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The Discrete Probability Distribution For r Failures In A Defined Time Interval When The Time-To-Failure Is Weibully Distributed Throughout

30 January 1987

U.S. ARMY MISSILE COMMAND
Redstone Arsenal, Alabama 35898-5000

Systems Analysis Division
Systems Analysis & Evaluation Office
US Army Missile Command
Redstone Arsenal, Alabama

THE DISCRETE PROBABILITY DISTRIBUTION FOR r FAILURES IN A DEFINED TIME INTERVAL, WHEN THE TIME-TO-FAILURE IS WEIBULL DISTRIBUTED THROUGHOUT

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Described herein is the development of a probability distribution function for the discrete random variable, number of failures, observed in a time interval consisting of T hours when the operating system's time-to-failure is distributed as a two parameter Weibull distribution. Particular application of the distribution is envisioned in repair/spare parts quantity forecasting. Additionally, discussions are provided pertaining to the distribution's 'goodness-of-fit' to simulated Weibull failure times and its use in evaluating stock-out risks associated with discrete stockage levels.

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THE DISCRETE PROBABILITY DISTRIBUTION FOR r FAILURES
IN A DEFINED TIME INTERVAL, WHEN THE TIME-TO-FAILURE
IS WEIBULLY DISTRIBUTED THROUGHOUT

30 JANUARY 1987

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Abstract

Described herein is the development of a probability distribution function for the discrete random variable, number of failures, observed in a time interval consisting of T hours when the operating system's time-to-failure is distributed as a two parameter Weibull distribution. Particular application of the distribution is envisioned in repair/spare parts quantity forecasting. Additionally, discussions are provided pertaining to the distribution's 'goodness-of-fit' to simulated Weibull failure times and its use in evaluating stock-out risks associated with discrete stockage levels.

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CHAPTER 1

INTRODUCTION

I. Background

If the time-to-failure of a system is an exponentially distributed random variable whose mean-time-between-failure [MTBF] is equal to $1/\lambda$, then the number of failures, r, observed in a fixed time interval consisting of T hours is a Poisson distributed random variable whose mean value is equal to λT. This reliability theorem is mathematically proven in references 4 and 7 of the attached bibliography and is fundamental to the vast majority of discussions relating to confidence assessments and risk evaluations pertaining to reliability testing. With the advent of reliability growth concepts, see reference 2 of the attached bibliography, the exponential assumption gave way to the assumption that the time-to-failure is distributed as a two parameter Weibull of the form,

$$f(t) = \lambda \beta \, t^{\beta - 1} e^{-\lambda t^{\beta}}, \qquad (1)$$

where λ is the scale parameter and β is the shape parameter. It is pertinent to point out that when the shape parameter equals one, equation 1 reduces to the Exponential and the Poisson distribution is again appropriate for r. The distribution of r when the shape parameter takes on any value greater than zero is the subject of this report.

II. Problem Definition

When a system is deployed, experiences use and failures occur, post failure remedial actions affect the total number of failures observed in the time period, and hence impact follow-on parameter estimates. Mr. J. Endrenyi's discussion of ideal repair, see reference 4 of the attached bibliography, presents the concept of replacing failed units

with 'like new' units, hence the value of t, in the density function, upon resumption of operation is zero. The total accrued time then becomes a sum of the time increments defined to be zero to time of failure or time truncation. The concepts of reliability growth, however advocate a dynamic failure rate, hopefully decreasing with time. If this be the case, then t does not revert to zero upon operation resumption, after failure. A decreasing failure rate will cause the shape parameter of the two parameter Weibull to be less than one but greater than zero. Conversely, an increasing failure rate will be characterized by a shape parameter greater than one. The post failure remedial actions, including redesign, in conjunction with the inherent failure modes of the system contribute to the failure density function observed during operation.

If repair actions or fixes are incorporated into the system during the time period in such a way that it can be assumed that the failure rate is not constant, but instead it is a time dependent function, and if the failure rate is parametric, then all operaing data accrued in the time period may be pooled together to estimate the scale and shape parameters of equation 1 (see reference 2 of the attached bibliography). If the above conditions are met, as well as the further conditions enumerated by Mr. J. T. Duane in his 1962 published report, then one can assume that equation 1 provides an adequate model for time-to-failure of the system in the time period. The estimates of the scale and shape parameters will, of course, be themselves random variables. Hence, a defined time will have Consumer and Producer risks associated with it, (i.e., the statistical variation in the shape and scale parameters will introduce risks).

Hypothesis testing can be imposed by determining critical regions for the Weibull parameters, or hypothesis testing can be imposed by the specification of the number of failures observed versus time, see

reference 7 of the attached bibliography. The null hypothesis can be easily defined by specification of the scale and shape parameters, but to contruct the test criteria in terms of the number of failures observed, the distribution of r is required. The remainder of this report is devoted deriving the required distribution, constructing life test criteria, evaluating risks, and assessing specific life test performance.

III. Problem Approach

Chapter 2 provides a detailed derivation of the probability distribution for the number of failures observed in T time units for all values assumable for the shape and scale parameters. Chapter 3 contains simulation examples intended to illustrate the 'goodness-of-fit' of the derived probability function. Chapter 4 discusses employing the derived distribution in confidence interval construction for the number of failures observed in a defined time period and discusses a provisioning methodology for implementation with systems or equipment meeting the defined conditions. Chapter 5 is devoted to the conclusions and extensions pertaining to the distribution. Appendices are provided which contain supporting material.

CHAPTER 2

PROBABILITY DISTRIBUTION FUNCTION DERIVATION

I. Condition Specification

The following derivation is based on the assumptions that a system is placed on life test and operated until T hours of operation have accrued. Upon failure, the system is repaired and operation is resumed. The density function for time-to-failure throughout the test phase is as specified by equation 1.

II. Probability of No Failure During Testing

The probability of no failure during the test phase is simply the reliability function for the two parameter Weibull and is defined as

$$p[r=0] = \int_T^\infty \lambda\beta t^{\beta-1} e^{-\lambda t^{\beta}} dt \qquad (2)$$

which can be easily shown to simplify to,

$$p[r=0] = e^{-\lambda T^{\beta}}. \qquad (3)$$

III. Probability of One Failure During Testing

If the test interval can be divided into two portions as shown in Figure 2.1,

Figure 2.1 - Failure at X Hours of Testing Only

then the time of failure, X, can vary from zero to T. The probability of failure at X is given by

$$f(X) = \lambda\beta X^{\beta-1} e^{-\lambda X^{\beta}} \qquad (4)$$

The probability of surviving from X to T, the remaining test period, is conditional, mathematically depending on the value of X. In general, the probability of surviving the remaining period can be expressed as

$$f(T/X) = \int_T^\infty \lambda\beta t^{\beta-1} e^{-\lambda t^\beta} dt \Big/ \int_X^\infty \lambda\beta t^{\beta-1} e^{-\lambda t^\beta} dt. \quad (5)$$

Simplification of the conditional probability statement shown as equation 5 results in

$$f(T/X) = e^{-\lambda T^\beta} \cdot e^{+\lambda X^\beta} \quad (6)$$

With equations 4 and 6 defined, the probability of one failure in the interval can be expressed as

$$p(r=1) = \int_0^T [\lambda\beta X^{\beta-1} e^{-\lambda X^\beta}][e^{-\lambda T^\beta} \cdot e^{\lambda X^\beta}] dX. \quad (7)$$

Performing the indicated integration results in

$$p(r=1) = \lambda T^\beta \cdot e^{-\lambda T^\beta}. \quad (8)$$

IV. Probability of Two Failures During Testing

By dividing the test interval into three portions such that,

$$0 \leq X \leq Y \leq T, \quad (9)$$

Figure 2.2 illustrates the situation where two failures occur, one at X and one at Y. By sequentially addressing the events, the probability of

Figure 2.2 - Failure at X and Y Hours of Testing

failure at Y is conditional on the value taken on by X. The conditional probability of failure at Y can be shown to be

$$f(Y/X) = \lambda\beta Y^{\beta-1} e^{-\lambda Y^{\beta}} \Big/ \int_{X}^{T} \lambda\beta t^{\beta-1} e^{-\lambda t^{\beta}}\, dt \qquad (10)$$

which reduces to

$$f(Y/X) = \lambda\beta Y^{\beta-1} e^{-\lambda Y^{\beta}} \cdot e^{+\lambda X^{\beta}} \qquad (11)$$

Similarly, the conditional probability of surviving the remaining time period is

$$f(T/Y \text{ and } X) = e^{-\lambda(T^{\beta} - Y^{\beta})}. \qquad (12)$$

The construction of the probability of two failures in the test interval is now possible. The appropriate expression, obtained by multiplying equations 4, 11 and 12, is

$$p(r=2) = \int_{0}^{T}\int_{0}^{Y} \lambda\beta X^{\beta-1} e^{-\lambda X^{\beta}} \cdot \lambda\beta Y^{\beta-1} e^{-\lambda Y^{\beta}} e^{\lambda X^{\beta}} e^{-\lambda(T^{\beta} - Y^{\beta})}\, dx\,dy. \qquad (13)$$

Upon performing the indicated integration and evaluating the results over the limits shown, the probability of two failures can be written as

$$p(r=2) = (\lambda T^{\beta})^{2} e^{-\lambda T^{\beta}} / (2!). \qquad (14)$$

V. Probability of Three Failures During Testing

If the first failure occurs at X, the second at Y and the third at Z, then appropriate probability statements can be shown to be given as

$$f(X) = \lambda\beta X^{\beta-1} e^{-\lambda X^{\beta}},$$

$$f(Y/X) = \lambda\beta Y^{\beta-1} e^{-\lambda Y^{\beta}} e^{+\lambda X^{\beta}},$$

$$f(Z/Y) = \lambda\beta Z^{\beta-1} e^{-\lambda Z^{\beta}} e^{+\lambda Y^{\beta}}, \qquad (15)$$

and

$$f(T/Z) = e^{-\lambda(T^{\beta} - Z^{\beta})}. \qquad (16)$$

Employing these four probability statements, the probability of three failures in the test interval can be written as

$$p(r=3) = \int_0^T \int_0^Z \int_0^Y (\lambda\beta)^3 X^{\beta-1} Y^{\beta-1} Z^{\beta-1} e^{-\lambda T^{\beta}} \, dx\,dy\,dz . \qquad (17)$$

Upon evaluation of equation 17, the probability of three failures in the test period becomes

$$p(r=3) = (\lambda T^{\beta})^3 e^{-\lambda T^{\beta}} / (3!). \qquad (18)$$

VI. Generalization of the Probability of r Failures During Testing

Upon reviewing equations 3, 8, 14, and 18, the Poisson form will be seen. Hence, the general expression for r failures in a test period comprised of T hours can be formulated as

$$p(r) = (\lambda T^{\beta})^r e^{-\lambda T^{\beta}} / (r!). \qquad (19)$$

It is pertinent to point out that when the shape parameter equals one, equation 19 is the Poisson distribut··tal function. This is a necessary condition.

VII. The Mean Number of Failures During Testing

The average or expected number of failures in T hours of testing is obtained by summing the discrete density function times the random variable over its entire range. Mathematically stated, the mean is

$$E[r] = \sum_{r=0}^{\infty} r \left(\lambda T^{\beta}\right)^{r} e^{-\lambda T^{\beta}} / (r!) , \qquad (20)$$

which can be shown to simplify to

$$E[r] = \lambda T^{\beta} . \qquad (21)$$

It is interesting to point out that equation 21 is also the results obtained by integrating the Weibull failure rate,

$$h(t) = \lambda \beta t^{\beta - 1} , \qquad (22)$$

over the limits zero to T.

CHAPTER 3

APPLICATION ASSESSMENT

I. Simulation Specifications

To preliminarily evaluate the accurracy of the discrete probability distribution function, specified by equation 19, a series of simulations were performed. The parameter specifications employed with the simulations are itemized in Table 3.1. Additionally, each simulation used a ten-thousand hour time period, and ten-thousand of these time periods were simulated for each scenario. It will be noted that a shape parameter of one was also included. This is equivalent to simulating from an Exponential distribution. The result of such action is known, namely a Poisson distributed random variable results.

Table 3.1 - Simulation Scenario Specifications

Scenario Number	Shape Parameter	Scale Parameter	Expected Failures	Scenario Number	Shape Parameter	Scale Parameter	Expected Failures
1	.10	4	10.04	16	1.25	5×10^{-5}	5.00
2	.20	2	12.62	17	1.30	8×10^{-5}	12.68
3	.25	0.5	5.00	18	1.40	5×10^{-5}	19.91
4	.30	1.0	15.85	19	1.50	6×10^{-6}	6.00
5	.40	0.5	19.91	20	1.60	1×10^{-5}	25.12
6	.50	0.1	10.00	21	1.70	2×10^{-6}	12.62
7	.60	0.05	12.55	22	1.80	3×10^{-7}	4.75
8	.70	0.03	18.93	23	1.90	5×10^{-7}	19.91
9	.75	0.02	20.00	24	2.00	1×10^{-7}	10.00
10	.80	0.01	15.85	25	2.50	9×10^{-10}	14.29
11	.90	0.005	19.91	26	3.00	12×10^{-12}	12.00
12	.95	0.003	18.83	27	4.00	9×10^{-16}	9.00
13	1.00	0.001	10.00	28	5.00	2×10^{-19}	20.00
14	1.10	0.001	25.11	29	7.50	5×10^{-30}	5.00
15	1.20	5×10^{-5}	3.15	30	10.00	4×10^{-40}	4.00

Before beginning the discussion of the simulation results, a development of the time-to-failure simulation equation will be made. Also, verification that the simulation equation reduces to the Exponential simulation equation will be provided.

II. Monte Carlo Failure Time Simulator

At the outset of operation the system's age was set equal to zero. The probability of surviving to time S, given the system's age at the time of the evaluation, AGE, is then given by

$$P[\text{surviving to } S/AGE] = e^{-\lambda(S^{\beta} - AGE^{\beta})}. \qquad (23)$$

Setting the probability of survival equal to a uniform random number enables the direct calculation of S. This calculation is performed as

$$\text{Random Number} = e^{-\lambda(S^{\beta} - AGE^{\beta})},$$

$$(1/\text{Random Number}) = e^{\lambda(S^{\beta} - AGE^{\beta})},$$

$$\text{Log}(1/\text{Random Number}) = \lambda(S^{\beta} - AGE^{\beta}),$$

and

$$S = (AGE^{\beta} + \text{LOG}(1/\text{Random Number})/\lambda)^{(1/\beta)}. \qquad (24)$$

Once the time of failure, S, is obtained, the age of the system is incremented to S. If S exceeds ten thousand hours, the simulation for the time period ends, and the number of failures is stored. If S is less than ten thousand hours the number of failures is incremented by one and the process for generating S is repeated. The above described procedure was repeated for all of the enumerated simulation scenarios. Attached at Appendix 1 is a copy of the Hewlett-Packard Enhanced BASIC computer program used to perform the simulations. The program was executed on a Hewlett-Packard 9845B desk top computer.

Upon letting the shape parameter, β, equal to one, equation 24 simplifies to

$$S = AGE + Log(1/Random\ Number)/\lambda \quad , \qquad (25)$$

which is one version of the common equations used to simulate the age of a system at the ith failure, when the system's time-to-failure is Exponentially distributed. In short, equation 24 reduces to an exponential simulator when the shape parameter equals to one. This is as it should be.

III. Simulation Results

Appendix 2 contains the simulation output obtained by running the program found in Appendix 1 for the scenarios shown in Table 3.1. Each scenario's simulation output is summarized with a frequency table and a figure. A description of each is provided below.

Within Appendix 2, each scenario's frequency table contains the number of failures observed in the ten thousand simulations along with the number or frequency of times the number was observed. The third column of the table contains the expected number, frequency, of failures in the ten thousand observations. The entries in this column were calculated by evaluating equation 19 with the appropriate values for the shape and scale parameters and T. The results were then multiplied by ten thousand. The fourth column of each table is simply the absolute value of the difference between the second and third columns' entries. The fifth column contains the Chi-Square summing elements which are computed by squaring the fourth column's entries and dividing the results by their respective third column entries. It will be noted that all expected frequencies are greater than or equal to five. This heuritic decision is common practice when using the Chi-Square 'goodness-of-fit' test.

