1.099 | 1.135 |  |
| N= 20 | 0.568                            | 0.597 | 0.627 | 0.657 | 0.687 | 0.717 | 0.748 | 0.779 | 0.810 | 0.842 | 0.874 | 0.907 | 0.940 | 0.973 | 1.007 | 1.041 | 1.076 | 1.112 |  |
| N= 21 | 0.551                            | 0.581 | 0.610 | 0.640 | 0.670 | 0.700 | 0.730 | 0.761 | 0.792 | 0.823 | 0.855 | 0.887 | 0.920 | 0.953 | 0.987 | 1.021 | 1.055 | 1.090 |  |
| N= 22 | 0.537                            | 0.566 | 0.595 | 0.624 | 0.654 | 0.684 | 0.714 | 0.744 | 0.775 | 0.806 | 0.838 | 0.870 | 0.902 | 0.935 | 0.968 | 1.002 | 1.036 | 1.071 |  |
| N= 23 | 0.523                            | 0.552 | 0.581 | 0.610 | 0.639 | 0.669 | 0.699 | 0.729 | 0.760 | 0.791 | 0.822 | 0.854 | 0.886 | 0.918 | 0.951 | 0.984 | 1.018 | 1.053 |  |
| N= 24 | 0.510                            | 0.539 | 0.568 | 0.597 | 0.626 | 0.655 | 0.685 | 0.715 | 0.746 | 0.776 | 0.807 | 0.839 | 0.870 | 0.903 | 0.935 | 0.969 | 1.002 | 1.036 |  |
| N= 25 | 0.498                            | 0.527 | 0.555 | 0.584 | 0.613 | 0.643 | 0.672 | 0.702 | 0.732 | 0.763 | 0.794 | 0.825 | 0.856 | 0.888 | 0.921 | 0.954 | 0.987 | 1.021 |  |
| N= 26 | 0.487                            | 0.516 | 0.544 | 0.573 | 0.602 | 0.631 | 0.660 | 0.690 | 0.720 | 0.750 | 0.781 | 0.812 | 0.843 | 0.874 | 0.907 | 0.940 | 0.973 | 1.007 |  |
| N= 27 | 0.477                            | 0.505 | 0.533 | 0.562 | 0.591 | 0.620 | 0.649 | 0.679 | 0.708 | 0.739 | 0.769 | 0.800 | 0.831 | 0.863 | 0.895 | 0.927 | 0.960 | 0.994 |  |
| N= 28 | 0.467                            | 0.495 | 0.523 | 0.552 | 0.581 | 0.609 | 0.639 | 0.668 | 0.698 | 0.728 | 0.758 | 0.789 | 0.820 | 0.851 | 0.883 | 0.915 | 0.948 | 0.981 |  |
| N= 29 | 0.456                            | 0.484 | 0.512 | 0.541 | 0.570 | 0.600 | 0.629 | 0.658 | 0.688 | 0.717 | 0.748 | 0.778 | 0.809 | 0.840 | 0.872 | 0.904 | 0.937 | 0.970 |  |
| N= 30 | 0.449                            | 0.477 | 0.505 | 0.533 | 0.562 | 0.591 | 0.619 | 0.649 | 0.678 | 0.708 | 0.738 | 0.768 | 0.799 | 0.830 | 0.862 | 0.894 | 0.926 | 0.959 |  |
| N= 31 | 0.441                            | 0.469 | 0.497 | 0.525 | 0.553 | 0.582 | 0.611 | 0.640 | 0.669 | 0.699 | 0.728 | 0.759 | 0.789 | 0.820 | 0.852 | 0.884 | 0.916 | 0.949 |  |
| N= 32 | 0.434                            | 0.461 | 0.489 | 0.517 | 0.545 | 0.574 | 0.602 | 0.631 | 0.660 | 0.690 | 0.720 | 0.750 | 0.780 | 0.811 | 0.842 | 0.874 | 0.906 | 0.939 |  |
| N= 33 | 0.426                            | 0.454 | 0.482 | 0.509 | 0.538 | 0.566 | 0.594 | 0.623 | 0.652 | 0.682 | 0.711 | 0.741 | 0.772 | 0.803 | 0.834 | 0.865 | 0.897 | 0.930 |  |
| N= 34 | 0.419                            | 0.447 | 0.474 | 0.502 | 0.530 | 0.559 | 0.587 | 0.616 | 0.645 | 0.674 | 0.704 | 0.733 | 0.764 | 0.794 | 0.825 | 0.857 | 0.889 | 0.921 |  |
| N= 35 | 0.413                            | 0.440 | 0.468 | 0.495 | 0.523 | 0.551 | 0.580 | 0.608 | 0.637 | 0.667 | 0.696 | 0.726 | 0.756 | 0.787 | 0.817 | 0.849 | 0.881 | 0.913 |  |
| N= 36 | 0.406                            | 0.434 | 0.461 | 0.488 | 0.515 | 0.543 | 0.573 | 0.602 | 0.630 | 0.660 | 0.689 | 0.719 | 0.749 | 0.779 | 0.810 | 0.841 | 0.873 | 0.905 |  |
| N= 37 | 0.400                            | 0.427 | 0.455 | 0.483 | 0.510 | 0.538 | 0.567 | 0.595 | 0.624 | 0.653 | 0.682 | 0.712 | 0.742 | 0.772 | 0.803 | 0.834 | 0.866 | 0.898 |  |
| N= 38 | 0.394                            | 0.422 | 0.449 | 0.477 | 0.504 | 0.532 | 0.560 | 0.589 | 0.617 | 0.646 | 0.675 | 0.705 | 0.735 | 0.765 | 0.796 | 0.827 | 0.858 | 0.890 |  |
| N= 39 | 0.389                            | 0.416 | 0.443 | 0.471 | 0.499 | 0.526 | 0.554 | 0.583 | 0.611 | 0.640 | 0.669 | 0.699 | 0.729 | 0.759 | 0.789 | 0.820 | 0.852 | 0.884 |  |
| N= 40 | 0.384                            | 0.411 | 0.438 | 0.465 | 0.493 | 0.521 | 0.549 | 0.577 | 0.606 | 0.634 | 0.663 | 0.693 | 0.722 | 0.752 | 0.783 | 0.814 | 0.845 | 0.877 |  |
| N= 41 | 0.378                            | 0.405 | 0.433 | 0.460 | 0.488 | 0.515 | 0.543 | 0.571 | 0.600 | 0.629 | 0.658 | 0.687 | 0.717 | 0.747 | 0.777 | 0.808 | 0.839 | 0.871 |  |
| N= 42 | 0.374                            | 0.401 | 0.428 | 0.455 | 0.483 | 0.510 | 0.538 | 0.566 | 0.595 | 0.623 | 0.652 | 0.681 | 0.711 | 0.741 | 0.771 | 0.802 | 0.833 | 0.865 |  |
| N= 43 | 0.369                            | 0.396 | 0.423 | 0.450 | 0.478 | 0.505 | 0.533 | 0.561 | 0.589 | 0.618 | 0.647 | 0.676 | 0.705 | 0.735 | 0.765 | 0.796 | 0.827 | 0.859 |  |
| N= 44 | 0.364                            | 0.391 | 0.418 | 0.445 | 0.473 | 0.500 | 0.528 | 0.556 | 0.584 | 0.613 | 0.642 | 0.671 | 0.700 | 0.730 | 0.760 | 0.791 | 0.822 | 0.853 |  |
| N= 45 | 0.360                            | 0.387 | 0.414 | 0.441 | 0.468 | 0.495 | 0.522 | 0.550 | 0.578 | 0.606 | 0.634 | 0.662 | 0.691 | 0.720 | 0.750 | 0.781 | 0.812 | 0.843 |  |
| N= 46 | 0.356                            | 0.382 | 0.409 | 0.437 | 0.464 | 0.491 | 0.519 | 0.547 | 0.575 | 0.603 | 0.632 | 0.661 | 0.690 | 0.720 | 0.750 | 0.781 | 0.811 | 0.843 |  |
| N= 47 | 0.352                            | 0.378 | 0.405 | 0.432 | 0.459 | 0.487 | 0.515 | 0.543 | 0.571 | 0.599 | 0.628 | 0.656 | 0.686 | 0.715 | 0.745 | 0.776 | 0.806 | 0.838 |  |
| N= 48 | 0.348                            | 0.374 | 0.401 | 0.428 | 0.455 | 0.483 | 0.510 | 0.538 | 0.566 | 0.595 | 0.623 | 0.652 | 0.681 | 0.711 | 0.741 | 0.771 | 0.802 | 0.833 |  |
| N= 49 | 0.344                            | 0.371 | 0.397 | 0.424 | 0.452 | 0.479 | 0.506 | 0.534 | 0.562 | 0.590 | 0.619 | 0.648 | 0.677 | 0.706 | 0.736 | 0.766 | 0.797 | 0.828 |  |
| N= 50 | 0.340                            | 0.367 | 0.394 | 0.421 | 0.448 | 0.475 | 0.502 | 0.530 | 0.558 | 0.586 | 0.615 | 0.644 | 0.673 | 0.702 | 0.732 | 0.762 | 0.793 | 0.824 |  |
| N= 55 | 0.323                            | 0.350 | 0.376 | 0.403 | 0.430 | 0.457 | 0.485 | 0.512 | 0.540 | 0.568 | 0.596 | 0.625 | 0.654 | 0.683 | 0.712 | 0.742 | 0.773 | 0.803 |  |