At the bottom of each table, the sum of the Chi-Square elements is found, along with the appropriate degrees of freedom. The accompanying figure provides a visual comparison of the expected relative frequencies, via equation 19, and the simulated relative frequencies. Briefly stated, the histogram form represents the expected relative frequencies and the points are the simulated relative frequencies. It is pertinent to point out that the referenced simulations are not to be considered as absolute proof of the acurracy of equation 19, moreover they are offered simply as evidence of the equation's appropriateness.

Table 3.2 contains a summary of the simulation results obtained thus far, and the Chi-Square 'goodness-of-fit' results. A level of significance of one percent was chosen for application with the Chi-Square test due to the numerous tests to be performed. Although this choice may initially appear low, if the null hypothesis is true in all thirty scenarios, then the probability of one or more rejections , in thirty applications, is twenty-six percent. In dealing with multiple applications of the test, a trade-off between the level of significance and the probability that all of the applications will pass the test, given that the null hypothesis is true for all apllications, must be made.

IV. Simulation Conclusions

To re-iterate, the simulations provided herein are not offered as conclusive proof of the appropriateness of equation 19. They are presented as preliminary tests. The results are favorable but are limited in scope (i.e., the expected values are all less than 25). Simulations of this nature are characterized by scope limitations and constraints, but in this case they do contributed to the overall confidence associated with equation 19. Attention will now be focused on applying equation 19.

Table 3.2 - Chi-Square 'Goodness-of-Fit' Summary
At a Level of Significance of .01

Scenario Number	Chi-Square Test Statistic	Degrees of Freedom	Critical Chi-Square	Null Hypothesis Conclusion
1	14.72	20	37.6	No Rejection
2	24.23	23	41.6	No Rejection
3	11.59	14	29.1	No Rejection
4	32.91	25	44.3	No Rejection
5	34.33	29	49.6	No Rejection
6	17.30	20	37.6	No Rejection
7	19.30	23	41.6	No Rejection
8	21.61	29	49.6	No Rejection
9	25.74	29	49.6	No Rejection
10	21.72	25	44.3	No Rejection
11	40.36	29	49.6	No Rejection
12	33.65	29	49.6	No Rejection
13	20.75	20	37.6	No Rejection
14	50.08	33	54.7	No Rejection
15	6.99	10	23.2	No Rejection
16	7.29	13	27.7	No Rejection
17	24.44	23	41.6	No Rejection
18	16.26	29	49.6	No Rejection
19	15.35	15	30.6	No Rejection
20	38.15	33	54.7	No Rejection
21	25.66	23	41.6	No Rejection
22	8.68	18	34.8	No Rejection
23	37.67	29	49.6	No Rejection
24	21.11	20	37.6	No Rejection
25	14.29	19	36.2	No Rejection
26	20.91	23	41.6	No Rejection
27	12.22	26	45.6	No Rejection
28	29.81	29	49.6	No Rejection
29	19.12	14	29.1	No Rejection
30	11.57	12	26.2	No Rejection

CHAPTER 4

CONFIDENCE DETERMINATIONS

I. Historical Background

Forecasting repair part quantities is an integral part of a comprehensive inventory control program and to a large degree governs the effectiveness of the program. To date the vast majority of repair/spare part forecasts involve computing an expected number of failures or demands by multiplying the envisioned operating time by the reciprocal of the item's MTBF, modifying the expected number to reflect failures not included in the design failure rate, and employing the Poisson distribution with a specified confidence level. Multiple item applications are handled by multiplying the expected number of demands by the anticipated density prior to employing the Poisson. Reference 1 of the attached bibliography provides a description of the aforementioned procedure. Of essence is the fact that the entire procedure is based on an assumption. Namely that the time-to-failure is Exponentially distributed, a special case of the Weibull.

Past inaccuracies have, to a large degree, been attributed to inaccuracies in the item's MTBF prediction or specification. This point is well taken. Additionally, the inaccuracies may also be attributed to the distributional form assumed. If the failure rate or demand rate of the item is not constant, the aforementioned provisioning procedure will be biased. This bias can lead to either an over-stocked inventory position or an under-stocked position. Both are considered undesireable. To reduce the likelihood of these two undesireable inventory postures, it is recommended that assessments of the scale and shape parameters be made well in advance of provisioning forecasts. Reference 7 of the attached bibliography provides estimation techniques well suited for these purposes.

II. Expected Failure Determination

In many applications of the two parameter Weibull, a parameter called the characteristic life is referenced. The characteristic life is defined as the value of time, T, at which 36.8 percent of the time an item will operate without failure. It can be shown that the characteristic life equals to $(1/\lambda)^{1/\beta}$, where λ and β are as defined for equation 1. Hence, equation 1 can be written as

$$f(t) = (\beta/\theta)(t/\theta)^{\beta-1} e^{-(t/\theta)^{\beta}}, \qquad (26)$$

where θ is the characteristic life. Equation 26 is mathematically equivalent to equation 1 but is, perhaps, a more convenient form. Writing equation 19 in terms of θ, yields

$$p(r) = (T/\theta)^{\beta r} e^{-(T/\theta)^{\beta}}/r! , \qquad (27)$$

where the mean value of r can be shown to be

$$E(r) = (T/\theta)^{\beta} . \qquad (28)$$

Notice that when the shape parameter, in equation 28 equals one, θ equals the MTBF. This occurrence is a constraint and proves that equation 28 is appropriate when the Exponential distribution results from the shape parameter's estimate(i.e., the shape parameter's estimate equals one).

III. One-Sided Confidence Level Evaluations

If the expected number of failures is defined by equation 28, then the probability that c or less failures will occur in a time interval of T hours is given by

$$P[\, r \leq c \,] = \sum_{r=0}^{c} (T/\theta)^{\beta r} e^{-(T/\theta)^{\beta}}/r! . \qquad (29)$$

Appendix 3 contains tables which can be conveniently used to evaluate equation 29 for selected values of T/θ and shape parameter values ranging from .01 to 1.5.

To illustrate the use of the tables provided in Appendix 3, suppose that a item's characteristic life is assessed to be one thousand hours, and its shape parameter is ten percent. Further, suppose that the annual usage of the item is anticipated to be five thousand hours. If sufficient spares/repair parts have been procured to effect four repairs, what is the probability that the procured parts are adequate to sustain five years of operation?

Five years of operation equates to 25,000 hours of use. The ratio, T/θ, then becomes twenty-five. Referring to Table A3.4 of Appendix 3, the probability of four or less failures is equal to 98.7 percent. The exact or more precise calculation is

$$P(r \leq 4) = \sum_{r=0}^{4} (25)^{(.1)r} e^{-25^{(.1)}} / r! \quad . \qquad (30)$$

which can be evaluated to be 98.65 percent. To summarize, the tables provided at Appendix 3 are offered simply as a labor saving aid. Calculations requiring more than three decimal place precision or involving shape parameter values not found in the tables must be performed using equation 29.

IV. Two-Sided Confidence Level Evaluations

Although one-sided confidence level evaluations are more prevalent in the evaluation of spare/repair part sufficiency, it may be desireable to set two-sided confidence limits. Mathematically stated, one might wish to

determine the probability that L or more but M or less failures occur. To do so, one can simply use equation 29 evaluated over the limits L to U. If the Appendix 3 tables are used, the probability statement,

$$P(L \leq r \leq U) = P(r \leq U) - P(r \leq L-1), \qquad (31)$$

should be used due to the structuring of the tables.

V. Provisioning Methodology

The subject matter and simple examples discussed thus far impact current provisioning methodology only in the initial provisioning stages (i.e., first buys). Specifically, it is recommended that action be taken to determine if the items to be provisioned do in fact possess a constant demand or failure rate(i.e., Exponential time-to-failure). If this special form of the Weibull distribution is appropriate, then the forecasting procedures of the past are acceptable. Otherwise, estimates or assessments of the shape and scale parameters must be made, and the modified provisioning calculations discussed herein should be adopted to determine the spare/repair part quantities to be procured for a specified time period at a stipulated risk.

Currently, the initial provisioning of an item is a synthesis of both qualitative judgements and quantitative procedures. The procedures discussed within this report in no way replace or reduce the scope of this art. Moreover, it is envisioned that the application of these techniques will improve the accuracy of the final product to levels heretofore unrealized.

CHAPTER 5

CONCLUSIONS AND EXTENSIONS

In an effort to enhance and/or expand logistical forecasting techniques, a discrete probability distribution for the number of failures in a defined time period has been derived. The distribution is appropriate when the time-to-failure of the operating item is Weibully distributed. It has been shown that the discrete distribution reduces to the Poisson distribution when the shape parameter of the Weibull is one and the Exponential distribution for time-to-failure results. The enhanced logistical analysis capability can be summarized simply by stating that the derived distribution enables the analyst to perform provisioning calculations for items possessing increasing and decreasing failure rates as well as for items possessing constant failure rates. This capability should improve the accuracy of initial provisioning forecasts for items subjected to wear, corrosion and other factors contributing to reliability degradation with age. Additionally, improvements are also envisioned in situations where reliability growth is exhibited by the item to be provisioned.

To supplement the mathematical derivation of the discrete distribution, a series of simulations were performed. Although the initial results were quite favorable, it is highly recommended that the scope of coverage and repetition be expanded to accommodate increased confidence levels.

Although not directly addressed herein, the derived distribution can be used to advantage in constructing life test operating characteristic OC curves. These OC curves provide a plot of the probability of acceptance versus specified values of the shape and scale parameters for tests such as those discussed in Reference 2 of the attached bibliography. In general, these three dimensional plots can be readily constructed by the use of equation 29.

Appendix 1

Hewlett-Packard Enhanced Basic Simulation Program

```
10    REM ****************************************************
20    REM *****    Weibull Time-to-failure Simulation    *****
30    REM *****          10,000 hour test interval       *****
40    REM *****  With variable scale & slope parameters  *****
50    REM ***** Ten thousand Test Interval Replications  *****
60    REM *****                                          *****
70    REM ****************************************************
80    PRINTER IS 0
90    DIM X(2002),F(2002),Cum(2002),Prob(2002),Exp(2002)
100   RANDOMIZE
110   DISP
120   DISP " ENTER THE SHAPE PARAMETER....."
130   DISP "                              "
140   DISP
150   BEEP
160   INPUT B
170   DISP
180   DISP " ENTER THE SCALE PARAMETER....."
190   DISP "                              "
200   BEEP
210   INPUT L
220   DISP
230   DISP " ENTER THE SIMULATION NUMBER..."
240   DISP "                              "
250   DISP
260   BEEP
270   INPUT Sim
280   Test=10000
290   FOR I=1 TO 2002
300   X(I)=I-1
310   F(I)=0
320   NEXT I
330   BEEP
340   FOR J=1 TO 10000
350   Fail=0
360   Age=0
370   Ran=RND
380   Time=LOG(1/Ran)/L
390   Time=Time+Age^B
400   Time=Time^(1/B)
410   IF Time<Age THEN DISP "ERROR IN SIMULATOR!"
420   IF Time<Age THEN STOP
430   IF Time>Test THEN 470
440   Age=Time
450   Fail=Fail+1
460   GOTO 370
470   F(Fail+1)=F(Fail+1)+1
480   Ck=INT(J/1000)
490   IF Ck-J/1000<>0 THEN 510
500   DISP TAB(Ck*7);Ck
510   NEXT J
520   Cum(1)=F(1)
530   FOR J=2 TO 2002
540   Cum(J)=Cum(J-1)+F(J)
550   IF Cum(J)=10000 THEN Xaxis=X(J)
560   IF Cum(J)=10000 THEN 580
570   NEXT J
580   FOR Count=1 TO 2002
590   GOSUB 1580
600   Exp(Count)=Prob(Count)*10000
610   Lim=Count
620   IF Cum(Count)=10000 THEN 640
630   NEXT Count
640   Low=1
650   IF Exp(Low)>=5 THEN 700
660   Exp(Low+1)=Exp(Low+1)+Exp(Low)
```

```
670   F(Low+1)=F(Low+1)+F(Low)
680   Low=Low+1
690   GOTO 650
700   IF Exp(Lim)>5 THEN 750
710   Exp(Lim-1)=Exp(Lim-1)+Exp(Lim)
720   F(Lim-1)=F(Lim-1)+F(Lim)
730   Lim=Lim-1
740   GOTO 700
750   PRINT PAGE;"Table A2.";Sim;" - Simulation Summary Frequency Table For A Tw
o Parameter"
760   PRINT "              Weibull: Scale Parameter = ";L;"and Shape Parameter =
";B;LIN(1)
770   IMAGE 5X,"                                                              "
780   IMAGE 5X,"┌──────────┬──────────┬──────────┬──────────┬──────────┐"
790   IMAGE 5X,"│  Number  │Frequency │ Expected │ Absolute │Chi-Square│"
800   IMAGE 5X,"│    of    │    of    │Occurrence│  Value of│  Summing │"
      IMAGE 5X,"│ Failures │Occurrence│ Frequency│Difference│ Elements │"
810   PRINT USING 770
820   PRINT USING 780
830   PRINT USING 790
840   PRINT USING 800
850   IMAGE +,5X,"│ ",6D," │",10D,"│",5D.4D,"│",5D.4D,"│",7D.2D,"│"
860   IMAGE 5X,"└──────────┴──────────┴──────────┴──────────┴──────────┘"
870   Sumchi=0
880   Dof=0
890   FOR Count=Low TO Lim
900   Dof=Dof+1
910   Diff=ABS(F(Count)-Exp(Count))
920   Chi=Diff^2/Exp(Count)
930   Sumchi=Sumchi+Chi
940   PRINT USING 850;X(Count),F(Count),Exp(Count),Diff,Chi
950   PRINT USING 860
960   NEXT Count
970   Dof=Dof-1
980   PRINT LIN(4);"The Chi-Square Test Statistic = ";Sumchi
990   PRINT LIN(1);"There are ";Dof;" degrees of freedom."
1000   PRINT PAGE;LIN(6)
1010   PLOTTER IS "GRAPHICS"
1020   GRAPHICS
1030   FOR I=1 TO 2002
1040   IF Cum(I)=10000 THEN Xaxis=X(I)
1050   IF Cum(I)=10000 THEN 1070
1060   NEXT I
1070   Ymax=0
1080   FOR I=1 TO Xaxis
1090   F(I)=F(I)*100/10000
1100   Prob(I)=Prob(I)*100
1110   IF Ymax<F(I) THEN Ymax=F(I)
1120   IF Ymax<Prob(I) THEN Ymax=Prob(I)
1130   NEXT I
1140   IF Ymax<10 THEN Ymax=10
1150   IF (Ymax>10) AND (Ymax<=15) THEN Mmax=15
1160   IF (Ymax>15) AND (Ymax<=20) THEN Mmax=20
1170   IF (Ymax>20) AND (Ymax<=25) THEN Mmax=25
1180   IF (Ymax>25) AND (Ymax<=30) THEN Mmax=30
1190   IF (Ymax>30) AND (Ymax<=35) THEN Mmax=35
1200   IF (Ymax>35) AND (Ymax<=40) THEN Mmax=40
1210   IF (Ymax>40) AND (Ymax<=45) THEN Mmax=40
1220   IF (Ymax>45) AND (Ymax<=50) THEN Mmax=50
1230   IF (Ymax>50) AND (Ymax<=55) THEN Mmax=55
1240   IF (Ymax>55) AND (Ymax<=60) THEN Mmax=60
1250   IF (Ymax>60) AND (Ymax<=65) THEN Mmax=65
1260   IF (Ymax>65) AND (Ymax<=70) THEN Mmax=70
1270   IF (Ymax>70) AND (Ymax<=75) THEN Mmax=75
1280   IF (Ymax>75) AND (Ymax<=80) THEN Mmax=80
1290   IF Ymax>80 THEN Mmax=100
1300   Ymax=Mmax
```

```
1310   LOCATE 10,100,10,100
1320   SCALE Low-2,Lim+1,0,Ymax+Ymax/22
1330   Dif=Lim+1-Low+2
1340   IF Dif<=20 THEN Xlabel=1
1350   IF (Dif>20) AND (Dif<=40) THEN Xlabel=2
1360   IF (Dif>40) AND (Dif<=80) THEN Xlabel=4
1370   IF Dif>80 THEN Xlabel=5
1380   Ylabel=Ymax/20
1390   CSIZE 2
1400   LAXES Xlabel,Ylabel,Low-2,0,-1,1
1410   MOVE Low-1.5,Ymax
1420   LABEL "PERCENT OCCURRENCE"
1430   MOVE Xlabel+5,-.9*Ylabel
1440   LABEL "NUMBER OF FAILURES"
1450   FOR I=Low TO Lim
1460   MOVE X(I),F(I)
1470   POLYGON .1,FILL
1480   NEXT I
1490   FOR I=Low TO Lim
1500   MOVE X(I)-.5,0
1510   RECTANGLE 1,Prob(I)
1520   NEXT I
1530   DUMP GRAPHICS
1540   PRINT LIN(2);"Figure A2.";Sim;"- Theoritical Histogram Versus Simulated F
requencies For"
1550   PRINT "                Scale=";L;" and Shape=";B;"."
1560   STOP
1570   END
1580   REM ******************************
1590   REM *** PROBABILITY EVALUATOR ***
1600   REM ******************************
1610   Fact=L*10000^B
1620   Prob(Count)=1/EXP(Fact)
1630   IF X(Count)=0 THEN RETURN
1640   FOR In=1 TO X(Count)
1650   Prob(Count)=Prob(Count)*Fact/In
1660   NEXT In
1670   RETURN
```

Appendix 2

Simulation Results

Table A2. 1 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = 4 and Shape Parameter = .1

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
X≤ 2	19	26.6349	7.6349	2.19
3	76	73.1872	2.8128	.11
4	176	183.8379	7.8379	.33
5	378	369.4239	8.5761	.20
6	610	618.6340	8.6340	.12
7	904	887.9648	16.0352	.29
8	1071	1115.2333	44.2333	1.75
9	1296	1245.0398	50.9602	2.09
10	1278	1250.9594	27.0406	.58
11	1128	1142.6429	14.6429	.19
12	929	956.7297	27.7297	.80
13	725	739.4450	14.4450	.28
14	522	530.6863	8.6863	.14
15	341	355.4730	14.4730	.59
16	236	223.2269	12.7731	.73
17	141	131.9343	9.0657	.62
18	83	73.6453	9.3547	1.19
19	45	38.9450	6.0550	.94
20	21	19.5651	1.4349	.11
21	13	9.3610	3.6390	1.41
X≥ 22	8	7.4274	.5726	.04

The Chi-Square Test Statistic = 14.7172406153

There are 20 degrees of freedom.