| N= 60 | 0.309                            | 0.335 | 0.362 | 0.388 | 0.415 | 0.442 | 0.469 | 0.497 | 0.524 | 0.552 | 0.580 | 0.608 | 0.637 | 0.666 | 0.696 | 0.725 | 0.755 | 0.786 |  |
| N= 65 | 0.296                            | 0.322 | 0.349 | 0.375 | 0.402 | 0.429 | 0.456 | 0.483 | 0.510 | 0.538 | 0.566 | 0.594 | 0.623 | 0.652 | 0.681 | 0.710 | 0.740 | 0.771 |  |
| N= 70 | 0.285                            | 0.311 | 0.337 | 0.364 | 0.390 | 0.417 | 0.444 | 0.471 | 0.498 | 0.526 | 0.554 | 0.582 | 0.610 | 0.639 | 0.668 | 0.697 | 0.727 | 0.757 |  |
| N= 75 | 0.275                            | 0.301 | 0.327 | 0.353 | 0.380 | 0.406 | 0.433 | 0.460 | 0.488 | 0.515 | 0.543 | 0.571 | 0.599 | 0.627 | 0.656 | 0.685 | 0.715 | 0.745 |  |

|       |     |     |     |     |     |     |     |       |       |       |       |       |       |       |       |       |       |       |
|-------|-----|-----|-----|-----|-----|-----|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| N# 12 | 784 | 817 | 850 | 884 | 918 | 953 | 988 | 1,023 | 1,059 | 1,096 | 1,132 | 1,170 | 1,208 | 1,246 | 1,285 | 1,325 | 1,365 | 1,406 |
| N# 13 | 743 | 775 | 808 | 841 | 874 | 908 | 942 | 976   | 1,011 | 1,047 | 1,083 | 1,119 | 1,156 | 1,193 | 1,231 | 1,270 | 1,309 | 1,349 |
| N# 14 | 708 | 739 | 771 | 804 | 836 | 869 | 903 | 937   | 971   | 1,005 | 1,040 | 1,076 | 1,112 | 1,148 | 1,185 | 1,223 | 1,261 | 1,300 |
| N# 15 | 677 | 708 | 740 | 772 | 804 | 836 | 869 | 902   | 936   | 969   | 1,004 | 1,039 | 1,074 | 1,110 | 1,146 | 1,183 | 1,220 | 1,259 |
| N# 16 | 650 | 681 | 712 | 744 | 775 | 807 | 839 | 872   | 905   | 938   | 972   | 1,006 | 1,041 | 1,076 | 1,112 | 1,148 | 1,185 | 1,222 |
| N# 17 | 627 | 657 | 688 | 719 | 750 | 781 | 813 | 845   | 878   | 910   | 944   | 977   | 1,012 | 1,046 | 1,081 | 1,117 | 1,154 | 1,190 |
| N# 18 | 605 | 635 | 665 | 696 | 727 | 758 | 789 | 821   | 853   | 885   | 918   | 951   | 985   | 1,019 | 1,054 | 1,089 | 1,125 | 1,161 |
| N# 19 | 585 | 615 | 645 | 675 | 706 | 737 | 768 | 799   | 831   | 863   | 895   | 928   | 961   | 995   | 1,029 | 1,064 | 1,099 | 1,135 |
| N# 20 | 568 | 597 | 627 | 657 | 687 | 717 | 748 | 779   | 810   | 842   | 874   | 907   | 940   | 973   | 1,007 | 1,041 | 1,076 | 1,112 |
| N# 21 | 551 | 581 | 610 | 640 | 670 | 700 | 730 | 761   | 792   | 823   | 855   | 887   | 920   | 953   | 987   | 1,021 | 1,055 | 1,090 |
| N# 22 | 537 | 566 | 595 | 624 | 654 | 684 | 714 | 744   | 775   | 806   | 838   | 870   | 902   | 935   | 968   | 1,002 | 1,036 | 1,071 |
| N# 23 | 523 | 552 | 581 | 610 | 639 | 669 | 699 | 729   | 760   | 791   | 822   | 854   | 886   | 918   | 951   | 984   | 1,018 | 1,053 |
| N# 24 | 510 | 539 | 568 | 597 | 626 | 655 | 685 | 715   | 746   | 776   | 807   | 839   | 870   | 903   | 935   | 969   | 1,002 | 1,036 |
| N# 25 | 498 | 527 | 555 | 584 | 613 | 643 | 672 | 702   | 732   | 763   | 794   | 825   | 856   | 888   | 921   | 954   | 987   | 1,021 |
| N# 26 | 487 | 516 | 544 | 573 | 602 | 631 | 660 | 690   | 720   | 750   | 781   | 812   | 843   | 875   | 907   | 940   | 973   | 1,007 |
| N# 27 | 477 | 505 | 533 | 562 | 591 | 620 | 649 | 679   | 708   | 739   | 769   | 800   | 831   | 863   | 895   | 927   | 960   | 994   |
| N# 28 | 467 | 495 | 523 | 552 | 581 | 610 | 639 | 668   | 698   | 728   | 758   | 789   | 820   | 851   | 883   | 915   | 948   | 981   |
| N# 29 | 458 | 486 | 514 | 542 | 571 | 600 | 629 | 658   | 688   | 717   | 746   | 776   | 809   | 840   | 872   | 904   | 937   | 970   |
| N# 30 | 449 | 477 | 505 | 533 | 562 | 591 | 619 | 648   | 678   | 708   | 736   | 766   | 799   | 830   | 862   | 894   | 926   | 959   |
| N# 31 | 441 | 469 | 497 | 525 | 553 | 582 | 611 | 640   | 669   | 699   | 726   | 756   | 789   | 820   | 852   | 884   | 916   | 949   |
| N# 32 | 434 | 461 | 489 | 517 | 545 | 574 | 602 | 631   | 660   | 690   | 720   | 750   | 780   | 811   | 842   | 874   | 906   | 939   |
| N# 33 | 426 | 454 | 482 | 509 | 538 | 566 | 594 | 623   | 652   | 682   | 711   | 741   | 772   | 803   | 834   | 865   | 897   | 930   |
| N# 34 | 419 | 447 | 474 | 502 | 530 | 559 | 587 | 616   | 645   | 674   | 704   | 733   | 764   | 794   | 825   | 857   | 889   | 921   |
| N# 35 | 413 | 440 | 468 | 495 | 523 | 551 | 580 | 608   | 637   | 667   | 696   | 726   | 756   | 787   | 817   | 849   | 881   | 913   |
| N# 36 | 406 | 434 | 461 | 489 | 517 | 545 | 573 | 602   | 630   | 660   | 689   | 719   | 749   | 779   | 810   | 841   | 873   | 905   |
| N# 37 | 400 | 427 | 455 | 483 | 510 | 538 | 567 | 595   | 624   | 653   | 682   | 712   | 742   | 772   | 803   | 834   | 866   | 898   |
| N# 38 | 394 | 422 | 449 | 477 | 504 | 532 | 560 | 589   | 617   | 646   | 676   | 705   | 735   | 765   | 796   | 827   | 858   | 890   |
| N# 39 | 389 | 416 | 443 | 471 | 499 | 526 | 554 | 583   | 611   | 640   | 669   | 699   | 729   | 759   | 789   | 820   | 852   | 884   |
| N# 40 | 384 | 411 | 438 | 465 | 493 | 521 | 549 | 577   | 606   | 634   | 663   | 693   | 722   | 752   | 783   | 814   | 845   | 877   |
| N# 41 | 378 | 405 | 433 | 460 | 488 | 515 | 543 | 571   | 600   | 629   | 658   | 687   | 717   | 747   | 777   | 808   | 839   | 871   |
| N# 42 | 374 | 401 | 428 | 455 | 482 | 510 | 538 | 566   | 595   | 623   | 652   | 681   | 711   | 741   | 771   | 802   | 833   | 865   |
| N# 43 | 369 | 396 | 423 | 450 | 478 | 505 | 533 | 561   | 589   | 618   | 647   | 676   | 706   | 736   | 766   | 796   | 827   | 859   |
| N# 44 | 364 | 391 | 418 | 445 | 473 | 500 | 528 | 556   | 584   | 613   | 642   | 671   | 700   | 730   | 760   | 791   | 822   | 853   |
| N# 45 | 360 | 387 | 414 | 441 | 468 | 496 | 524 | 551   | 580   | 608   | 637   | 666   | 695   | 725   | 755   | 786   | 816   | 846   |
| N# 46 | 356 | 382 | 409 | 437 | 464 | 491 | 519 | 547   | 575   | 603   | 632   | 661   | 690   | 720   | 750   | 781   | 811   | 843   |
| N# 47 | 352 | 378 | 405 | 432 | 460 | 487 | 515 | 543   | 571   | 599   | 628   | 656   | 686   | 715   | 745   | 776   | 806   | 838   |
| N# 48 | 348 | 374 | 401 | 428 | 455 | 483 | 510 | 538   | 566   | 595   | 623   | 652   | 681   | 711   | 741   | 771   | 802   | 832   |
| N# 49 | 344 | 371 | 397 | 424 | 452 | 479 | 506 | 534   | 562   | 590   | 619   | 648   | 677   | 706   | 736   | 766   | 797   | 828   |
| N# 50 | 340 | 367 | 394 | 421 | 448 | 475 | 502 | 530   | 558   | 586   | 615   | 644   | 673   | 702   | 732   | 762   | 793   | 824   |
| N# 51 | 335 | 362 | 389 | 416 | 443 | 470 | 497 | 524   | 551   | 580   | 608   | 637   | 666   | 695   | 725   | 755   | 786   | 816   |
| N# 52 | 331 | 358 | 385 | 412 | 439 | 466 | 493 | 520   | 547   | 575   | 603   | 632   | 661   | 690   | 720   | 750   | 781   | 811   |
| N# 53 | 327 | 354 | 381 | 408 | 435 | 462 | 489 | 516   | 544   | 572   | 600   | 628   | 656   | 685   | 715   | 745   | 776   | 806   |
| N# 54 | 323 | 350 | 377 | 404 | 431 | 458 | 485 | 512   | 540   | 568   | 600   | 625   | 654   | 683   | 712   | 742   | 773   | 803   |
| N# 55 | 319 | 346 | 373 | 400 | 427 | 454 | 481 | 508   | 535   | 563   | 591   | 619   | 647   | 676   | 705   | 735   | 765   | 795   |
| N# 56 | 315 | 342 | 369 | 396 | 423 | 450 | 477 | 504   | 531   | 559   | 587   | 615   | 643   | 672   | 701   | 731   | 761   | 791   |
| N# 57 | 311 | 338 | 365 | 392 | 419 | 446 | 473 | 500   | 527   | 555   | 583   | 611   | 639   | 667   | 695   | 724   | 754   | 784   |
| N# 58 | 307 | 334 | 361 | 388 | 415 | 442 | 469 | 496   | 524   | 552   | 580   | 608   | 637   | 666   | 695   | 725   | 755   | 785   |
| N# 59 | 303 | 330 | 357 | 384 | 411 | 438 | 465 | 492   | 520   | 548   | 576   | 604   | 632   | 660   | 688   | 717   | 746   | 775   |
| N# 60 | 299 | 326 | 353 | 380 | 407 | 434 | 461 | 488   | 516   | 544   | 572   | 600   | 628   | 657   | 687   | 716   | 745   | 774   |
| N# 61 | 295 | 322 | 349 | 376 | 403 | 430 | 457 | 484   | 511   | 539   | 567   | 595   | 623   | 652   | 681   | 710   | 740   | 770   |
| N# 62 | 291 | 318 | 345 | 372 | 399 | 426 | 453 | 480   | 507   | 535   | 562   | 590   | 618   | 646   | 674   | 702   | 731   | 760   |
| N# 63 | 287 | 314 | 341 | 368 | 395 | 422 | 449 | 476   | 503   | 530   | 557   | 584   | 611   | 638   | 665   | 692   | 720   | 748   |
| N# 64 | 283 | 310 | 337 | 364 | 391 | 418 | 445 | 472   | 500   | 527   | 554   | 581   | 608   | 635   | 662   | 689   | 716   | 743   |
| N# 65 | 279 | 306 | 333 | 360 | 387 | 414 | 441 | 468   | 495   | 522   | 549   | 576   | 603   | 630   | 657   | 684   | 711   | 738   |
| N# 66 | 275 | 302 | 329 | 356 | 383 | 410 | 437 | 464   | 491   | 518   | 545   | 572   | 600   | 627   | 654   | 681   | 708   | 735   |
| N# 67 | 271 | 298 | 325 | 352 | 379 | 406 | 433 | 460   | 487   | 514   | 541   | 568   | 595   | 622   | 649   | 676   | 703   | 730   |
| N# 68 | 267 | 294 | 321 | 348 | 375 | 402 | 429 | 456   | 483   | 510   | 537   | 564   | 591   | 618   | 645   | 672   | 700   | 727   |
| N# 69 | 263 | 290 | 317 | 344 | 371 | 398 | 425 | 452   | 479   | 506   | 533   | 560   | 587   | 614   | 641   | 668   | 695   | 722   |
| N# 70 | 259 | 286 | 313 | 340 | 367 | 394 | 421 | 448   | 475   | 502   | 529   | 556   | 583   | 610   | 637   | 664   | 691   | 718   |
| N# 71 | 255 | 282 | 309 | 336 | 363 | 390 | 417 | 444   | 471   | 498   | 525   | 552   | 579   | 606   | 633   | 660   | 687   | 714   |
| N# 72 | 251 | 278 | 305 | 332 | 359 | 386 | 413 | 440   | 467   | 494   | 521   | 548   | 575   | 602   | 629   | 656   | 683   | 710   |
| N# 73 | 247 | 274 | 301 | 328 | 355 | 382 | 409 | 436   | 463   | 490   | 517   | 544   | 571   | 598   | 625   | 652   | 679   | 706   |
| N# 74 | 243 | 270 | 297 | 324 | 351 | 378 | 405 | 432   | 459   | 486   | 513   | 540   | 567   | 594   | 621   | 648   | 675   | 702   |
| N# 75 | 239 | 266 | 293 | 320 | 347 | 374 | 401 | 428   | 455   | 482   | 509   | 536   | 563   | 590   | 617   | 644   | 671   | 698   |
| N# 76 | 235 | 262 | 289 | 316 | 343 | 370 | 397 | 424   | 451   | 478   | 505   | 532   | 559   | 586   | 613   | 640   | 667   | 694   |
| N# 77 | 231 | 258 | 285 | 312 | 339 | 366 | 393 | 420   | 447   | 474   | 501   | 528   | 555   | 582   | 609   | 636   | 663   | 690   |
| N# 78 | 227 | 254 | 281 | 308 | 335 | 362 | 389 | 416   | 443   | 470   | 497   | 524   | 551   | 578   | 605   | 632   | 659   | 686   |
| N# 79 | 223 | 250 | 277 | 304 | 331 | 358 | 385 | 412   | 439   | 466   | 493   | 520   | 547   | 574   | 601   | 628   | 655   | 682   |
| N# 80 | 219 | 246 | 273 | 300 | 327 | 354 | 381 | 408   | 435   | 462   | 489   | 516   | 543   | 570   | 597   | 624   | 651   | 678   |
| N# 81 | 215 | 242 | 269 | 296 | 323 | 350 | 377 | 404   | 431   | 458   | 485   | 512   | 539   | 566   | 593   | 620   | 647   | 674   |
| N# 82 | 211 | 238 | 265 | 292 | 319 | 346 | 373 | 400   | 427   | 454   | 481   | 508   | 535   | 562   | 589   | 616   | 643   | 670   |
| N# 83 | 207 | 234 | 261 | 288 | 315 | 342 | 369 | 396   | 423   | 450   | 477   | 504   | 531   | 558   | 585   | 612   | 639   | 666   |
| N# 84 | 203 | 230 | 257 | 284 | 311 | 338 | 365 | 392   | 419   | 446   | 473   | 500   | 527   | 554   | 581   | 608   | 635   | 662   |
| N# 85 | 199 | 226 | 253 | 280 | 307 | 334 | 361 | 388   | 415   | 442   | 469   | 496   | 523   | 550   | 577   | 604   | 631   | 658   |
| N# 86 | 195 | 222 | 249 | 276 | 303 | 330 | 357 | 384   | 411   | 438   | 465   | 492   | 519   | 546   | 573   | 600   | 627   | 654   |
| N# 87 | 191 | 218 | 245 | 272 | 299 | 326 | 353 | 380   | 407   | 434   | 461   | 488   | 515   | 542   | 569   | 596   | 623   | 650   |
| N# 88 | 187 | 214 | 241 | 268 | 295 | 322 | 349 | 376   | 403   | 430   | 457   | 484   | 511   | 538   | 565   | 592   | 619   | 646   |
| N# 89 | 183 | 210 |     |     |     |     |     |       |       |       |       |       |       |       |       |       |       |       |

TABLE III (Contd.)  