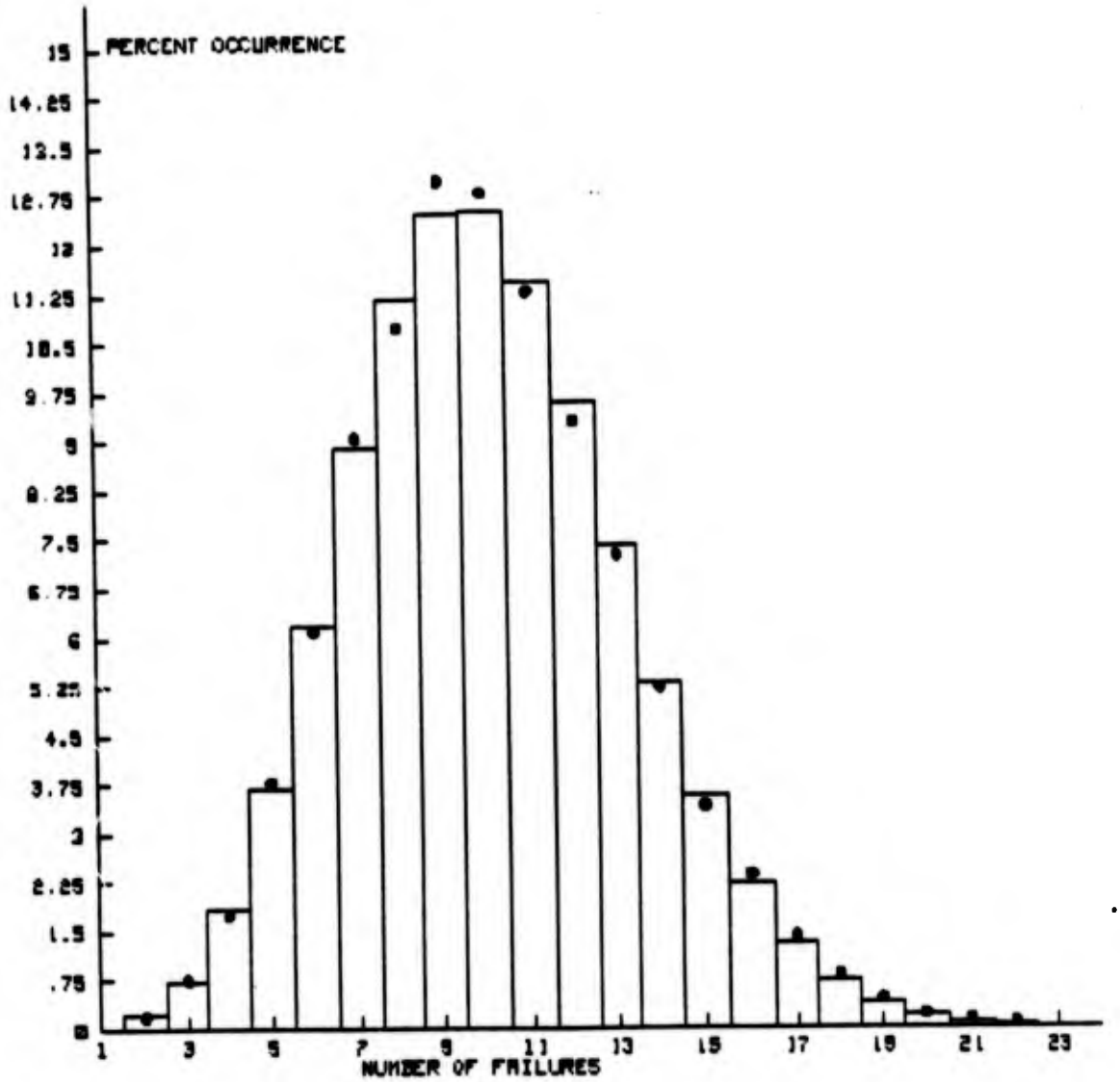

Figure A2. 1 - Theoritical Histogram Versus Simulated Frequencies For Scale= 4 and Shape= .1 .

Table A2. 2 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = 2 and Shape Parameter = .2

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
X≤ 3	11	14.1638	3.1638	.71
4	34	34.9529	.9529	.03
5	86	88.2151	2.2151	.06
6	188	185.5332	2.4668	.03
7	346	334.4672	11.5328	.40
8	529	527.5864	1.4136	.00
9	763	739.7433	23.2567	.73
10	947	933.4930	13.5070	.20
11	1091	1070.8987	20.1013	.38
12	1136	1126.1523	9.8477	.09
13	1022	1093.1601	71.1601	4.63
14	1000	985.3391	14.6609	.22
15	758	828.9426	70.9426	6.07
16	694	653.7843	40.2157	2.47
17	512	485.3059	26.6941	1.47
18	319	340.2303	21.2303	1.32
19	221	225.9693	4.9693	.11
20	144	142.5770	1.4230	.01
21	98	85.6762	12.3238	1.77
22	45	49.1437	4.1437	.35
23	23	26.9631	3.9631	.58
24	14	14.1771	.1771	.00
25	9	7.1561	1.8439	.48
X≥ 26	10	6.3349	3.6651	2.12

The Chi-Square Test Statistic = 24.2269621384

There are 23 degrees of freedom.

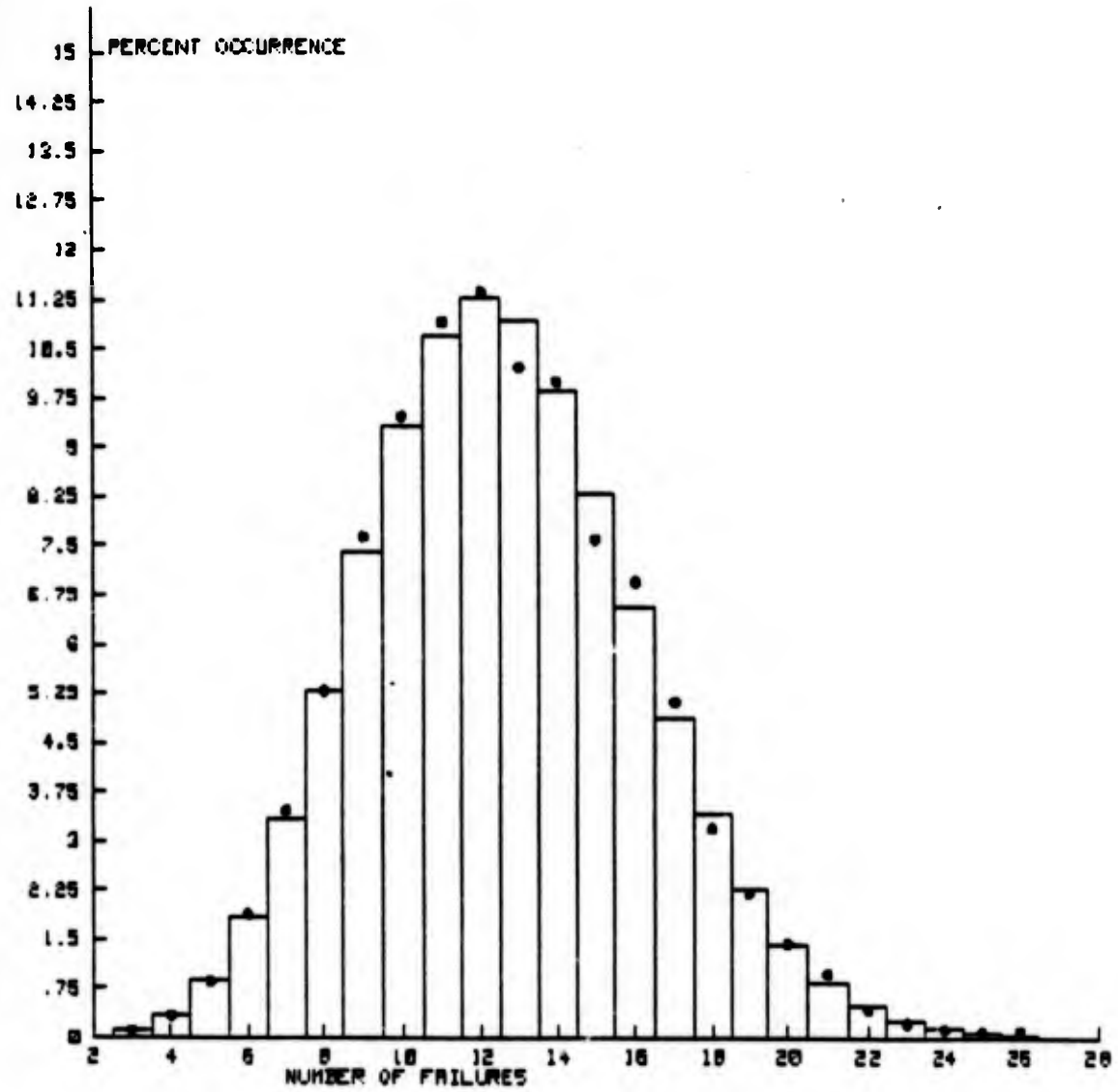

Figure A2. 2 - Theoritical Histogram Versus Simulated Frequencies For Scale= 2 and Shape= .2 .

Table A2. 3 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .5 and Shape Parameter = .25

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
0	74	67.3795	6.6205	.65
1	310	336.8974	26.8974	2.15
2	800	842.2434	42.2434	2.12
3	1421	1403.7390	17.2610	.21
4	1744	1754.6737	10.6737	.06
5	1753	1754.6737	1.6737	.00
6	1501	1462.2281	38.7719	1.03
7	1088	1044.4486	43.5514	1.82
8	643	652.7804	9.7804	.15
9	337	362.6558	25.6558	1.81
10	196	181.3279	14.6721	1.19
11	81	82.4218	1.4218	.02
12	31	34.3424	3.3424	.33
13	14	13.2086	.7914	.05
$X \geq 14$	7	6.9764	.0236	.00

The Chi-Square Test Statistic = 11.5855929557

There are 14 degrees of freedom.

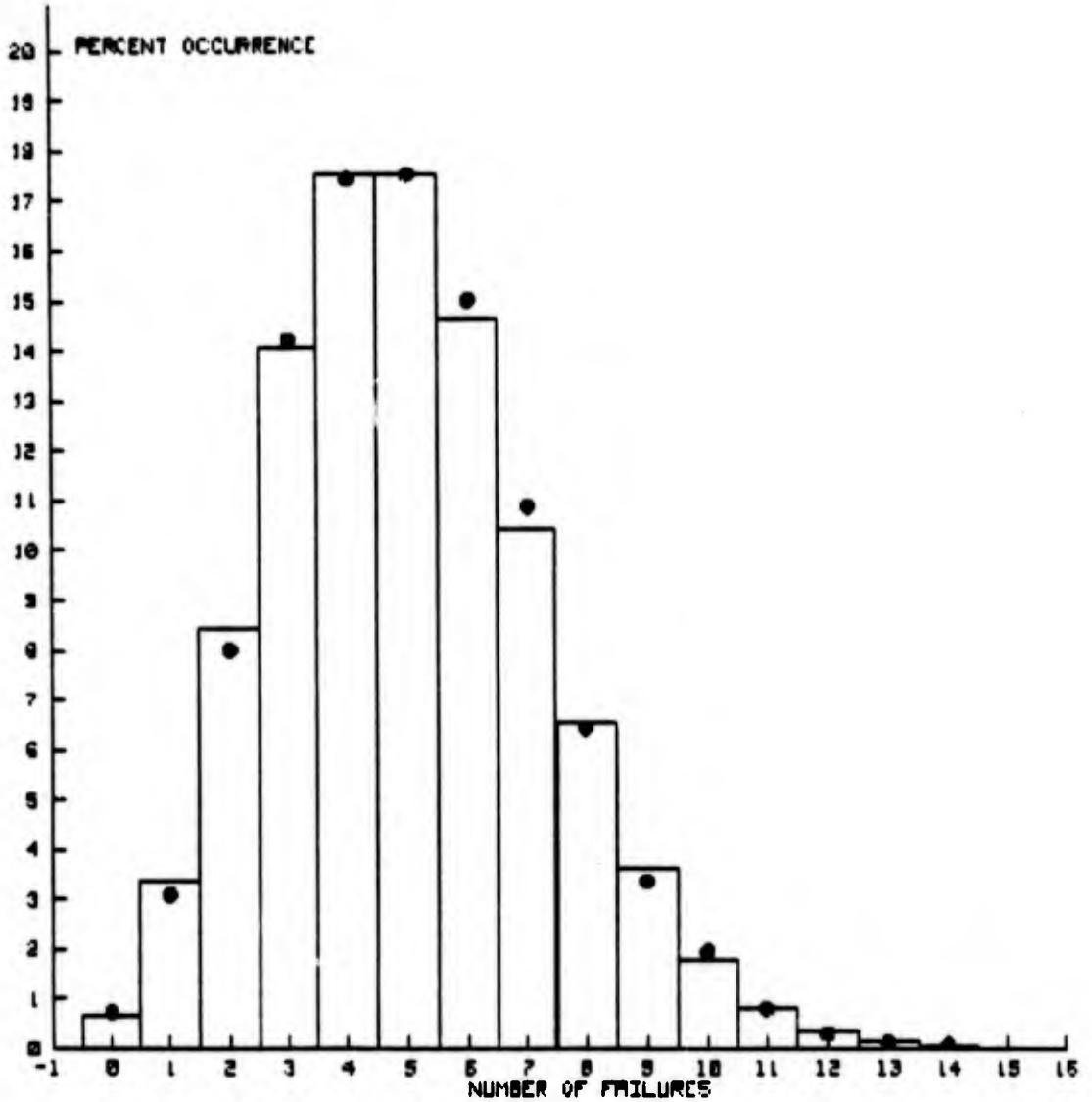

Figure A2. 3 - Theoritical Histogram Versus Simulated Frequencies For Scale= .5 and Shape= .25 .

Table A2. 4 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = 1 and Shape Parameter = .3

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
X≤ 5	16	15.4031	.5969	.02
6	36	28.8114	7.1886	1.79
7	46	65.2328	19.2328	5.67
8	141	129.2337	11.7663	1.07
9	235	227.5796	7.4204	.24
10	372	360.6893	11.3107	.35
11	474	519.6855	45.6855	4.02
12	710	686.3717	23.6283	.81
13	873	836.7891	36.2109	1.57
14	997	947.3009	49.6991	2.61
15	1003	1000.9139	2.0861	.00
16	967	991.4635	24.4635	.60
17	915	924.3316	9.3316	.09
18	750	813.8705	63.8705	5.01
19	718	678.8936	39.1064	2.25
20	505	537.9869	32.9869	2.02
21	404	406.0247	2.0247	.01
22	298	292.5026	5.4974	.10
23	215	201.5589	13.4411	.90
24	135	133.1039	1.8961	.03
25	77	84.3822	7.3822	.65
26	53	51.4372	1.5628	.05
27	27	30.1935	3.1935	.34
28	16	17.0905	1.0905	.07
29	5	9.3402	4.3402	2.02
X≥ 30	12	9.5864	2.4136	.61

The Chi-Square Test Statistic = 32.9108347382

There are 25 degrees of freedom.