FACTORS OF ONE-SIDE TOLERANCE LIMITS FOR A NORMAL DISTRIBUTION

99% CONFIDENCE

Proportion of Population Covered →

|      | .68   | .69   | .70   | .71   | .72   | .73   | .74   | .75   | .76   | .77   | .78   | .79   | .80    | .81    | .82    | .83    | .84    | .85    |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| N=1  | 7.118 | 7.329 | 7.547 | 7.770 | 7.999 | 8.235 | 8.478 | 8.728 | 8.986 | 9.253 | 9.529 | 9.815 | 10.111 | 10.419 | 10.740 | 11.075 | 11.426 | 11.795 |
| N=2  | 4.389 | 4.600 | 4.812 | 5.026 | 5.243 | 5.464 | 5.688 | 5.915 | 6.146 | 6.381 | 6.620 | 6.863 | 7.110  | 7.361  | 7.616  | 7.875  | 8.138  | 8.404  |
| N=3  | 3.430 | 3.639 | 3.847 | 4.056 | 4.266 | 4.477 | 4.688 | 4.900 | 5.113 | 5.327 | 5.542 | 5.758 | 5.975  | 6.193  | 6.412  | 6.632  | 6.853  | 7.075  |
| N=4  | 2.850 | 3.048 | 3.246 | 3.444 | 3.642 | 3.840 | 4.038 | 4.236 | 4.434 | 4.632 | 4.830 | 5.028 | 5.226  | 5.424  | 5.622  | 5.820  | 6.018  | 6.216  |
| N=5  | 2.500 | 2.687 | 2.874 | 3.061 | 3.248 | 3.435 | 3.622 | 3.809 | 3.996 | 4.183 | 4.370 | 4.557 | 4.744  | 4.931  | 5.118  | 5.305  | 5.492  | 5.679  |
| N=6  | 2.250 | 2.427 | 2.604 | 2.781 | 2.958 | 3.135 | 3.312 | 3.489 | 3.666 | 3.843 | 4.020 | 4.197 | 4.374  | 4.551  | 4.728  | 4.905  | 5.082  | 5.259  |
| N=7  | 2.075 | 2.242 | 2.409 | 2.576 | 2.743 | 2.910 | 3.077 | 3.244 | 3.411 | 3.578 | 3.745 | 3.912 | 4.079  | 4.246  | 4.413  | 4.580  | 4.747  | 4.914  |
| N=8  | 1.925 | 2.082 | 2.239 | 2.396 | 2.553 | 2.710 | 2.867 | 3.024 | 3.181 | 3.338 | 3.495 | 3.652 | 3.809  | 3.966  | 4.123  | 4.280  | 4.437  | 4.594  |
| N=9  | 1.795 | 1.942 | 2.089 | 2.236 | 2.383 | 2.530 | 2.677 | 2.824 | 2.971 | 3.118 | 3.265 | 3.412 | 3.559  | 3.706  | 3.853  | 3.999  | 4.146  | 4.293  |
| N=10 | 1.680 | 1.817 | 1.954 | 2.091 | 2.228 | 2.365 | 2.502 | 2.639 | 2.776 | 2.913 | 3.050 | 3.187 | 3.324  | 3.461  | 3.598  | 3.735  | 3.872  | 4.009  |
| N=11 | 1.580 | 1.707 | 1.834 | 1.961 | 2.088 | 2.215 | 2.342 | 2.469 | 2.596 | 2.723 | 2.850 | 2.977 | 3.104  | 3.231  | 3.358  | 3.485  | 3.612  | 3.739  |
| N=12 | 1.495 | 1.612 | 1.729 | 1.846 | 1.963 | 2.080 | 2.197 | 2.314 | 2.431 | 2.548 | 2.665 | 2.782 | 2.899  | 3.016  | 3.133  | 3.250  | 3.367  | 3.484  |
| N=13 | 1.425 | 1.532 | 1.639 | 1.746 | 1.853 | 1.960 | 2.067 | 2.174 | 2.281 | 2.388 | 2.495 | 2.602 | 2.709  | 2.816  | 2.923  | 3.030  | 3.137  | 3.244  |
| N=14 | 1.365 | 1.462 | 1.559 | 1.656 | 1.753 | 1.850 | 1.947 | 2.044 | 2.141 | 2.238 | 2.335 | 2.432 | 2.529  | 2.626  | 2.723  | 2.820  | 2.917  | 3.014  |
| N=15 | 1.310 | 1.407 | 1.504 | 1.601 | 1.698 | 1.795 | 1.892 | 1.989 | 2.086 | 2.183 | 2.280 | 2.377 | 2.474  | 2.571  | 2.668  | 2.765  | 2.862  | 2.959  |
| N=16 | 1.260 | 1.357 | 1.454 | 1.551 | 1.648 | 1.745 | 1.842 | 1.939 | 2.036 | 2.133 | 2.230 | 2.327 | 2.424  | 2.521  | 2.618  | 2.715  | 2.812  | 2.909  |
| N=17 | 1.215 | 1.312 | 1.409 | 1.506 | 1.603 | 1.700 | 1.797 | 1.894 | 1.991 | 2.088 | 2.185 | 2.282 | 2.379  | 2.476  | 2.573  | 2.670  | 2.767  | 2.864  |
| N=18 | 1.175 | 1.272 | 1.369 | 1.466 | 1.563 | 1.660 | 1.757 | 1.854 | 1.951 | 2.048 | 2.145 | 2.242 | 2.339  | 2.436  | 2.533  | 2.630  | 2.727  | 2.824  |
| N=19 | 1.140 | 1.237 | 1.334 | 1.431 | 1.528 | 1.625 | 1.722 | 1.819 | 1.916 | 2.013 | 2.110 | 2.207 | 2.304  | 2.401  | 2.498  | 2.595  | 2.692  | 2.789  |
| N=20 | 1.110 | 1.207 | 1.304 | 1.401 | 1.498 | 1.595 | 1.692 | 1.789 | 1.886 | 1.983 | 2.080 | 2.177 | 2.274  | 2.371  | 2.468  | 2.565  | 2.662  | 2.759  |
| N=21 | 1.085 | 1.182 | 1.279 | 1.376 | 1.473 | 1.570 | 1.667 | 1.764 | 1.861 | 1.958 | 2.055 | 2.152 | 2.249  | 2.346  | 2.443  | 2.540  | 2.637  | 2.734  |
| N=22 | 1.065 | 1.162 | 1.259 | 1.356 | 1.453 | 1.550 | 1.647 | 1.744 | 1.841 | 1.938 | 2.035 | 2.132 | 2.229  | 2.326  | 2.423  | 2.520  | 2.617  | 2.714  |
| N=23 | 1.045 | 1.142 | 1.239 | 1.336 | 1.433 | 1.530 | 1.627 | 1.724 | 1.821 | 1.918 | 2.015 | 2.112 | 2.209  | 2.306  | 2.403  | 2.500  | 2.597  | 2.694  |
| N=24 | 1.030 | 1.127 | 1.224 | 1.321 | 1.418 | 1.515 | 1.612 | 1.709 | 1.806 | 1.903 | 1.999 | 2.096 | 2.193  | 2.290  | 2.387  | 2.484  | 2.581  | 2.678  |
| N=25 | 1.015 | 1.112 | 1.209 | 1.306 | 1.403 | 1.500 | 1.597 | 1.694 | 1.791 | 1.888 | 1.985 | 2.082 | 2.179  | 2.276  | 2.373  | 2.470  | 2.567  | 2.664  |
| N=26 | 1.000 | 1.097 | 1.194 | 1.291 | 1.388 | 1.485 | 1.582 | 1.679 | 1.776 | 1.873 | 1.970 | 2.067 | 2.164  | 2.261  | 2.358  | 2.455  | 2.552  | 2.649  |
| N=27 | 0.985 | 1.082 | 1.179 | 1.276 | 1.373 | 1.470 | 1.567 | 1.664 | 1.761 | 1.858 | 1.955 | 2.052 | 2.149  | 2.246  | 2.343  | 2.440  | 2.537  | 2.634  |
| N=28 | 0.970 | 1.067 | 1.164 | 1.261 | 1.358 | 1.455 | 1.552 | 1.649 | 1.746 | 1.843 | 1.940 | 2.037 | 2.134  | 2.231  | 2.328  | 2.425  | 2.522  | 2.619  |
| N=29 | 0.955 | 1.052 | 1.149 | 1.246 | 1.343 | 1.440 | 1.537 | 1.634 | 1.731 | 1.828 | 1.925 | 2.022 | 2.119  | 2.216  | 2.313  | 2.410  | 2.507  | 2.604  |
| N=30 | 0.940 | 1.037 | 1.134 | 1.231 | 1.328 | 1.425 | 1.522 | 1.619 | 1.716 | 1.813 | 1.910 | 2.007 | 2.104  | 2.201  | 2.298  | 2.395  | 2.492  | 2.589  |
| N=31 | 0.925 | 1.022 | 1.119 | 1.216 | 1.313 | 1.410 | 1.507 | 1.604 | 1.701 | 1.798 | 1.895 | 1.992 | 2.089  | 2.186  | 2.283  | 2.380  | 2.477  | 2.574  |
| N=32 | 0.910 | 1.007 | 1.104 | 1.201 | 1.298 | 1.395 | 1.492 | 1.589 | 1.686 | 1.783 | 1.880 | 1.977 | 2.074  | 2.171  | 2.268  | 2.365  | 2.462  | 2.559  |
| N=33 | 0.895 | 0.992 | 1.089 | 1.186 | 1.283 | 1.380 | 1.477 | 1.574 | 1.671 | 1.768 | 1.865 | 1.962 | 2.059  | 2.156  | 2.253  | 2.350  | 2.447  | 2.544  |
| N=34 | 0.880 | 0.977 | 1.074 | 1.171 | 1.268 | 1.365 | 1.462 | 1.559 | 1.656 | 1.753 | 1.850 | 1.947 | 2.044  | 2.141  | 2.238  | 2.335  | 2.432  | 2.529  |
| N=35 | 0.865 | 0.962 | 1.059 | 1.156 | 1.253 | 1.350 | 1.447 | 1.544 | 1.641 | 1.738 | 1.835 | 1.932 | 2.029  | 2.126  | 2.223  | 2.320  | 2.417  | 2.514  |