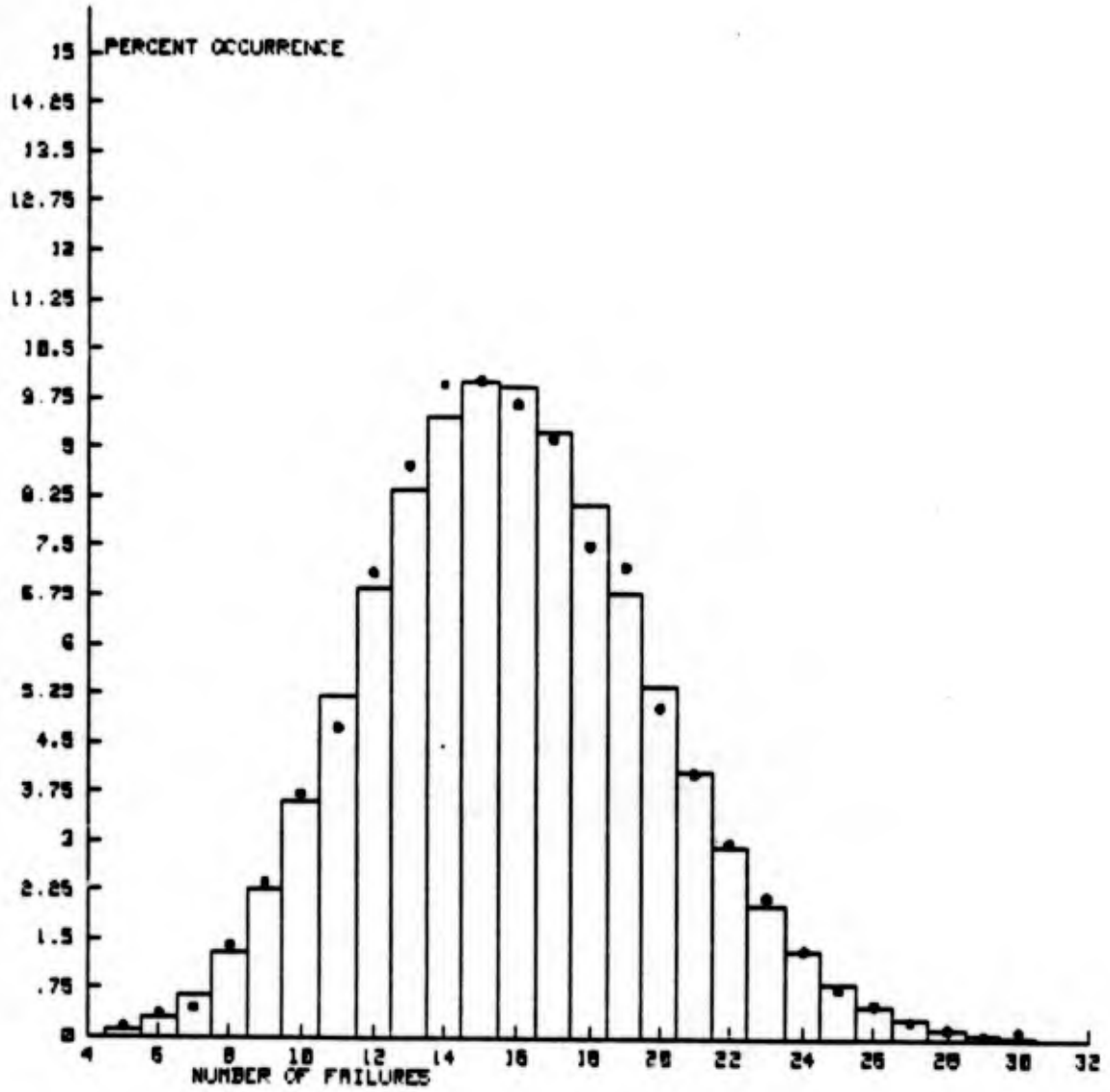

Figure A2. 4 - Theoritical Histogram Versus Simulated Frequencies For Scale= 1 and Shape= .3 .

Table A2. 5 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .5 and Shape Parameter = .4

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
X≤ 7	9	8.2969	.7031	.06
8	15	13.8501	1.1499	.10
9	27	30.6323	3.6323	.43
10	65	60.9747	4.0253	.27
11	108	110.3385	2.3385	.05
12	176	183.0272	7.0272	.27
13	338	280.2479	57.7521	11.90
14	399	398.4596	.5404	.00
15	490	528.7655	38.7655	2.84
16	646	657.8291	11.8291	.21
17	788	770.2544	17.7456	.41
18	812	851.7883	39.7883	1.86
19	881	892.3764	11.3764	.15
20	865	888.1536	23.1536	.60
21	815	841.8579	26.8579	.86
22	807	761.7038	45.2962	2.69
23	668	659.2169	8.7831	.12
24	562	546.7478	15.2522	.43
25	472	435.3285	36.6715	3.09
26	329	333.2834	4.2834	.06
27	214	245.7084	31.7084	4.09
28	185	174.6755	10.3245	.61
29	113	119.8958	6.8958	.40
30	81	79.5523	1.4477	.03
31	56	51.0812	4.9188	.47
32	28	31.7747	3.7747	.45
33	25	19.1662	5.8338	1.78
34	12	11.2209	.7791	.05
35	6	6.3816	.3816	.02
X≥ 36	8	7.3890	.6110	.05

The Chi-Square Test Statistic = 34.3311398562

There are 29 degrees of freedom.

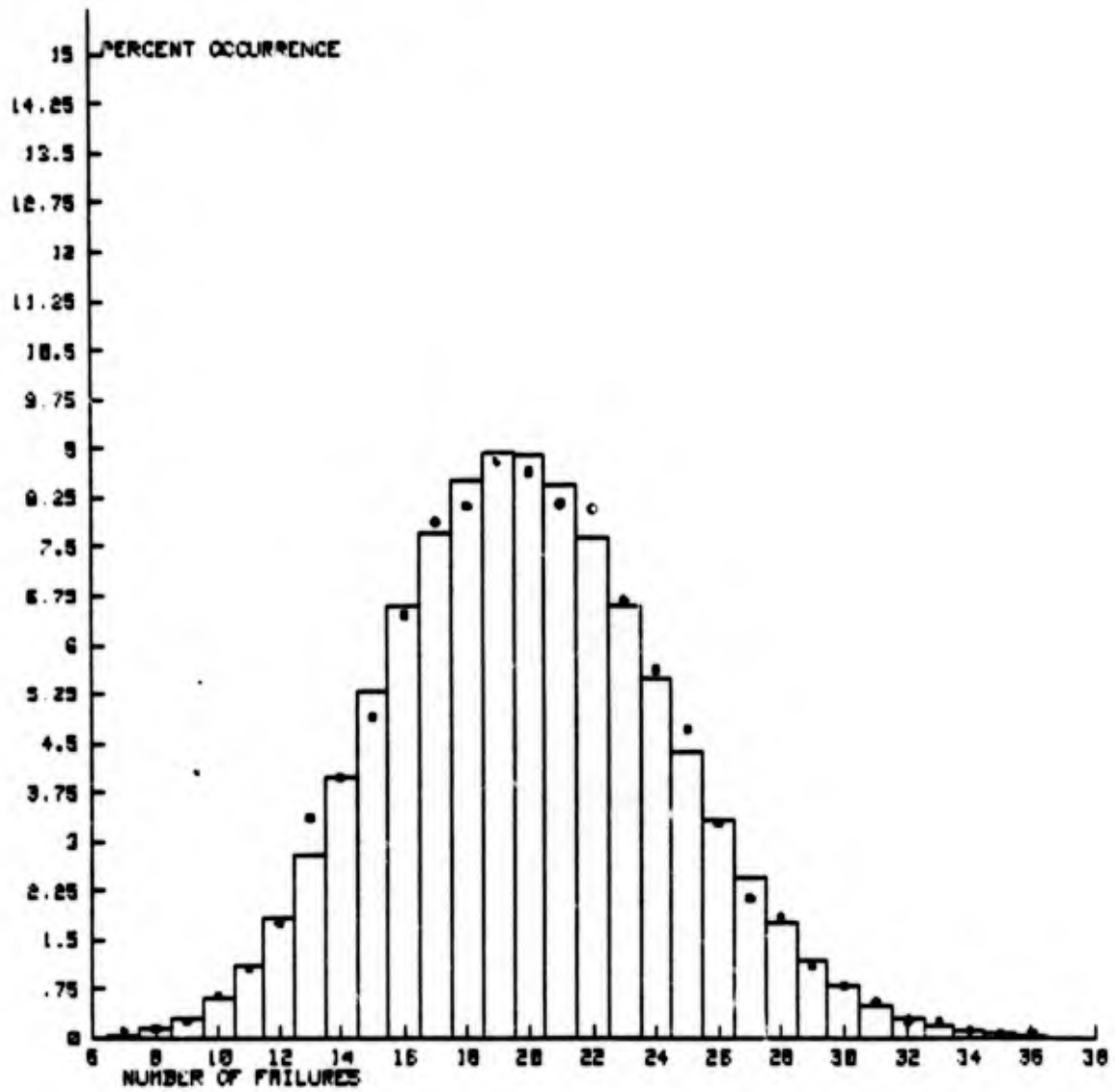

Figure A2. 5 - Theoritical Histogram Versus Simulated Frequencies For Scale= .5 and Shape= .4 .

Table A2. 6 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .1 and Shape Parameter = .5

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
$X \leq 2$	29	27.6940	1.3060	.06
3	71	75.6665	4.6665	.29
4	167	189.1664	22.1664	2.60
5	386	378.3327	7.6673	.16
6	612	630.5546	18.5546	.55
7	918	900.7923	17.2077	.33
8	1145	1125.9903	19.0097	.32
9	1324	1251.1004	72.8996	4.25
10	1232	1251.1004	19.1004	.29
11	1119	1137.3640	18.3640	.30
12	924	947.8033	23.8033	.60
13	738	729.0795	8.9205	.11
14	486	520.7710	34.7710	2.32
15	345	347.1807	2.1807	.01
16	224	216.9879	7.0121	.23
17	125	127.6400	2.6400	.05
18	68	70.9111	2.9111	.12
19	44	37.3216	6.6784	1.20
20	26	18.6608	7.3392	2.89
21	11	8.8861	2.1139	.50
$X \geq 22$	6	6.9740	.9740	.14

The Chi-Square Test Statistic = 17.2970500993

There are 20 degrees of freedom.

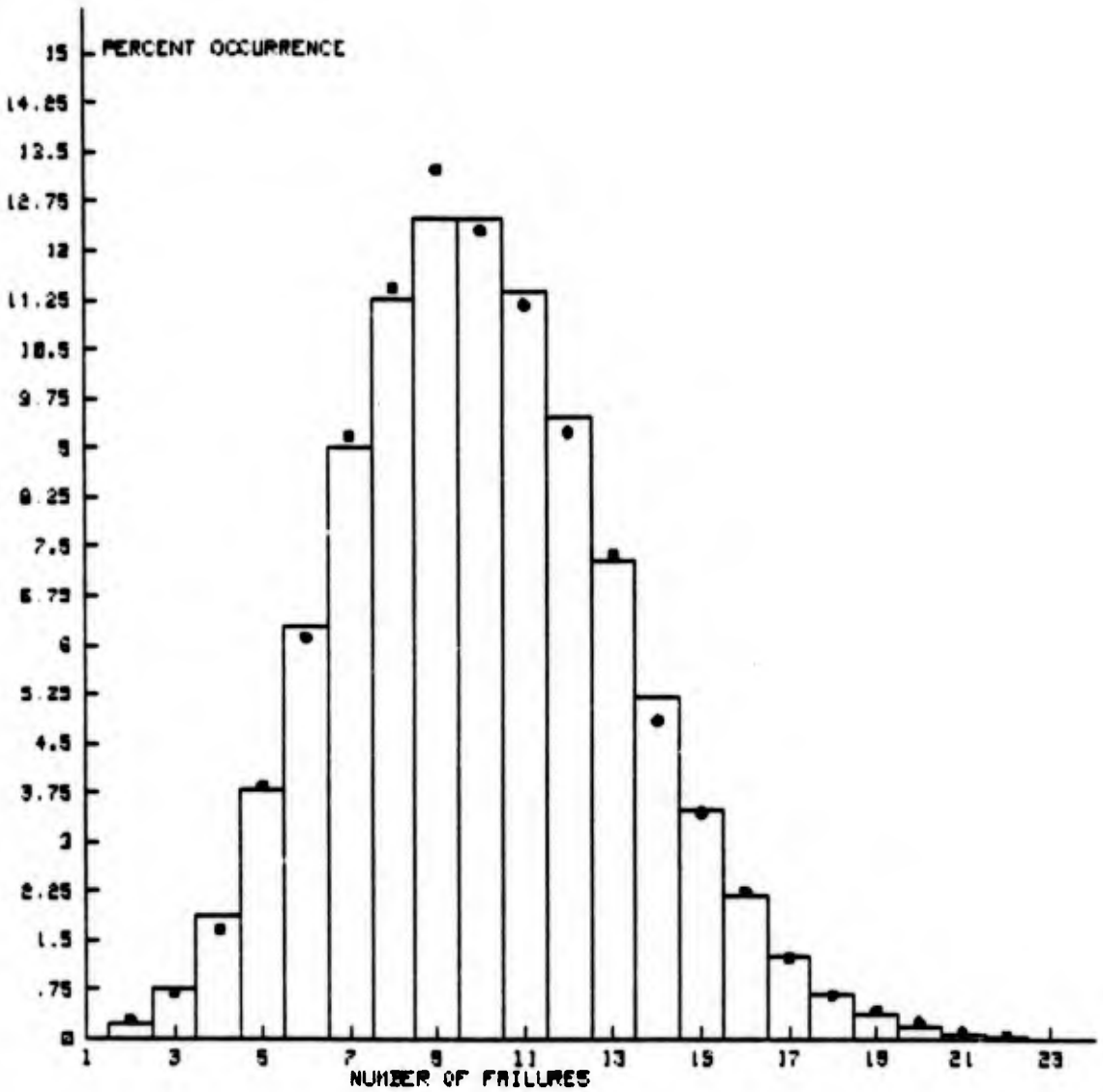

Figure A2. 6 - Theoritical Histogram Versus Simulated Frequencies For Scale= .1 and Shape= .5 .

Table A2. 7 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .05 and Shape Parameter = .6

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
$X \leq 3$	17	14.8407	2.1593	.31
4	42	36.4063	5.5937	.86
5	97	91.4485	5.5515	.34
6	200	191.4236	8.5764	.38
7	340	343.4531	3.4531	.03
8	536	539.1970	3.1970	.02
9	803	752.4453	50.5547	3.40
10	926	945.0285	19.0285	.38
11	1052	1079.0020	27.0020	.68
12	1134	1129.3044	4.6956	.02
13	1052	1091.0324	39.0324	1.40
14	1034	978.7677	55.2323	3.12
15	789	819.5178	30.5178	1.14
16	650	643.2924	6.7076	.07
17	450	475.2580	25.2580	1.34
18	342	331.6095	10.3905	.33
19	213	219.2014	6.2014	.18
20	158	137.6523	20.3477	3.01
21	81	82.3254	1.3254	.02
22	41	46.9982	5.9982	.77
23	22	25.6640	3.6640	.52
24	10	13.4302	3.4302	.88
25	6	6.7470	.7470	.08
$X \geq 26$	5	5.4553	.4553	.04

The Chi-Square Test Statistic = 19.3011212141

There are 23 degrees of freedom.