| N=36 | 0.850 | 0.947 | 1.044 | 1.141 | 1.238 | 1.335 | 1.432 | 1.529 | 1.626 | 1.723 | 1.820 | 1.917 | 2.014  | 2.111  | 2.208  | 2.305  | 2.402  | 2.499  |
| N=37 | 0.835 | 0.932 | 1.029 | 1.126 | 1.223 | 1.320 | 1.417 | 1.514 | 1.611 | 1.708 | 1.805 | 1.902 | 1.999  | 2.096  | 2.193  | 2.290  | 2.387  | 2.484  |
| N=38 | 0.820 | 0.917 | 1.014 | 1.111 | 1.208 | 1.305 | 1.402 | 1.499 | 1.596 | 1.693 | 1.790 | 1.887 | 1.984  | 2.081  | 2.178  | 2.275  | 2.372  | 2.469  |
| N=39 | 0.805 | 0.902 | 0.999 | 1.096 | 1.193 | 1.290 | 1.387 | 1.484 | 1.581 | 1.678 | 1.775 | 1.872 | 1.969  | 2.066  | 2.163  | 2.260  | 2.357  | 2.454  |
| N=40 | 0.790 | 0.887 | 0.984 | 1.081 | 1.178 | 1.275 | 1.372 | 1.469 | 1.566 | 1.663 | 1.760 | 1.857 | 1.954  | 2.051  | 2.148  | 2.245  | 2.342  | 2.439  |
| N=41 | 0.775 | 0.872 | 0.969 | 1.066 | 1.163 | 1.260 | 1.357 | 1.454 | 1.551 | 1.648 | 1.745 | 1.842 | 1.939  | 2.036  | 2.133  | 2.230  | 2.327  | 2.424  |
| N=42 | 0.760 | 0.857 | 0.954 | 1.051 | 1.148 | 1.245 | 1.342 | 1.439 | 1.536 | 1.633 | 1.730 | 1.827 | 1.924  | 2.021  | 2.118  | 2.215  | 2.312  | 2.409  |
| N=43 | 0.745 | 0.842 | 0.939 | 1.036 | 1.133 | 1.230 | 1.327 | 1.424 | 1.521 | 1.618 | 1.715 | 1.812 | 1.909  | 2.006  | 2.103  | 2.200  | 2.297  | 2.394  |
| N=44 | 0.730 | 0.827 | 0.924 | 1.021 | 1.118 | 1.215 | 1.312 | 1.409 | 1.506 | 1.603 | 1.700 | 1.797 | 1.894  | 1.991  | 2.088  | 2.185  | 2.282  | 2.379  |
| N=45 | 0.715 | 0.812 | 0.909 | 1.006 | 1.103 | 1.200 | 1.297 | 1.394 | 1.491 | 1.588 | 1.685 | 1.782 | 1.879  | 1.976  | 2.073  | 2.170  | 2.267  | 2.364  |
| N=46 | 0.700 | 0.797 | 0.894 | 0.991 | 1.088 | 1.185 | 1.282 | 1.379 | 1.476 | 1.573 | 1.670 | 1.767 | 1.864  | 1.961  | 2.058  | 2.155  | 2.252  | 2.349  |
| N=47 | 0.685 | 0.782 | 0.879 | 0.976 | 1.073 | 1.170 | 1.267 | 1.364 | 1.461 | 1.558 | 1.655 | 1.752 | 1.849  | 1.946  | 2.043  | 2.140  | 2.237  | 2.334  |
| N=48 | 0.670 | 0.767 | 0.864 | 0.961 | 1.058 | 1.155 | 1.252 | 1.349 | 1.446 | 1.543 | 1.640 | 1.737 | 1.834  | 1.931  | 2.028  | 2.125  | 2.222  | 2.319  |
| N=49 | 0.655 | 0.752 | 0.849 | 0.946 | 1.043 | 1.140 | 1.237 | 1.334 | 1.431 | 1.528 | 1.625 | 1.722 | 1.819  | 1.916  | 2.013  | 2.110  | 2.207  | 2.304  |
| N=50 | 0.640 | 0.737 | 0.834 | 0.931 | 1.028 | 1.125 | 1.222 | 1.319 | 1.416 | 1.513 | 1.610 | 1.707 | 1.804  | 1.901  | 1.998  | 2.095  | 2.192  | 2.289  |
| N=51 | 0.625 | 0.722 | 0.819 | 0.916 | 1.013 | 1.110 | 1.207 | 1.304 | 1.401 | 1.498 | 1.595 | 1.692 | 1.789  | 1.886  | 1.983  | 2.080  | 2.177  | 2.274  |
| N=52 | 0.610 | 0.707 | 0.804 | 0.901 | 0.998 | 1.095 | 1.192 | 1.289 | 1.386 | 1.483 | 1.580 | 1.677 | 1.774  | 1.871  | 1.968  | 2.065  | 2.162  | 2.259  |
| N=53 | 0.595 | 0.692 | 0.789 | 0.886 | 0.983 | 1.080 | 1.177 | 1.274 | 1.371 | 1.468 | 1.565 | 1.662 | 1.759  | 1.856  | 1.953  | 2.050  | 2.147  | 2.244  |
| N=54 | 0.580 | 0.677 | 0.774 | 0.871 | 0.968 | 1.065 | 1.162 | 1.259 | 1.356 | 1.453 | 1.550 | 1.647 | 1.744  | 1.841  | 1.938  | 2.035  | 2.132  | 2.229  |
| N=55 | 0.565 | 0.662 | 0.759 | 0.856 | 0.953 | 1.050 | 1.147 | 1.244 | 1.341 | 1.438 | 1.535 | 1.632 | 1.729  | 1.826  | 1.923  | 2.020  | 2.117  | 2.214  |
| N=56 | 0.550 | 0.647 | 0.744 | 0.841 | 0.938 | 1.035 | 1.132 | 1.229 | 1.326 | 1.423 | 1.520 | 1.617 | 1.714  | 1.811  | 1.908  | 2.005  | 2.102  | 2.199  |
| N=57 | 0.535 | 0.632 | 0.729 | 0.826 | 0.923 | 1.020 | 1.117 | 1.214 | 1.311 | 1.408 | 1.505 | 1.602 | 1.699  | 1.796  | 1.893  | 1.990  | 2.087  | 2.184  |
| N=58 | 0.520 | 0.617 | 0.714 | 0.811 | 0.908 | 1.005 | 1.102 | 1.199 | 1.296 | 1.393 | 1.490 | 1.587 | 1.684  | 1.781  | 1.878  | 1.975  | 2.072  | 2.169  |
| N=59 | 0.505 | 0.602 | 0.699 | 0.796 | 0.893 | 0.990 | 1.087 | 1.184 | 1.281 | 1.378 | 1.475 | 1.572 | 1.669  | 1.766  | 1.863  | 1.960  | 2.057  | 2.154  |
| N=60 | 0.490 | 0.587 | 0.684 | 0.781 | 0.878 | 0.975 | 1.072 | 1.169 | 1.266 | 1.363 | 1.460 | 1.557 | 1.654  | 1.751  | 1.848  | 1.945  | 2.042  | 2.139  |
| N=61 | 0.475 | 0.572 | 0.669 | 0.766 | 0.863 | 0.960 | 1.057 | 1.154 | 1.251 | 1.348 | 1.445 | 1.542 | 1.639  | 1.736  | 1.833  | 1.930  | 2.027  | 2.124  |
| N=62 | 0.460 | 0.557 | 0.654 | 0.751 | 0.848 | 0.945 | 1.042 | 1.139 | 1.236 | 1.333 | 1.430 | 1.527 | 1.624  | 1.721  | 1.818  | 1.915  | 2.012  | 2.109  |
| N=63 | 0.445 | 0.542 | 0.639 | 0.736 | 0.833 | 0.930 |       |       |       |       |       |       |        |        |        |        |        |        |





TABLE III (Cont.)  
FACTORS OF ONE-SIDED TOLERANCE LIMITS FOR A NORMAL DISTRIBUTION

99% CONFIDENCE

Proportion of Population Covered →

|        | .86    | .87    | .88    | .89    | .90    | .91    | .92    | .93    | .94    | .95    | .96    | .97    | .98    | .99    | .999   |        |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| N= 3   | 12.183 | 12.593 | 13.025 | 13.495 | 13.995 | 14.536 | 15.131 | 15.786 | 16.524 | 17.370 | 18.371 | 19.609 | 21.265 | 23.696 | 26.319 | 31.348 |
| N= 4   | 6.465  | 6.672  | 6.890  | 7.127  | 7.380  | 7.653  | 7.953  | 8.284  | 8.656  | 9.083  | 9.589  | 10.215 | 11.054 | 12.367 | 13.618 | 16.176 |
| N= 5   | 4.708  | 4.856  | 5.012  | 5.181  | 5.362  | 5.557  | 5.771  | 6.007  | 6.273  | 6.578  | 6.939  | 7.387  | 7.950  | 8.739  | 9.619  | 11.649 |
| N= 6   | 3.876  | 3.997  | 4.125  | 4.263  | 4.411  | 4.571  | 4.745  | 4.939  | 5.156  | 5.405  | 5.701  | 6.066  | 6.556  | 7.335  | 8.054  | 9.550  |
| N= 7   | 3.391  | 3.497  | 3.609  | 3.730  | 3.859  | 3.999  | 4.151  | 4.320  | 4.510  | 4.728  | 4.985  | 5.304  | 5.732  | 6.412  | 7.040  | 8.346  |
| N= 8   | 3.073  | 3.169  | 3.270  | 3.380  | 3.497  | 3.624  | 3.762  | 3.916  | 4.088  | 4.285  | 4.519  | 4.808  | 5.195  | 5.812  | 6.381  | 7.564  |
| N= 9   | 2.846  | 2.935  | 3.029  | 3.132  | 3.240  | 3.358  | 3.487  | 3.629  | 3.792  | 3.972  | 4.169  | 4.457  | 4.813  | 5.369  | 5.917  | 7.014  |