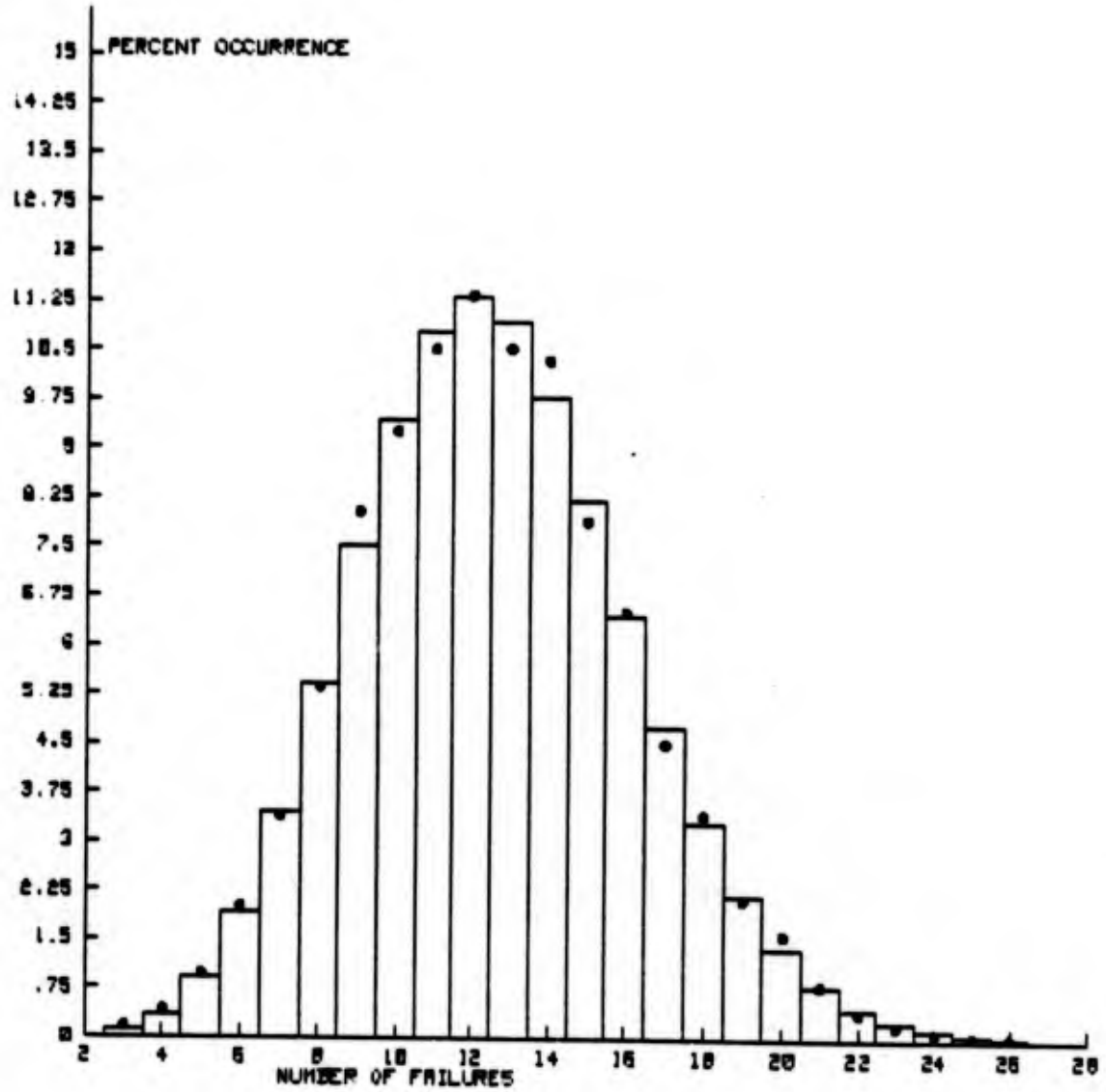

Figure A2. 7 - Theoritical Histogram Versus Simulated Frequencies For Scale= .05 and Shape= .6 .

Table A2. 8 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .03 and Shape Parameter = .7

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
X≤ 6	9	5.4640	3.5360	2.29
7	12	10.3939	1.6061	.25
8	25	24.5930	.4070	.01
9	50	51.7237	1.7237	.06
10	111	97.9063	13.0937	1.75
11	154	168.4765	14.4765	1.24
12	278	265.7537	12.2463	.56
13	381	386.9521	5.9521	.09
14	492	523.1791	31.1791	1.86
15	645	660.2074	15.2074	.35
16	823	781.0551	41.9449	2.25
17	865	869.6691	4.6691	.03
18	916	914.5401	1.4599	.00
19	877	911.1092	34.1092	1.28
20	884	862.3066	21.6934	.55
21	804	777.2552	26.7448	.92
22	642	668.7476	26.7476	1.07
23	565	550.3711	14.6289	.39
24	439	434.0759	4.9241	.06
25	349	328.6600	20.3400	1.26
26	224	239.2736	15.2736	.97
27	154	167.7460	13.7460	1.13
28	119	113.4006	5.5994	.28
29	65	74.0182	9.0182	1.10
30	51	46.7024	4.2976	.40
31	26	28.5166	2.5166	.22
32	18	16.8682	1.1318	.08
33	8	9.6756	1.6756	.29
34	6	5.3867	.6133	.07
X≥ 35	8	5.8084	2.1916	.83

The Chi-Square Test Statistic = 21.6133176046

There are 29 degrees of freedom.

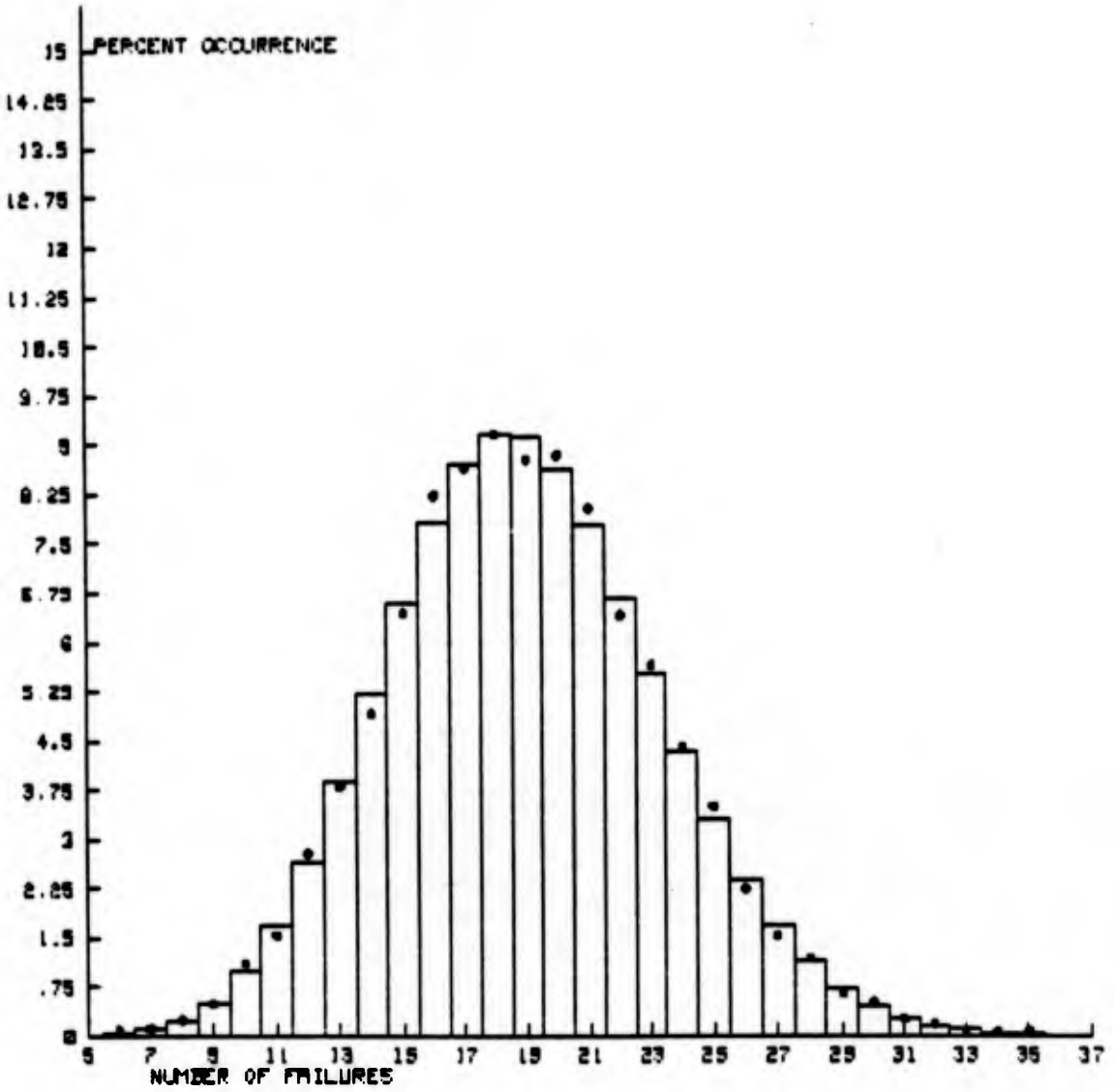

Figure A2. 8 - Theoritical Histogram Versus Simulated Frequencies For Scale= .03 and Shape= .7 .

Table A2. 9 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .02 and Shape Parameter = .75

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
$X \leq 7$	10	7.7859	2.2141	.63
8	16	13.0867	2.9133	.65
9	26	29.0815	3.0815	.33
10	63	58.1631	4.8369	.40
11	105	105.7510	.7510	.01
12	180	176.2517	3.7483	.08
13	288	271.1565	16.8435	1.05
14	377	387.3664	10.3664	.28
15	512	516.4885	4.4885	.04
16	647	645.6107	1.3893	.00
17	763	759.5420	3.4580	.02
18	785	843.9355	58.9355	4.12
19	920	888.3532	31.6468	1.13
20	871	888.3532	17.3532	.34
21	840	846.0506	6.0506	.04
22	761	769.1369	8.1369	.09
23	669	668.8147	.1853	.00
24	589	557.3456	31.6544	1.80
25	452	445.8765	6.1235	.08
26	354	342.9819	11.0181	.35
27	237	254.0607	17.0607	1.15
28	179	181.4719	2.4719	.03
29	131	125.1530	5.8470	.27
30	91	83.4354	7.5646	.69
31	55	53.8293	1.1707	.03
32	29	33.6433	4.6433	.64
33	28	20.3899	7.6101	2.84
34	5	11.9940	6.9940	4.08
35	6	6.8537	.8537	.11
$X \geq 36$	11	5.8658	5.1342	4.49

The Chi-Square Test Statistic = 25.7443246611

There are 29 degrees of freedom.

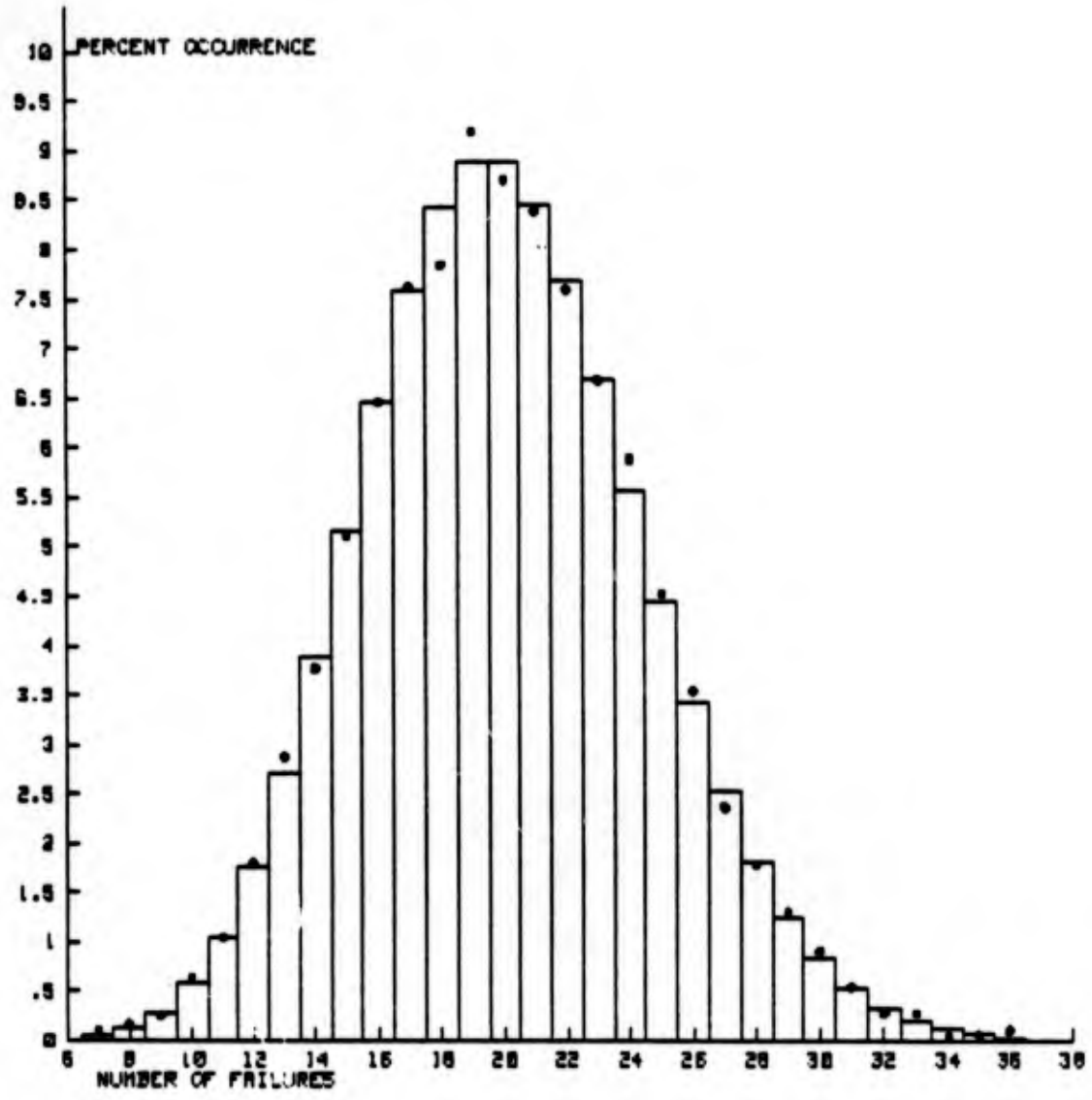

Figure A2. 9 - Theoritical Histogram Versus Simulated Frequencies For Scale= .02 and Shape= .75 .

Table A2. 10 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .01 and Shape Parameter = .8

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
X≤ 5	18	15.4031	2.5969	.44
6	34	28.8114	5.1886	.93
7	56	65.2328	9.2328	1.31
8	142	129.2337	12.7663	1.26
9	232	227.5796	4.4204	.09
10	373	360.6893	12.3107	.42
11	516	519.6855	3.6855	.03
12	700	686.3717	13.6283	.27
13	852	836.7891	15.2109	.28
14	990	947.3009	42.6991	1.92
15	981	1000.9139	19.9139	.40
16	965	991.4635	26.4635	.71
17	910	924.3316	14.3316	.22
18	758	813.8705	55.8705	3.84
19	684	678.8936	5.1064	.04
20	528	537.9869	9.9869	.19
21	422	406.0247	15.9753	.63
22	294	292.5026	1.4974	.01
23	210	201.5589	8.4411	.35
24	151	133.1039	17.8961	2.41
25	69	84.3822	15.3822	2.80
26	54	51.4372	2.5628	.13
27	26	30.1935	4.1935	.58
28	16	17.0905	1.0905	.07
29	6	9.3402	3.3402	1.19
X≥ 30	13	9.5864	3.4136	1.22

The Chi-Square Test Statistic = 21.70473986

There are 25 degrees of freedom.

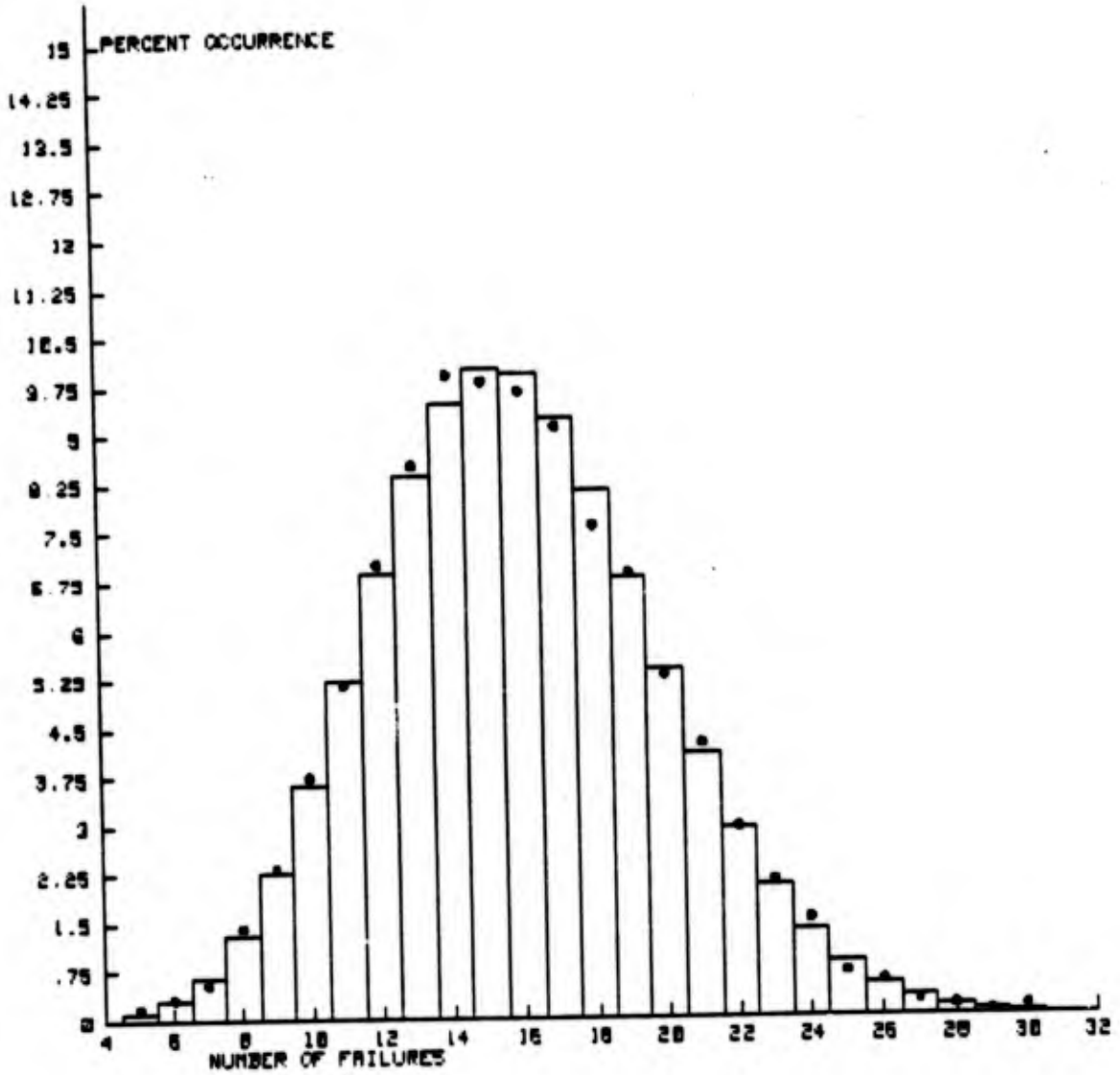

Figure A2. 10 - Theoritical Histogram Versus Simulated Frequencies For Scale= .01 and Shape= .8 .

Table A2. 11 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .005 and Shape Parameter = .9

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
X≤ 7	10	8.2969	1.7031	.35
8	10	13.8501	3.8501	1.07
9	29	30.6323	1.6323	.09
10	69	60.9747	8.0253	1.06
11	121	110.3385	10.6615	1.03
12	180	183.0272	3.0272	.05
13	344	280.2479	63.7521	14.50
14	398	398.4596	.4596	.00
15	499	528.7655	29.7655	1.68
16	644	657.8291	13.8291	.29
17	784	770.2544	13.7456	.25
18	815	851.7883	36.7883	1.59
19	911	892.3764	18.6236	.39
20	884	888.1536	4.1536	.02
21	799	841.8579	42.8579	2.18
22	764	761.7038	2.2962	.01
23	648	659.2169	11.2169	.19
24	575	546.7478	28.2522	1.46
25	476	435.3285	40.6715	3.80
26	312	333.2834	21.2834	1.36
27	231	245.7084	14.7084	.88
28	184	174.6755	9.3245	.50
29	102	119.8958	17.8958	2.67
30	80	79.5523	.4477	.00
31	53	51.0812	1.9188	.07
32	27	31.7747	4.7747	.72
33	24	19.1662	4.8338	1.22
34	16	11.2209	4.7791	2.04
35	4	6.3816	2.3816	.89
X≥ 36	7	7.3890	.3890	.02

The Chi-Square Test Statistic = 40.3588175056

There are 29 degrees of freedom.

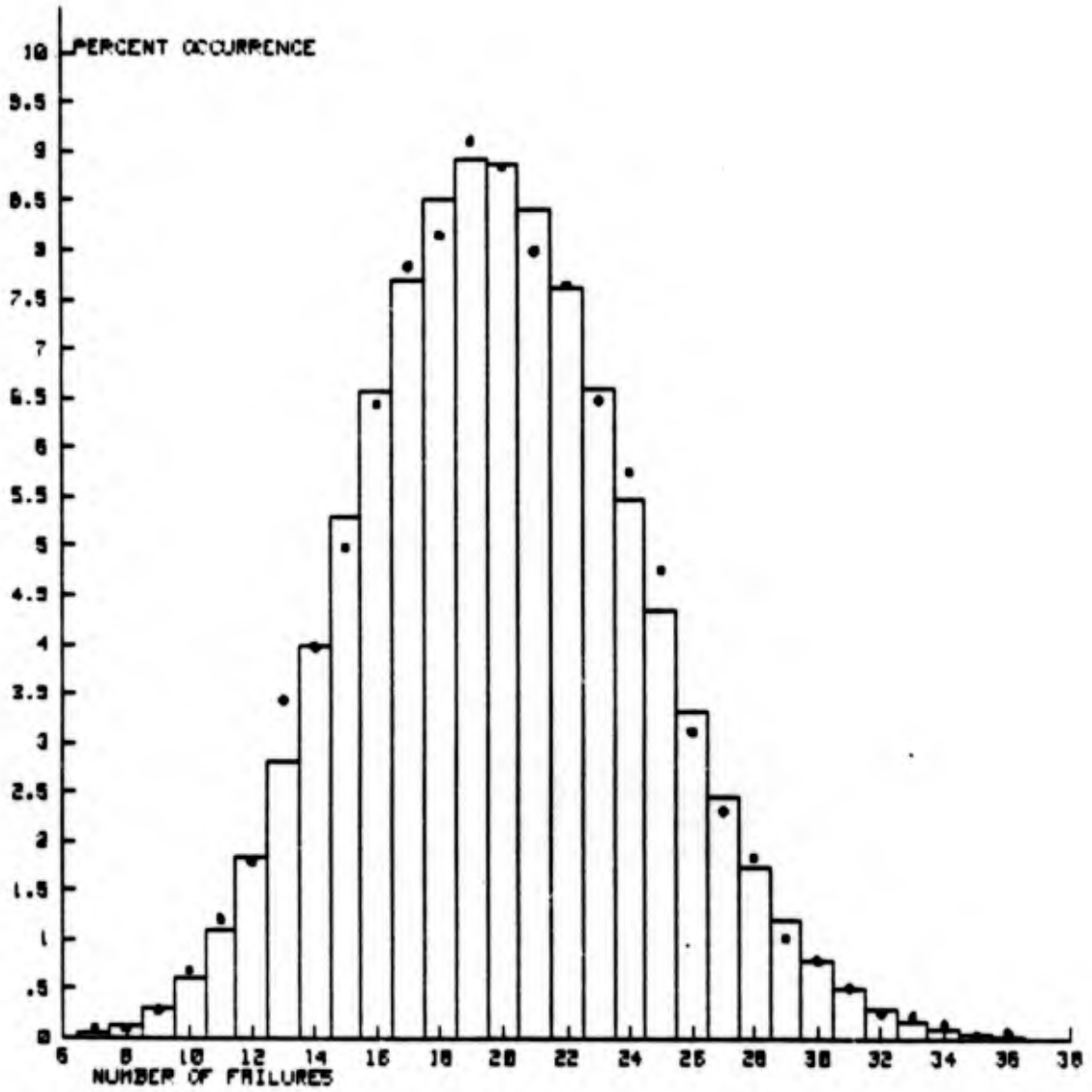

Figure A2. 11 - Theoritical Histogram Versus Simulated Frequencies For Scale= .005 and Shape= .9 .

Table A2. 12 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .003 and Shape Parameter = .95

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
X≤ 6	9	5.4640	3.5360	2.29
7	10	10.3939	.3939	.01
8	24	24.5930	.5930	.01
9	48	51.7237	3.7237	.27
10	112	97.9063	14.0937	2.03
11	142	168.4765	26.4765	4.16
12	287	265.7537	21.2463	1.70
13	382	386.9521	4.9521	.06
14	516	523.1791	7.1791	.10
15	634	660.2074	26.2074	1.04
16	801	781.0551	19.9449	.51
17	865	869.6691	4.6691	.03
18	896	914.5401	18.5401	.38
19	869	911.1092	42.1092	1.95
20	899	862.3066	36.6934	1.56
21	766	777.2552	11.2552	.16
22	685	668.7476	16.2524	.39
23	588	550.3711	37.6289	2.57
24	412	434.0759	22.0759	1.12
25	376	328.6600	47.3400	6.82
26	230	239.2736	9.2736	.36
27	159	167.7460	8.7460	.46
28	108	113.4006	5.4006	.26
29	63	74.0182	11.0182	1.64
30	53	46.7024	6.2976	.85
31	26	28.5166	2.5166	.22
32	20	16.8682	3.1318	.58
33	7	9.6756	2.6756	.74
34	8	5.3867	2.6133	1.27
X≥ 35	5	5.8084	.8084	.11

The Chi-Square Test Statistic = 33.65189223

There are 29 degrees of freedom.

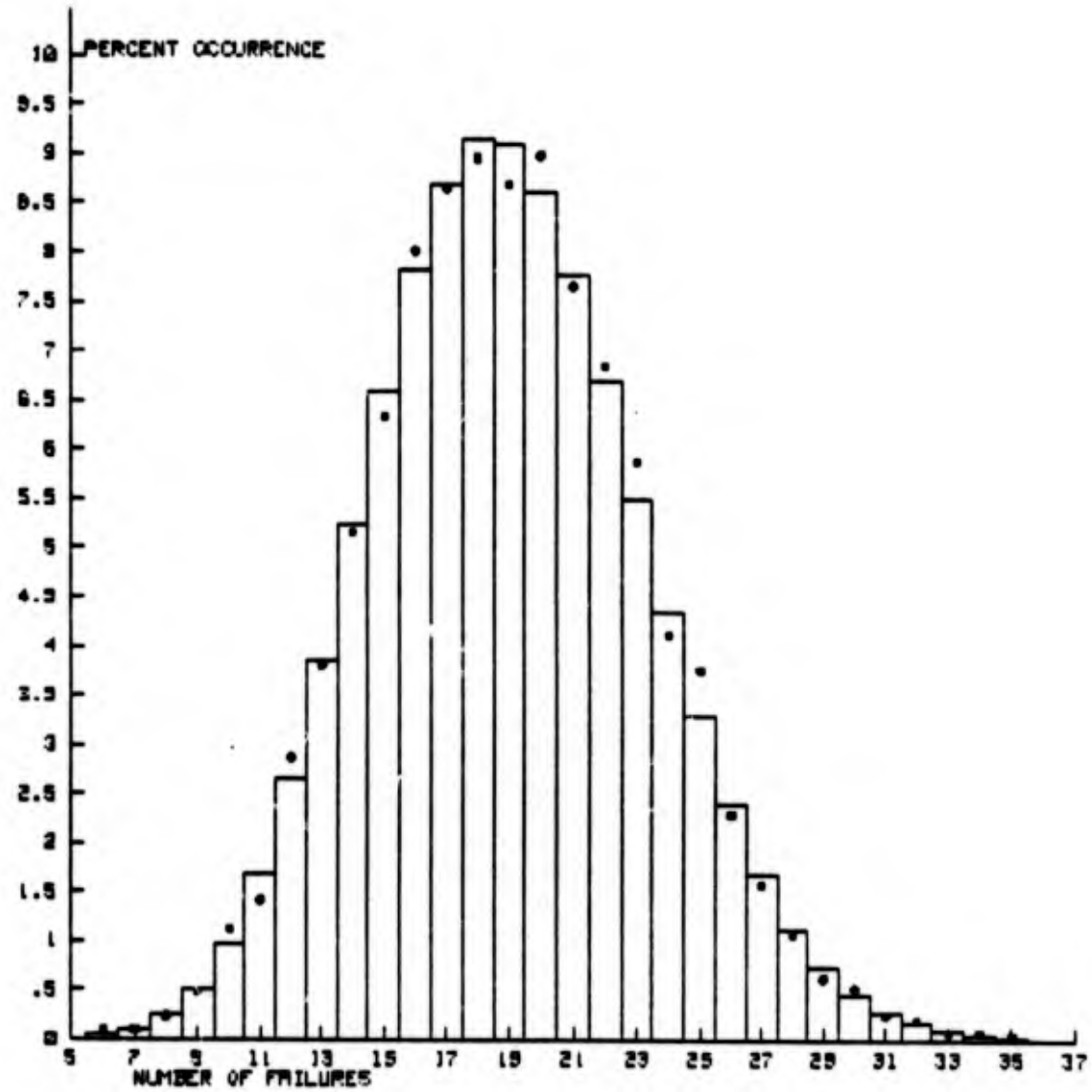

Figure A2. 12 - Theoritical Histogram Versus Simulated Frequencies For Scale= .003 and Shape= .95 .

Table A2. 13 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .001 and Shape Parameter = 1

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
X≤ 2	25	27.6940	2.6940	.26
3	88	75.6665	12.3335	2.01
4	192	189.1664	2.8336	.04
5	393	378.3327	14.6673	.57
6	647	630.5546	16.4454	.43
7	906	900.7923	5.2077	.03
8	1110	1125.9903	15.9903	.23
9	1289	1251.1004	37.8996	1.15
10	1226	1251.1004	25.1004	.50
11	1103	1137.3640	34.3640	1.04
12	970	947.8033	22.1967	.52
13	687	729.0795	42.0795	2.43
14	494	520.7710	26.7710	1.38
15	350	347.1807	2.8193	.02
16	208	216.9879	8.9879	.37
17	139	127.6400	11.3600	1.01
18	82	70.9111	11.0889	1.73
19	44	37.3216	6.6784	1.20
20	26	18.6608	7.3392	2.89
21	14	8.8861	5.1139	2.94
X≥ 22	7	6.9940	.0060	.00

The Chi-Square Test Statistic = 20.7489814785

There are 20 degrees of freedom.