| N= 10  | 2.675  | 2.760  | 2.849  | 2.945  | 3.048  | 3.159  | 3.280  | 3.415  | 3.565  | 3.738  | 3.943  | 4.196  | 4.535  | 5.074  | 5.571  | 6.605  |
| N= 11  | 2.540  | 2.621  | 2.705  | 2.797  | 2.895  | 3.001  | 3.117  | 3.245  | 3.389  | 3.554  | 3.749  | 3.990  | 4.313  | 4.826  | 5.300  | 6.285  |
| N= 12  | 2.432  | 2.509  | 2.591  | 2.680  | 2.774  | 2.876  | 3.000  | 3.133  | 3.287  | 3.468  | 3.682  | 3.952  | 4.268  | 4.768  | 5.229  | 6.030  |
| N= 13  | 2.343  | 2.418  | 2.497  | 2.583  | 2.674  | 2.773  | 2.881  | 3.000  | 3.133  | 3.287  | 3.468  | 3.682  | 3.952  | 4.268  | 4.768  | 5.229  |
| N= 14  | 2.269  | 2.342  | 2.419  | 2.502  | 2.587  | 2.682  | 2.791  | 2.907  | 3.037  | 3.186  | 3.362  | 3.580  | 3.871  | 4.234  | 4.761  | 5.649  |
| N= 15  | 2.206  | 2.277  | 2.352  | 2.433  | 2.520  | 2.614  | 2.716  | 2.829  | 2.955  | 3.101  | 3.272  | 3.485  | 3.769  | 4.220  | 4.637  | 5.502  |
| N= 16  | 2.151  | 2.221  | 2.294  | 2.374  | 2.459  | 2.550  | 2.650  | 2.761  | 2.885  | 3.027  | 3.195  | 3.403  | 3.681  | 4.122  | 4.529  | 5.375  |
| N= 17  | 2.103  | 2.172  | 2.244  | 2.322  | 2.405  | 2.495  | 2.593  | 2.701  | 2.823  | 2.963  | 3.127  | 3.331  | 3.604  | 4.037  | 4.436  | 5.265  |
| N= 18  | 2.059  | 2.127  | 2.198  | 2.275  | 2.356  | 2.445  | 2.541  | 2.648  | 2.767  | 2.905  | 3.066  | 3.267  | 3.534  | 3.960  | 4.352  | 5.166  |
| N= 19  | 2.021  | 2.087  | 2.157  | 2.233  | 2.313  | 2.400  | 2.495  | 2.600  | 2.718  | 2.853  | 3.012  | 3.209  | 3.473  | 3.891  | 4.277  | 5.078  |
| N= 20  | 1.986  | 2.052  | 2.120  | 2.195  | 2.275  | 2.360  | 2.454  | 2.557  | 2.674  | 2.807  | 2.964  | 3.158  | 3.418  | 3.830  | 4.210  | 5.000  |
| N= 21  | 1.955  | 2.019  | 2.087  | 2.161  | 2.240  | 2.324  | 2.417  | 2.519  | 2.634  | 2.765  | 2.920  | 3.112  | 3.368  | 3.775  | 4.150  | 4.929  |
| N= 22  | 1.926  | 1.990  | 2.057  | 2.130  | 2.208  | 2.292  | 2.383  | 2.484  | 2.597  | 2.727  | 2.880  | 3.070  | 3.323  | 3.725  | 4.096  | 4.865  |
| N= 23  | 1.900  | 1.963  | 2.030  | 2.102  | 2.179  | 2.262  | 2.352  | 2.452  | 2.564  | 2.693  | 2.844  | 3.032  | 3.282  | 3.680  | 4.046  | 4.806  |
| N= 24  | 1.876  | 1.939  | 2.005  | 2.076  | 2.152  | 2.234  | 2.324  | 2.423  | 2.534  | 2.661  | 2.811  | 2.997  | 3.244  | 3.638  | 4.000  | 4.753  |
| N= 25  | 1.854  | 1.916  | 1.982  | 2.053  | 2.128  | 2.209  | 2.298  | 2.396  | 2.506  | 2.632  | 2.781  | 2.964  | 3.210  | 3.600  | 3.959  | 4.704  |
| N= 26  | 1.834  | 1.895  | 1.960  | 2.031  | 2.105  | 2.186  | 2.274  | 2.371  | 2.480  | 2.605  | 2.752  | 2.934  | 3.178  | 3.564  | 3.920  | 4.658  |
| N= 27  | 1.815  | 1.876  | 1.940  | 2.010  | 2.084  | 2.164  | 2.252  | 2.348  | 2.456  | 2.580  | 2.726  | 2.907  | 3.148  | 3.531  | 3.884  | 4.616  |
| N= 28  | 1.797  | 1.858  | 1.922  | 1.991  | 2.065  | 2.144  | 2.231  | 2.326  | 2.434  | 2.557  | 2.702  | 2.881  | 3.121  | 3.501  | 3.851  | 4.577  |
| N= 29  | 1.780  | 1.841  | 1.904  | 1.973  | 2.046  | 2.125  | 2.211  | 2.306  | 2.413  | 2.535  | 2.679  | 2.857  | 3.095  | 3.472  | 3.820  | 4.541  |
| N= 30  | 1.765  | 1.825  | 1.888  | 1.957  | 2.029  | 2.108  | 2.193  | 2.288  | 2.393  | 2.515  | 2.658  | 2.835  | 3.071  | 3.446  | 3.791  | 4.507  |
| N= 31  | 1.750  | 1.810  | 1.873  | 1.941  | 2.013  | 2.091  | 2.176  | 2.270  | 2.375  | 2.496  | 2.638  | 2.813  | 3.048  | 3.421  | 3.763  | 4.475  |
| N= 32  | 1.737  | 1.796  | 1.858  | 1.926  | 2.007  | 2.075  | 2.160  | 2.253  | 2.358  | 2.478  | 2.619  | 2.794  | 3.027  | 3.397  | 3.738  | 4.442  |
| N= 33  | 1.724  | 1.783  | 1.845  | 1.912  | 1.984  | 2.061  | 2.145  | 2.238  | 2.342  | 2.461  | 2.601  | 2.775  | 3.007  | 3.377  | 3.714  | 4.410  |
| N= 34  | 1.712  | 1.770  | 1.832  | 1.899  | 1.970  | 2.047  | 2.130  | 2.223  | 2.326  | 2.445  | 2.585  | 2.757  | 2.988  | 3.354  | 3.691  | 4.389  |
| N= 35  | 1.700  | 1.759  | 1.820  | 1.886  | 1.957  | 2.024  | 2.117  | 2.209  | 2.312  | 2.430  | 2.569  | 2.741  | 2.970  | 3.334  | 3.669  | 4.354  |
| N= 36  | 1.689  | 1.747  | 1.808  | 1.875  | 1.945  | 2.021  | 2.104  | 2.195  | 2.298  | 2.415  | 2.554  | 2.725  | 2.953  | 3.315  | 3.649  | 4.340  |
| N= 37  | 1.678  | 1.737  | 1.797  | 1.863  | 1.933  | 2.009  | 2.092  | 2.183  | 2.285  | 2.402  | 2.539  | 2.710  | 2.937  | 3.297  | 3.629  | 4.317  |
| N= 38  | 1.668  | 1.726  | 1.787  | 1.853  | 1.922  | 1.998  | 2.080  | 2.170  | 2.272  | 2.388  | 2.526  | 2.695  | 2.921  | 3.280  | 3.610  | 4.295  |
| N= 39  | 1.659  | 1.716  | 1.777  | 1.842  | 1.912  | 1.987  | 2.069  | 2.159  | 2.260  | 2.376  | 2.512  | 2.681  | 2.907  | 3.264  | 3.593  | 4.275  |
| N= 40  | 1.650  | 1.707  | 1.767  | 1.832  | 1.902  | 1.976  | 2.058  | 2.148  | 2.248  | 2.364  | 2.500  | 2.668  | 2.892  | 3.248  | 3.576  | 4.255  |
| N= 41  | 1.641  | 1.698  | 1.758  | 1.823  | 1.892  | 1.966  | 2.047  | 2.137  | 2.237  | 2.352  | 2.488  | 2.655  | 2.879  | 3.233  | 3.559  | 4.236  |
| N= 42  | 1.632  | 1.689  | 1.749  | 1.814  | 1.883  | 1.957  | 2.038  | 2.127  | 2.227  | 2.341  | 2.477  | 2.643  | 2.866  | 3.219  | 3.544  | 4.217  |
| N= 43  | 1.624  | 1.681  | 1.741  | 1.805  | 1.874  | 1.948  | 2.028  | 2.117  | 2.217  | 2.331  | 2.466  | 2.632  | 2.854  | 3.205  | 3.529  | 4.200  |
| N= 44  | 1.616  | 1.673  | 1.732  | 1.797  | 1.865  | 1.939  | 2.019  | 2.108  | 2.207  | 2.321  | 2.455  | 2.621  | 2.842  | 3.192  | 3.515  | 4.183  |
| N= 45  | 1.609  | 1.666  | 1.725  | 1.789  | 1.857  | 1.930  | 2.011  | 2.099  | 2.198  | 2.311  | 2.445  | 2.610  | 2.831  | 3.180  | 3.501  | 4.167  |
| N= 46  | 1.602  | 1.658  | 1.717  | 1.781  | 1.849  | 1.922  | 2.002  | 2.090  | 2.189  | 2.302  | 2.436  | 2.600  | 2.820  | 3.168  | 3.488  | 4.152  |
| N= 47  | 1.595  | 1.651  | 1.710  | 1.774  | 1.841  | 1.915  | 1.994  | 2.082  | 2.180  | 2.293  | 2.426  | 2.590  | 2.809  | 3.156  | 3.474  | 4.137  |
| N= 48  | 1.588  | 1.644  | 1.703  | 1.767  | 1.834  | 1.907  | 1.986  | 2.074  | 2.172  | 2.285  | 2.417  | 2.581  | 2.799  | 3.145  | 3.463  | 4.123  |