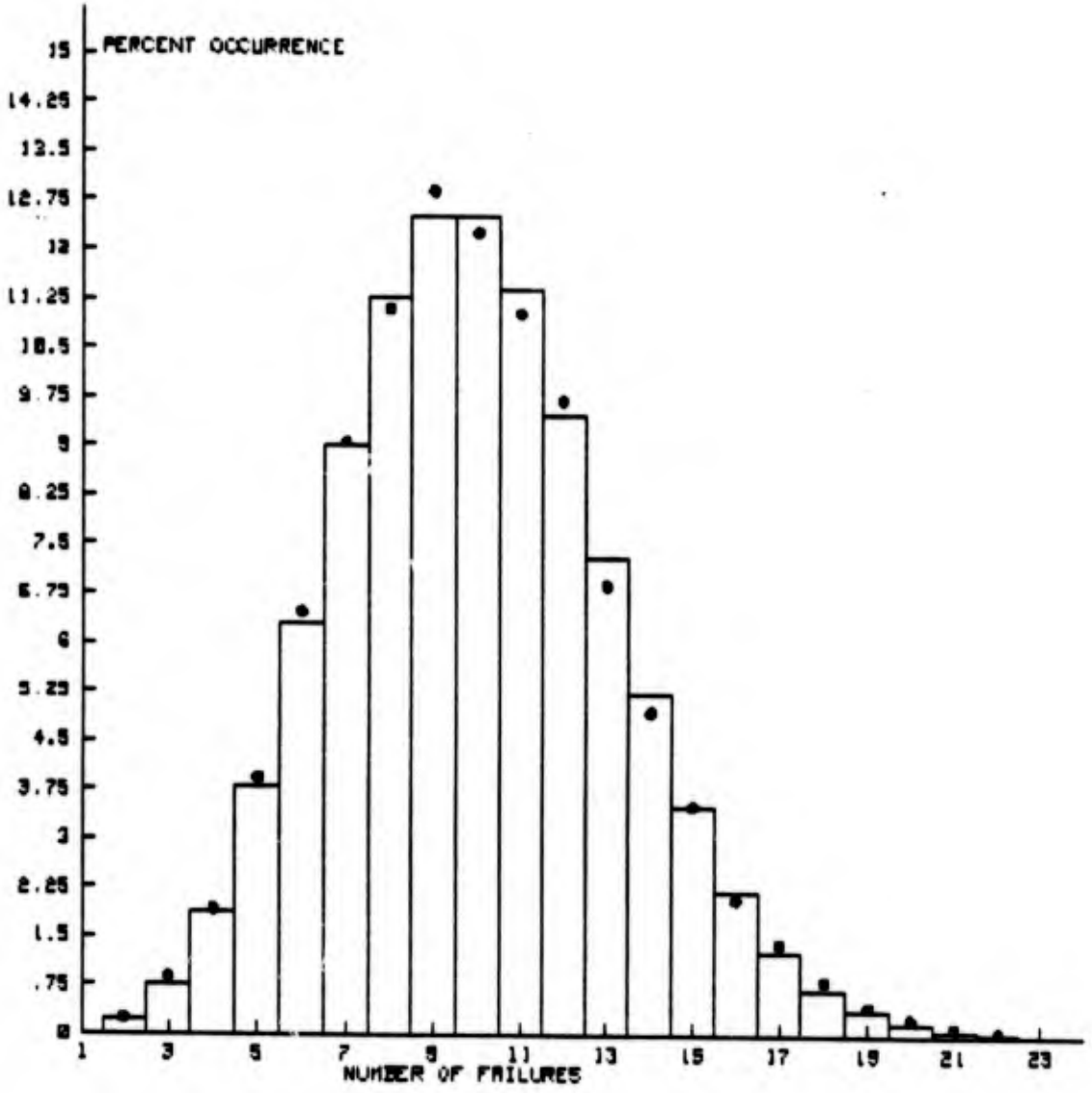

Figure A2. 13 - Theoritical Histogram Versus Simulated Frequencies For Scale= .001 and Shape= 1 .

Table A2. 14 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .001 and Shape Parameter = 1.1

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
X≤ 10	2	5.4459	3.4459	2.18
11	11	7.7600	3.2400	1.35
12	13	16.2435	3.2435	.65
13	25	31.3860	6.3860	1.30
14	61	56.3128	4.6872	.39
15	91	94.3010	3.3010	.12
16	177	148.0459	28.9541	5.66
17	229	218.7496	10.2504	.48
18	293	305.2635	12.2635	.49
19	395	403.5722	8.5722	.18
20	498	506.8637	8.8637	.16
21	566	606.2782	40.2782	2.68
22	703	692.2281	10.7719	.17
23	769	755.9993	13.0007	.22
24	791	791.2435	.2435	.00
25	804	795.0055	8.9945	.10
26	753	768.0629	15.0629	.30
27	737	714.5507	22.4493	.71
28	610	641.0251	31.0251	1.50
29	532	555.2352	23.2352	.97
30	512	464.8959	47.1041	4.77
31	432	376.6987	55.3013	8.12
32	277	295.6951	18.6951	1.18
33	227	225.0765	1.9235	.02
34	144	166.2843	22.2843	2.99
35	102	119.3392	17.3392	2.52
36	89	83.2685	5.7315	.39
37	50	56.5300	6.5300	.75
38	49	37.3676	11.6324	3.62
39	19	24.0675	5.0675	1.07
40	11	15.1137	4.1137	1.12
41	14	9.2595	4.7405	2.43
42	4	5.5378	1.5378	.43
X≥ 43	10	7.2145	2.7855	1.08

The Chi-Square Test Statistic = 50.0835188408

There are 33 degrees of freedom.

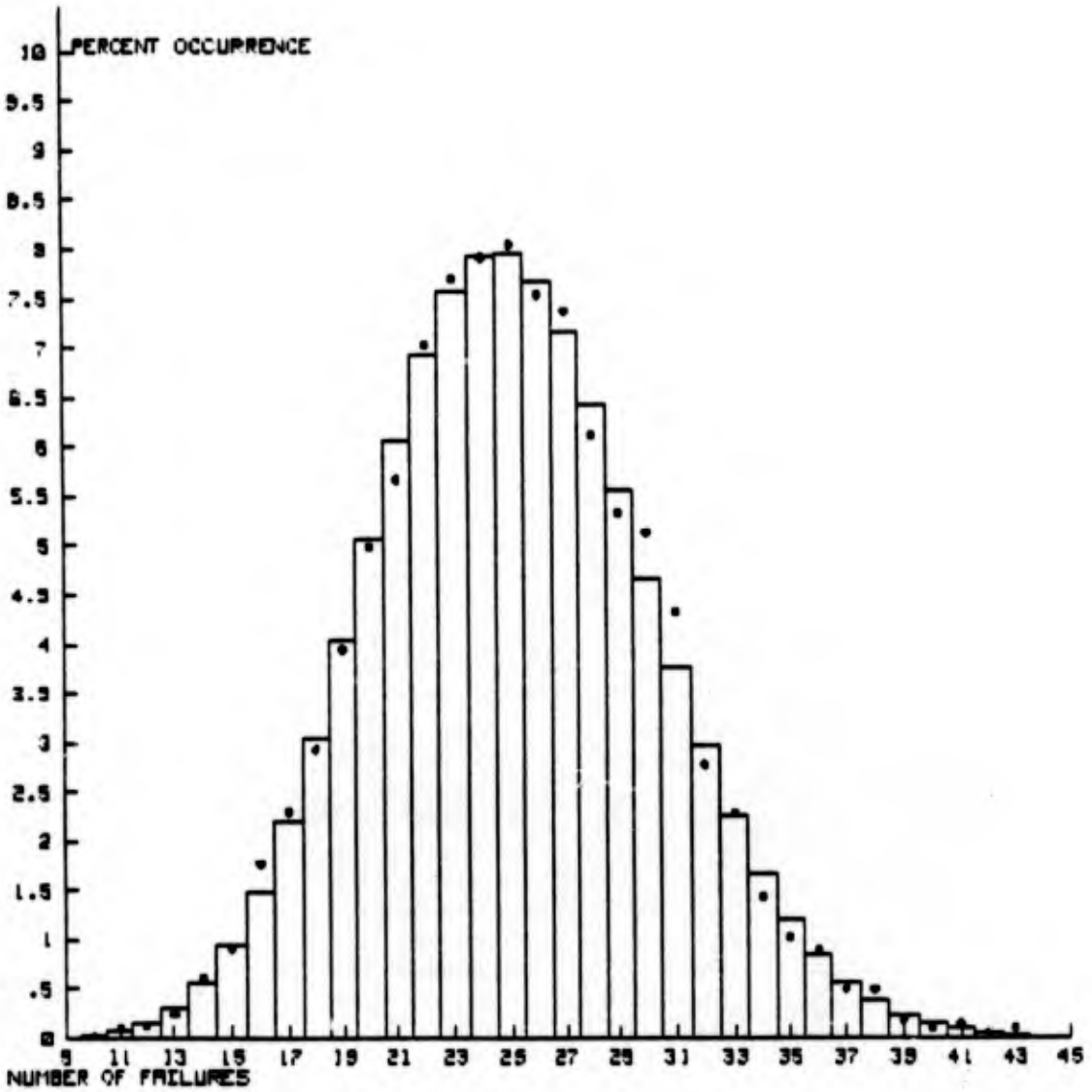

Figure A2. 14 - Theoritical Histogram Versus Simulated Frequencies For Scale= .001 and Shape= 1.1 .

Table A2. 15 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .00005 and Shape Parameter = 1.2

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
0	436	426.4750	9.5250	.21
1	1339	1345.4375	6.4375	.03
2	2176	2122.2842	53.7158	1.36
3	2249	2231.7847	17.2153	.13
4	1733	1760.2012	27.2012	.42
5	1068	1110.6119	42.6119	1.63
6	571	583.9573	12.9573	.29
7	273	263.1801	9.8199	.37
8	95	103.7846	8.7846	.74
9	41	36.3798	4.6202	.59
X≥ 10	19	14.7687	4.2313	1.21

The Chi-Square Test Statistic = 6.98771084448

There are 10 degrees of freedom.

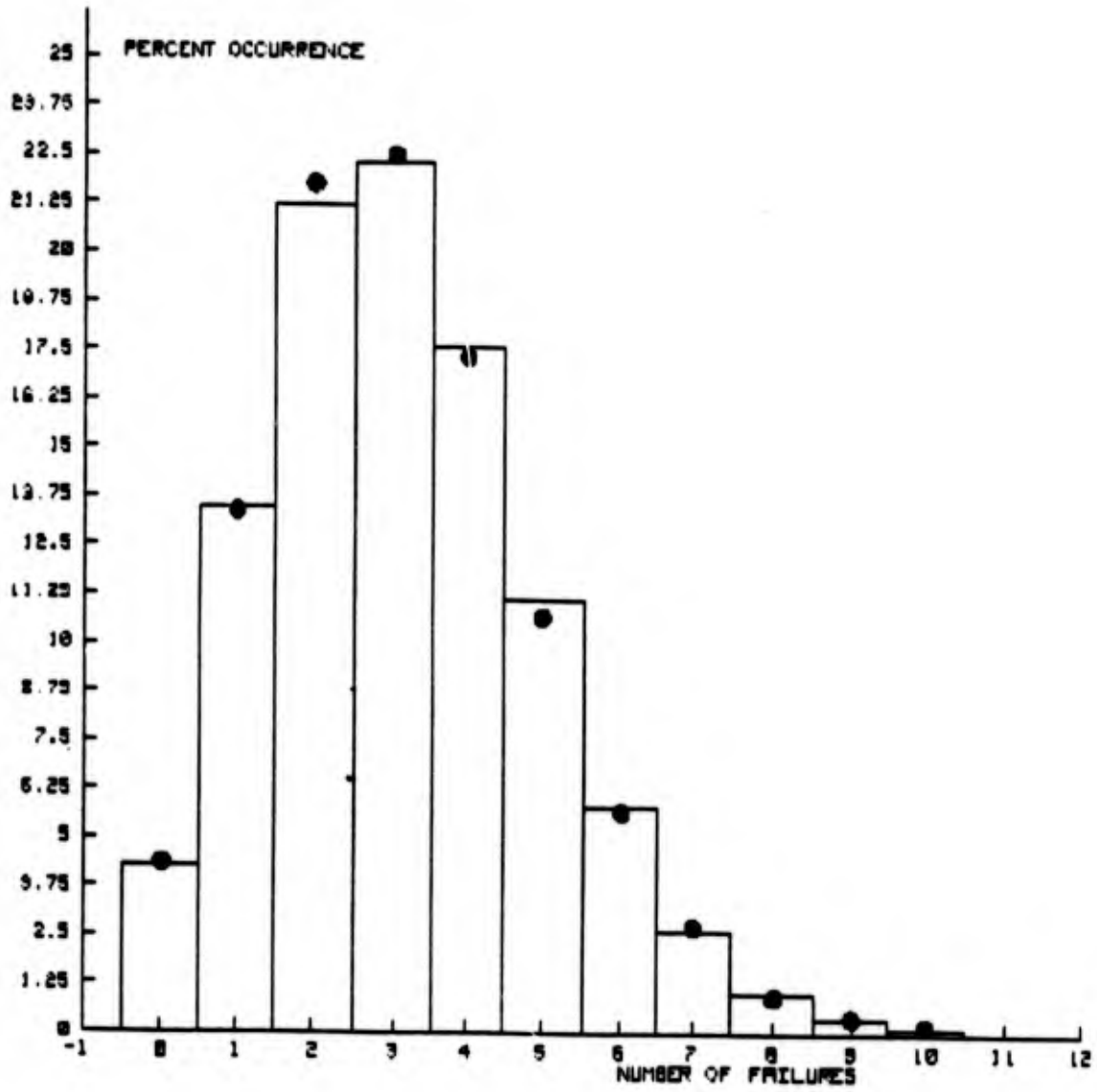

Figure A2. 15 - Theoritical Histogram Versus Simulated Frequencies For Scale= .00005 and Shape= 1.2 .

Table A2. 16 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .00005 and Shape Parameter = 1.25

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
0	57	67.3795	10.3795	1.60
1	368	336.8974	31.1026	2.87
2	871	842.2434	28.7566	.98
3	1402	1403.7390	1.7390	.00
4	1746	1754.6737	8.6737	.04
5	1758	1754.6737	3.3263	.01
6	1437	1462.2281	25.2281	.44
7	1052	1044.4486	7.5514	.05
8	631	652.7804	21.7804	.73
9	367	362.6558	4.3442	.05
10	175	181.3279	6.3279	.22
11	85	82.4218	2.5782	.08
12	35	34.3424	.6576	.01
X≥ 13	16	17.9260	1.9260	.21

The Chi-Square Test Statistic = 7.29311137726

There are 13 degrees of freedom.

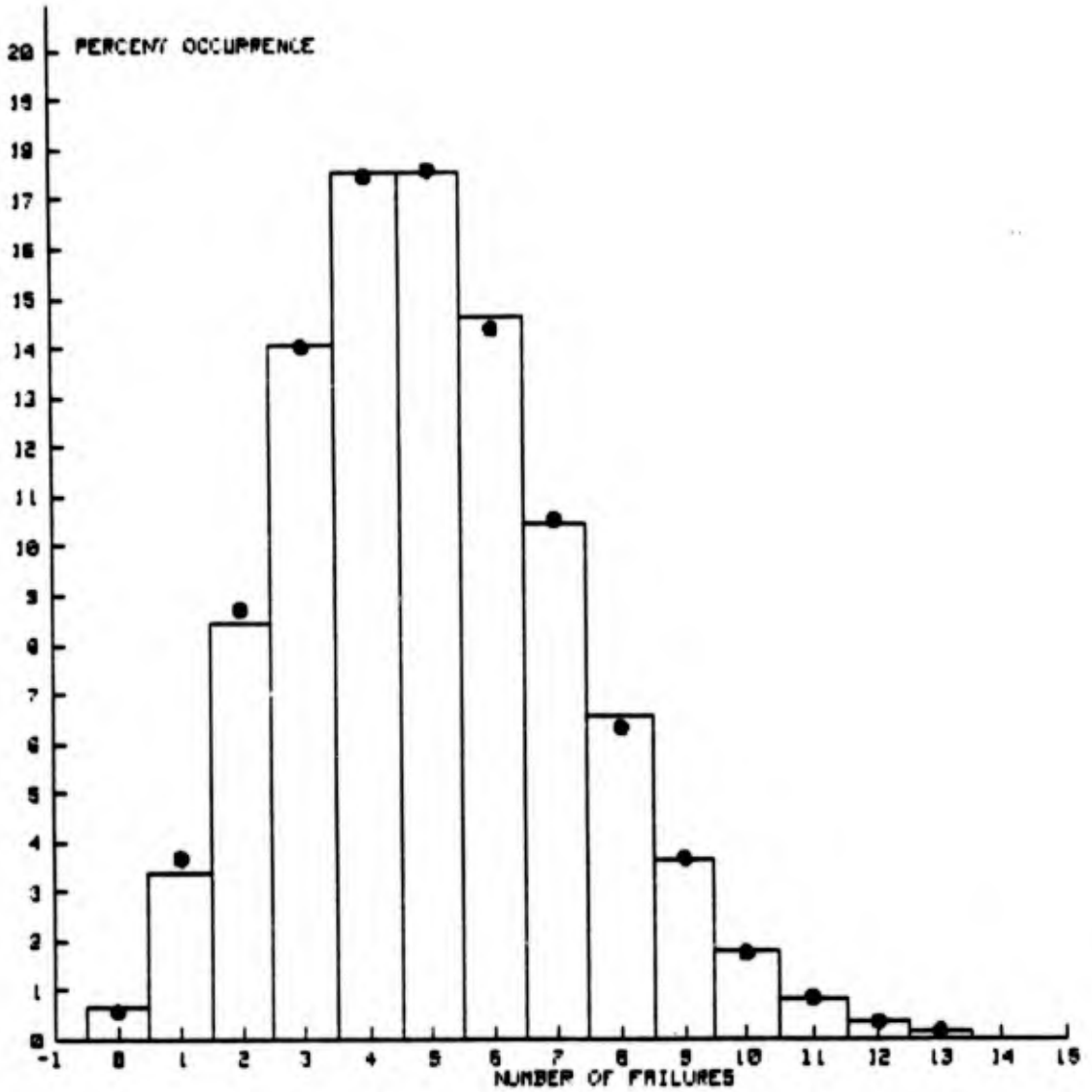

Figure A2. 16 - Theoritical Histogram Versus Simulated Frequencies For Scale= .00005 and Shape= 1.25 .