| N= 49  | 1.582  | 1.638  | 1.696  | 1.760  | 1.827  | 1.900  | 1.979  | 2.066  | 2.164  | 2.276  | 2.408  | 2.572  | 2.789  | 3.134  | 3.452  | 4.110  |
| N= 50  | 1.576  | 1.632  | 1.690  | 1.753  | 1.820  | 1.893  | 1.972  | 2.059  | 2.157  | 2.268  | 2.400  | 2.563  | 2.780  | 3.124  | 3.440  | 4.096  |
| N= 55  | 1.548  | 1.603  | 1.661  | 1.723  | 1.790  | 1.861  | 1.939  | 2.026  | 2.122  | 2.232  | 2.363  | 2.525  | 2.738  | 3.077  | 3.390  | 4.037  |
| N= 60  | 1.524  | 1.579  | 1.636  | 1.698  | 1.764  | 1.835  | 1.912  | 1.997  | 2.093  | 2.202  | 2.331  | 2.490  | 2.702  | 3.038  | 3.347  | 3.987  |
| N= 65  | 1.504  | 1.558  | 1.614  | 1.676  | 1.741  | 1.811  | 1.888  | 1.972  | 2.067  | 2.175  | 2.303  | 2.460  | 2.671  | 3.003  | 3.309  | 3.943  |
| N= 70  | 1.485  | 1.539  | 1.595  | 1.656  | 1.721  | 1.791  | 1.867  | 1.951  | 2.045  | 2.152  | 2.279  | 2.435  | 2.643  | 2.973  | 3.277  | 3.905  |
| N= 75  | 1.469  | 1.523  | 1.579  | 1.639  | 1.704  | 1.773  | 1.848  | 1.932  | 2.025  | 2.132  | 2.257  | 2.412  | 2.619  | 2.947  | 3.248  | 3.871  |
| N= 80  | 1.455  | 1.508  | 1.564  | 1.624  | 1.688  | 1.757  | 1.832  | 1.915  | 2.007  | 2.113  | 2.238  | 2.392  | 2.598  | 2.923  | 3.222  | 3.841  |
| N= 85  | 1.442  | 1.495  | 1.550  | 1.610  | 1.674  | 1.742  | 1.817  | 1.899  | 1.991  | 2.097  | 2.221  | 2.374  | 2.579  | 2.902  | 3.199  | 3.815  |
| N= 90  | 1.431  | 1.483  | 1.538  | 1.598  | 1.661  | 1.729  | 1.804  | 1.885  | 1.977  | 2.082  | 2.206  | 2.358  | 2.561  | 2.883  | 3.178  | 3.790  |
| N= 95  | 1.420  | 1.472  | 1.527  | 1.586  | 1.649  | 1.717  | 1.791  | 1.873  | 1.964  | 2.068  | 2.191  | 2.343  | 2.545  | 2.865  | 3.159  | 3.768  |
| N= 100 | 1.410  | 1.462  | 1.517  | 1.576  | 1.639  | 1.706  | 1.780  | 1.861  | 1.952  | 2.056  | 2.178  | 2.329  | 2.531  | 2.840  | 3.129  | 3.748  |

|       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| N= 18 | 2,059 | 2,127 | 2,198 | 2,275 | 2,356 | 2,445 | 2,541 | 2,648 | 2,767 | 2,905 | 3,066 | 3,267 | 3,534 | 3,960 | 4,566 |
| N= 19 | 2,021 | 2,087 | 2,157 | 2,233 | 2,313 | 2,400 | 2,495 | 2,600 | 2,718 | 2,853 | 3,012 | 3,209 | 3,473 | 3,891 | 4,277 |
| N= 20 | 1,986 | 2,052 | 2,120 | 2,195 | 2,275 | 2,360 | 2,454 | 2,557 | 2,674 | 2,807 | 2,964 | 3,158 | 3,418 | 3,830 | 4,210 |
| N= 21 | 1,955 | 2,019 | 2,087 | 2,161 | 2,240 | 2,324 | 2,417 | 2,519 | 2,634 | 2,765 | 2,920 | 3,112 | 3,368 | 3,775 | 4,150 |
| N= 22 | 1,926 | 1,990 | 2,057 | 2,130 | 2,208 | 2,292 | 2,383 | 2,484 | 2,597 | 2,727 | 2,880 | 3,070 | 3,323 | 3,725 | 4,096 |
| N= 23 | 1,900 | 1,963 | 2,030 | 2,102 | 2,179 | 2,262 | 2,352 | 2,452 | 2,564 | 2,693 | 2,844 | 3,032 | 3,282 | 3,680 | 4,056 |
| N= 24 | 1,876 | 1,939 | 2,005 | 2,076 | 2,152 | 2,234 | 2,324 | 2,423 | 2,534 | 2,661 | 2,811 | 2,997 | 3,244 | 3,638 | 4,000 |
| N= 25 | 1,854 | 1,916 | 1,982 | 2,053 | 2,128 | 2,209 | 2,298 | 2,396 | 2,506 | 2,632 | 2,781 | 2,964 | 3,210 | 3,600 | 3,959 |
| N= 26 | 1,834 | 1,895 | 1,960 | 2,031 | 2,105 | 2,186 | 2,274 | 2,371 | 2,480 | 2,605 | 2,752 | 2,934 | 3,178 | 3,564 | 3,920 |
| N= 27 | 1,815 | 1,875 | 1,940 | 2,010 | 2,084 | 2,164 | 2,252 | 2,348 | 2,456 | 2,580 | 2,726 | 2,907 | 3,148 | 3,531 | 3,884 |
| N= 28 | 1,797 | 1,856 | 1,922 | 1,991 | 2,065 | 2,144 | 2,231 | 2,326 | 2,434 | 2,557 | 2,702 | 2,881 | 3,121 | 3,501 | 3,851 |
| N= 29 | 1,780 | 1,841 | 1,906 | 1,973 | 2,046 | 2,125 | 2,211 | 2,306 | 2,413 | 2,535 | 2,679 | 2,857 | 3,097 | 3,472 | 3,820 |
| N= 30 | 1,765 | 1,825 | 1,890 | 1,957 | 2,029 | 2,108 | 2,193 | 2,288 | 2,393 | 2,515 | 2,658 | 2,835 | 3,071 | 3,446 | 3,791 |
| N= 31 | 1,750 | 1,810 | 1,873 | 1,941 | 2,013 | 2,091 | 2,176 | 2,270 | 2,375 | 2,496 | 2,638 | 2,813 | 3,048 | 3,421 | 3,763 |
| N= 32 | 1,737 | 1,796 | 1,858 | 1,926 | 1,998 | 2,075 | 2,160 | 2,253 | 2,358 | 2,478 | 2,619 | 2,794 | 3,027 | 3,397 | 3,738 |
| N= 33 | 1,724 | 1,783 | 1,845 | 1,912 | 1,984 | 2,061 | 2,145 | 2,238 | 2,342 | 2,461 | 2,601 | 2,775 | 3,007 | 3,375 | 3,714 |
| N= 34 | 1,712 | 1,770 | 1,832 | 1,899 | 1,970 | 2,047 | 2,130 | 2,223 | 2,326 | 2,445 | 2,585 | 2,757 | 2,988 | 3,354 | 3,691 |
| N= 35 | 1,700 | 1,759 | 1,820 | 1,886 | 1,957 | 2,034 | 2,117 | 2,209 | 2,312 | 2,430 | 2,569 | 2,741 | 2,970 | 3,334 | 3,669 |
| N= 36 | 1,689 | 1,747 | 1,808 | 1,874 | 1,945 | 2,021 | 2,104 | 2,195 | 2,298 | 2,415 | 2,554 | 2,725 | 2,953 | 3,315 | 3,649 |
| N= 37 | 1,678 | 1,737 | 1,797 | 1,863 | 1,933 | 2,009 | 2,092 | 2,183 | 2,285 | 2,402 | 2,539 | 2,710 | 2,937 | 3,297 | 3,629 |
| N= 38 | 1,668 | 1,726 | 1,787 | 1,853 | 1,922 | 1,998 | 2,080 | 2,170 | 2,272 | 2,388 | 2,526 | 2,695 | 2,921 | 3,280 | 3,610 |
| N= 39 | 1,659 | 1,716 | 1,777 | 1,842 | 1,912 | 1,987 | 2,069 | 2,159 | 2,260 | 2,376 | 2,512 | 2,681 | 2,907 | 3,264 | 3,593 |
| N= 40 | 1,650 | 1,707 | 1,767 | 1,832 | 1,902 | 1,976 | 2,058 | 2,148 | 2,248 | 2,364 | 2,500 | 2,668 | 2,892 | 3,248 | 3,576 |
| N= 41 | 1,641 | 1,698 | 1,758 | 1,823 | 1,892 | 1,966 | 2,047 | 2,137 | 2,237 | 2,352 | 2,488 | 2,655 | 2,879 | 3,233 | 3,559 |
| N= 42 | 1,632 | 1,689 | 1,749 | 1,814 | 1,883 | 1,957 | 2,038 | 2,127 | 2,227 | 2,341 | 2,477 | 2,643 | 2,866 | 3,219 | 3,544 |
| N= 43 | 1,624 | 1,681 | 1,741 | 1,805 | 1,874 | 1,948 | 2,028 | 2,117 | 2,217 | 2,331 | 2,466 | 2,632 | 2,854 | 3,205 | 3,529 |
| N= 44 | 1,616 | 1,673 | 1,732 | 1,797 | 1,865 | 1,939 | 2,019 | 2,108 | 2,207 | 2,321 | 2,456 | 2,621 | 2,842 | 3,192 | 3,515 |
| N= 45 | 1,609 | 1,666 | 1,725 | 1,789 | 1,857 | 1,930 | 2,011 | 2,099 | 2,196 | 2,311 | 2,445 | 2,610 | 2,831 | 3,180 | 3,501 |
| N= 46 | 1,602 | 1,658 | 1,717 | 1,781 | 1,849 | 1,922 | 2,002 | 2,090 | 2,189 | 2,302 | 2,435 | 2,600 | 2,820 | 3,168 | 3,488 |
| N= 47 | 1,595 | 1,651 | 1,710 | 1,774 | 1,841 | 1,915 | 1,994 | 2,082 | 2,180 | 2,293 | 2,426 | 2,590 | 2,809 | 3,156 | 3,475 |
| N= 48 | 1,588 | 1,644 | 1,703 | 1,767 | 1,834 | 1,907 | 1,986 | 2,074 | 2,172 | 2,285 | 2,417 | 2,581 | 2,799 | 3,145 | 3,463 |
| N= 49 | 1,582 | 1,638 | 1,696 | 1,760 | 1,827 | 1,900 | 1,979 | 2,066 | 2,164 | 2,276 | 2,408 | 2,572 | 2,789 | 3,134 | 3,450 |
| N= 50 | 1,576 | 1,632 | 1,690 | 1,753 | 1,820 | 1,893 | 1,972 | 2,059 | 2,157 | 2,268 | 2,400 | 2,563 | 2,780 | 3,124 | 3,440 |
| N= 51 | 1,568 | 1,623 | 1,681 | 1,743 | 1,810 | 1,881 | 1,959 | 2,046 | 2,142 | 2,252 | 2,383 | 2,545 | 2,762 | 3,077 | 3,390 |
| N= 52 | 1,561 | 1,615 | 1,673 | 1,735 | 1,802 | 1,874 | 1,951 | 2,037 | 2,132 | 2,241 | 2,371 | 2,532 | 2,748 | 3,061 | 3,373 |
| N= 53 | 1,554 | 1,607 | 1,665 | 1,727 | 1,794 | 1,866 | 1,942 | 2,028 | 2,122 | 2,230 | 2,359 | 2,519 | 2,734 | 2,947 | 3,258 |
| N= 54 | 1,547 | 1,600 | 1,657 | 1,719 | 1,786 | 1,858 | 1,934 | 2,019 | 2,112 | 2,219 | 2,347 | 2,506 | 2,720 | 2,932 | 3,245 |
| N= 55 | 1,540 | 1,593 | 1,650 | 1,711 | 1,778 | 1,850 | 1,926 | 2,010 | 2,102 | 2,208 | 2,335 | 2,493 | 2,706 | 2,917 | 3,222 |
| N= 56 | 1,533 | 1,585 | 1,642 | 1,703 | 1,770 | 1,842 | 1,918 | 1,999 | 2,090 | 2,195 | 2,321 | 2,478 | 2,690 | 2,900 | 3,200 |
| N= 57 | 1,526 | 1,577 | 1,634 | 1,695 | 1,762 | 1,834 | 1,910 | 1,990 | 2,080 | 2,184 | 2,309 | 2,465 | 2,676 | 2,885 | 3,184 |
| N= 58 | 1,519 | 1,570 | 1,627 | 1,688 | 1,755 | 1,827 | 1,902 | 1,981 | 2,070 | 2,173 | 2,300 | 2,455 | 2,665 | 2,873 | 3,176 |
| N= 59 | 1,512 | 1,562 | 1,619 | 1,680 | 1,747 | 1,819 | 1,894 | 1,972 | 2,060 | 2,162 | 2,288 | 2,442 | 2,651 | 2,858 | 3,159 |
| N= 60 | 1,505 | 1,555 | 1,612 | 1,673 | 1,740 | 1,812 | 1,887 | 1,964 | 2,051 | 2,152 | 2,277 | 2,430 | 2,638 | 2,844 | 3,142 |
| N= 61 | 1,498 | 1,547 | 1,604 | 1,665 | 1,732 | 1,804 | 1,879 | 1,955 | 2,041 | 2,141 | 2,265 | 2,417 | 2,624 | 2,829 | 3,124 |
| N= 62 | 1,491 | 1,540 | 1,597 | 1,658 | 1,725 | 1,797 | 1,872 | 1,947 | 2,032 | 2,131 | 2,254 | 2,405 | 2,611 | 2,815 | 3,106 |
| N= 63 | 1,484 | 1,533 | 1,590 | 1,651 | 1,718 | 1,790 | 1,865 | 1,939 | 2,023 | 2,122 | 2,245 | 2,395 | 2,600 | 2,802 | 3,083 |
| N= 64 | 1,477 | 1,526 | 1,583 | 1,644 | 1,711 | 1,783 | 1,858 | 1,931 | 2,014 | 2,112 | 2,234 | 2,383 | 2,587 | 2,787 | 3,066 |
| N= 65 | 1,470 | 1,519 | 1,576 | 1,637 | 1,704 | 1,776 | 1,851 | 1,923 | 2,005 | 2,102 | 2,223 | 2,371 | 2,574 | 2,772 | 3,050 |
| N= 66 | 1,463 | 1,512 | 1,569 | 1,630 | 1,697 | 1,769 | 1,844 | 1,915 | 2,006 | 2,102 | 2,222 | 2,369 | 2,571 | 2,768 | 3,042 |
| N= 67 | 1,456 | 1,505 | 1,562 | 1,623 | 1,690 | 1,762 | 1,837 | 1,907 | 1,997 | 2,092 | 2,211 | 2,357 | 2,558 | 2,754 | 3,033 |
| N= 68 | 1,449 | 1,498 | 1,555 | 1,616 | 1,683 | 1,755 | 1,830 | 1,900 | 1,989 | 2,083 | 2,199 | 2,317 | 2,517 | 2,712 | 2,999 |
| N= 69 | 1,442 | 1,491 | 1,548 | 1,609 | 1,676 | 1,748 | 1,823 | 1,892 | 1,980 | 2,073 | 2,189 | 2,306 | 2,505 | 2,699 | 2,985 |
| N= 70 | 1,435 | 1,484 | 1,541 | 1,602 | 1,669 | 1,741 | 1,816 | 1,884 | 1,971 | 2,063 | 2,178 | 2,294 | 2,492 | 2,685 | 2,970 |
| N= 71 | 1,428 | 1,477 | 1,534 | 1,595 | 1,662 | 1,734 | 1,809 | 1,876 | 1,962 | 2,053 | 2,167 | 2,282 | 2,479 | 2,671 | 2,955 |
| N= 72 | 1,421 | 1,470 | 1,527 | 1,588 | 1,655 | 1,727 | 1,802 | 1,868 | 1,953 | 2,043 | 2,156 | 2,270 | 2,466 | 2,657 | 2,940 |
| N= 73 | 1,414 | 1,463 | 1,520 | 1,581 | 1,648 | 1,720 | 1,795 | 1,860 | 1,944 | 2,033 | 2,145 | 2,258 | 2,453 | 2,643 | 2,926 |
| N= 74 | 1,407 | 1,456 | 1,513 | 1,574 | 1,641 | 1,713 | 1,788 | 1,852 | 1,935 | 2,023 | 2,134 | 2,246 | 2,440 | 2,629 | 2,913 |
| N= 75 | 1,400 | 1,449 | 1,506 | 1,567 | 1,634 | 1,706 | 1,781 | 1,844 | 1,926 | 2,013 | 2,123 | 2,234 | 2,427 | 2,615 | 2,898 |
| N= 76 | 1,393 | 1,442 | 1,499 | 1,560 | 1,627 | 1,699 | 1,774 | 1,836 | 1,917 | 1,999 | 2,108 | 2,218 | 2,410 | 2,597 | 2,879 |
| N= 77 | 1,386 | 1,435 | 1,492 | 1,553 | 1,620 | 1,692 | 1,767 | 1,828 | 1,908 | 1,989 | 2,097 | 2,206 | 2,397 | 2,583 | 2,864 |
| N= 78 | 1,379 | 1,428 | 1,485 | 1,546 | 1,613 | 1,685 | 1,760 | 1,819 | 1,900 | 1,979 | 2,086 | 2,194 | 2,384 | 2,569 | 2,849 |
| N= 79 | 1,372 | 1,421 | 1,478 | 1,539 | 1,606 | 1,678 | 1,753 | 1,811 | 1,891 | 1,968 | 2,074 | 2,181 | 2,370 | 2,554 | 2,833 |
| N= 80 | 1,365 | 1,414 | 1,471 | 1,532 | 1,600 | 1,672 | 1,747 | 1,804 | 1,883 | 1,959 | 2,064 | 2,170 | 2,358 | 2,541 | 2,819 |
| N= 81 | 1,358 | 1,407 | 1,464 | 1,525 | 1,593 | 1,665 | 1,740 | 1,796 | 1,874 | 1,949 | 2,053 | 2,159 | 2,346 | 2,528 | 2,805 |
| N= 82 | 1,351 | 1,400 | 1,457 | 1,518 | 1,586 | 1,658 | 1,733 | 1,788 | 1,865 | 1,939 | 2,042 | 2,147 | 2,333 | 2,514 | 2,790 |
| N= 83 | 1,344 | 1,393 | 1,450 | 1,511 | 1,579 | 1,651 | 1,726 | 1,780 | 1,856 | 1,929 | 2,031 | 2,135 | 2,320 | 2,499 | 2,773 |
| N= 84 | 1,337 | 1,386 | 1,443 | 1,504 | 1,572 | 1,644 | 1,719 | 1,771 | 1,846 | 1,918 | 2,019 | 2,122 | 2,306 | 2,484 | 2,756 |
| N= 85 | 1,330 | 1,379 | 1,436 | 1,497 | 1,565 | 1,637 | 1,712 | 1,763 | 1,837 | 1,908 | 2,008 | 2,110 | 2,293 | 2,470 | 2,740 |
| N= 86 | 1,323 | 1,372 | 1,429 | 1,490 | 1,558 | 1,630 | 1,705 | 1,755 | 1,828 | 1,898 | 1,997 | 2,098 | 2,280 | 2,456 | 2,724 |
| N= 87 | 1,316 | 1,365 | 1,422 | 1,483 | 1,551 | 1,623 | 1,698 | 1,747 | 1,819 | 1,888 | 1,986 | 2,086 | 2,267 | 2,442 | 2,709 |
| N= 88 | 1,309 | 1,358 | 1,415 | 1,476 | 1,544 | 1,616 | 1,691 | 1,739 | 1,810 | 1,878 | 1,975 | 2,074 | 2,254 | 2,428 | 2,693 |
| N= 89 | 1,302 | 1,351 | 1,408 | 1,469 | 1,537 | 1,609 | 1,684 | 1,731 | 1,801 | 1,868 | 1,964 | 2,062 | 2,241 | 2,414 | 2,678 |
| N= 90 | 1,295 | 1,344 | 1,401 | 1,462 | 1,530 | 1,602 | 1,677 | 1,723 | 1,792 | 1,858 | 1,953 | 2,050 | 2,228 | 2,399 | 2,662 |
| N= 91 | 1,288 | 1,337 | 1,394 | 1,455 | 1,523 | 1,595 | 1,670 | 1,715 | 1,783 | 1,848 | 1,942 | 2,038 | 2,215 | 2,385 | 2,647 |
| N= 92 | 1,281 | 1,330 | 1,387 | 1,448 | 1,516 | 1,588 | 1,663 | 1,707 | 1,774 | 1,838 | 1,931 | 2,026 | 2,202 | 2,371 | 2,632 |
| N= 93 | 1,274 | 1,323 | 1,380 | 1,44  |       |       |       |       |       |       |       |       |       |       |       |