Table A2. 17 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .00008 and Shape Parameter = 1.3

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
X≤ 3	19	13.5140	5.4860	2.23
4	26	33.5479	7.5479	1.70
5	89	85.0718	3.9282	.18
6	190	179.7730	10.2270	.58
7	340	325.6240	14.3760	.63
8	486	516.0793	30.0793	1.75
9	718	727.0494	9.0494	.11
10	948	921.8365	26.1635	.74
11	1075	1062.5545	12.4455	.15
12	1134	1122.6902	11.3098	.11
13	1077	1094.9810	17.9810	.30
14	979	991.6731	12.6731	.16
15	779	838.2378	59.2378	4.19
16	663	664.2587	1.2587	.00
17	518	495.4255	22.5745	1.03
18	368	348.9762	19.0238	1.04
19	248	232.8800	15.1200	.98
20	161	147.6360	13.3640	1.21
21	83	89.1380	6.1380	.42
22	57	51.3724	5.6276	.62
23	16	28.3199	12.3199	5.36
24	14	14.9614	.9614	.06
25	5	7.5879	2.5879	.88
X≥ 26	7	6.7737	.2263	.01

The Chi-Square Test Statistic = 24.4447346868

There are 23 degrees of freedom.

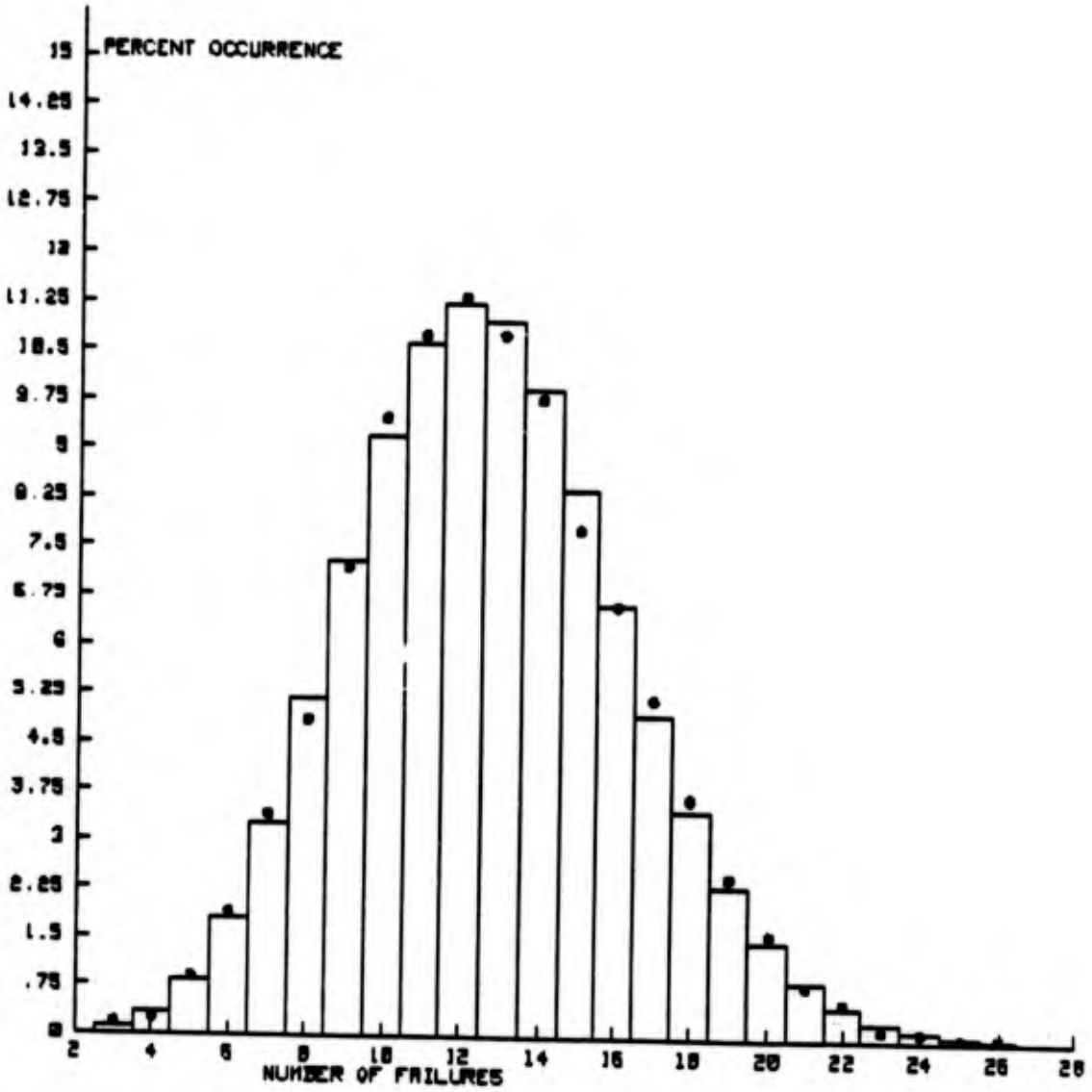

Figure A2. 17 - Theoritical Histogram Versus Simulated Frequencies For Scale= .00008 and Shape= 1.3 .

Table A2. 18 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .00005 and Shape Parameter = 1.4

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
X≤ 7	9	8.2969	.7031	.06
8	16	13.8501	2.1499	.33
9	31	30.6323	.3677	.00
10	62	60.9747	1.0253	.02
11	102	110.3385	8.3385	.63
12	186	183.0272	2.9728	.05
13	315	280.2479	34.7521	4.31
14	411	398.4596	12.5404	.39
15	508	528.7655	20.7655	.82
16	658	657.8291	.1709	.00
17	779	770.2544	8.7456	.10
18	823	851.7883	28.7883	.97
19	890	892.3764	2.3764	.01
20	892	888.1536	3.8464	.02
21	834	841.8579	7.8579	.07
22	791	761.7038	29.2962	1.13
23	652	659.2169	7.2169	.08
24	533	546.7478	13.7478	.35
25	454	435.3285	18.6715	.80
26	316	333.2834	17.2834	.90
27	225	245.7084	20.7084	1.75
28	184	174.6755	9.3245	.50
29	113	119.8958	6.8958	.40
30	84	79.5523	4.4477	.25
31	58	51.0812	6.9188	.94
32	31	31.7747	.7747	.02
33	22	19.1662	2.8338	.42
34	8	11.2209	3.2209	.92
35	6	6.3816	.3816	.02
X≥ 36	7	7.3890	.3890	.02

The Chi-Square Test Statistic = 16.2614240945

There are 29 degrees of freedom.

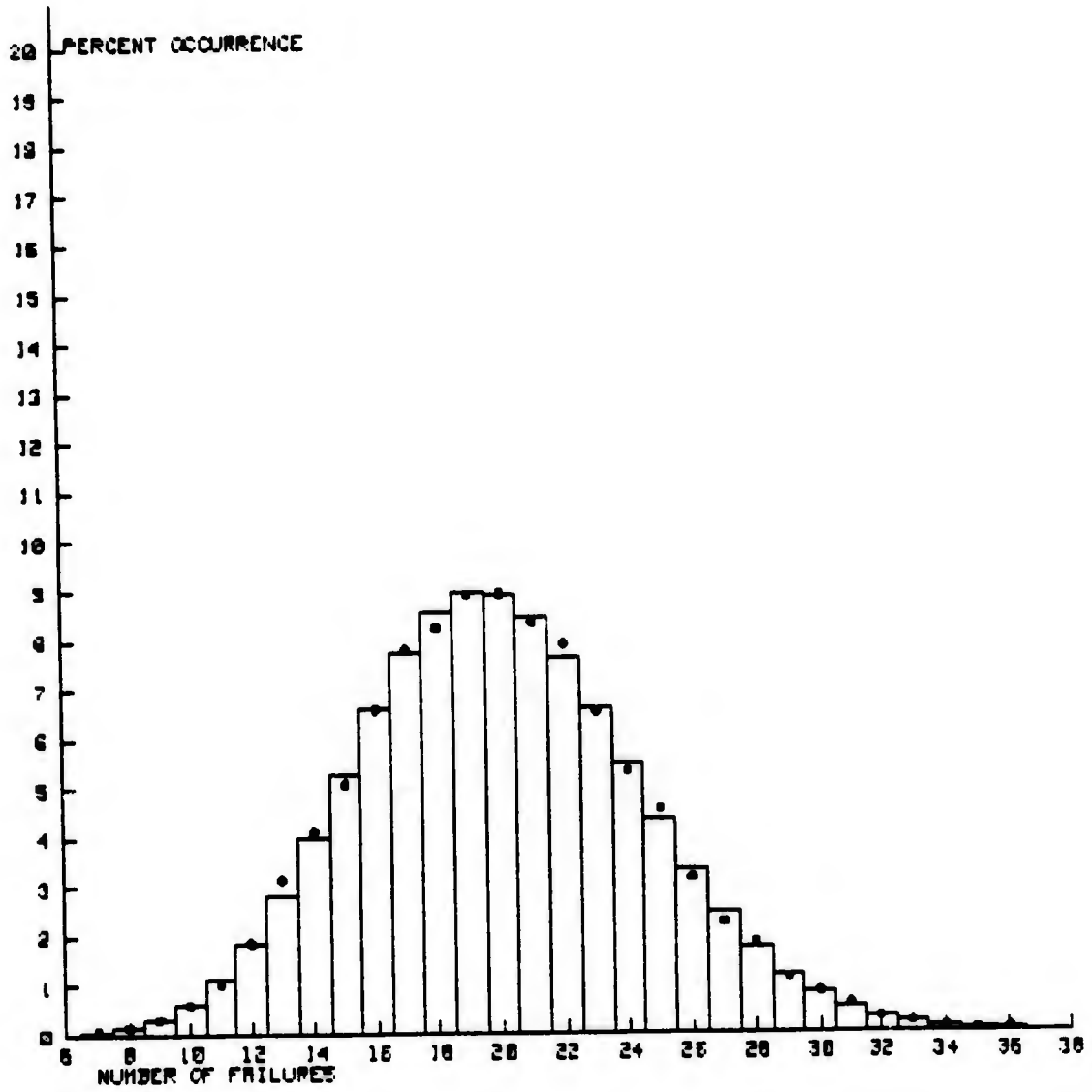

Figure A2. 18 - Theoritical Histogram Versus Simulated Frequencies For Scale= .00005 and Shape= 1.4 .

Table A2. 19 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .000006 and Shape Parameter = 1.5

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
0	38	24.7875	13.2125	7.04
1	146	148.7251	2.7251	.05
2	459	446.1754	12.8246	.37
3	884	892.3508	8.3508	.08
4	1389	1338.5262	50.4738	1.90
5	1604	1606.2314	2.2314	.00
6	1557	1606.2314	49.2314	1.51
7	1417	1376.7698	40.2302	1.18
8	990	1032.5773	42.5773	1.76
9	678	688.3849	10.3849	.16
10	416	413.0309	2.9691	.02
11	226	225.2896	.7104	.00
12	108	112.6448	4.6448	.19
13	54	51.9899	2.0101	.08
14	24	22.2814	1.7186	.13
$X \geq 15$	10	13.4344	3.4344	.88

The Chi-Square Test Statistic = 15.3458959296

There are 15 degrees of freedom.

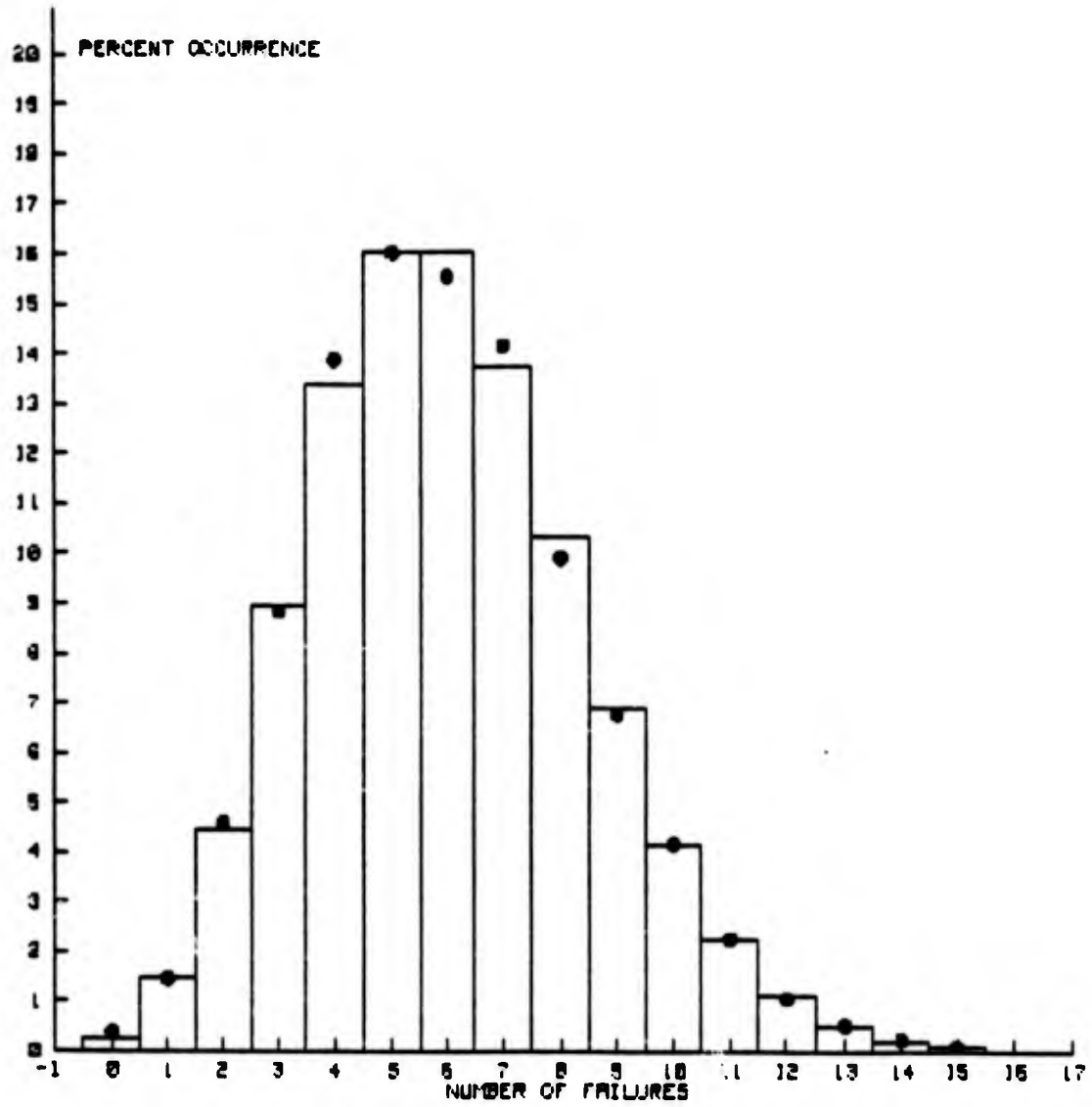

Figure A2. 19 - Theoritical Histogram Versus Simulated Frequencies For Scale= .000006 and Shape= 1.5 .

Table A2. 20 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .00001 and Shape Parameter = 1.6

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
X≤ 10	4	5.4459	1.4459	.38
11	9	7.7600	1.2400	.20
12	14	16.2435	2.2435	.31
13	22	31.3860	9.3860	2.81
14	64	56.3128	7.6872	1.05
15	95	94.3010	.6990	.01
16	175	148.0459	26.9541	4.91
17	245	218.7496	26.2504	3.15
18	309	305.2635	3.7365	.05
19	417	403.5722	13.4278	.45
20	501	506.8637	5.8637	.07
21	594	606.2782	12.2782	.25
22	692	692.2281	.2281	.00
23	787	755.9993	31.0007	1.27
24	772	791.2435	19.2435	.47
25	786	795.0055	9.0055	.10
26	736	768.0629	32.0629	1.34
27	708	714.5507	6.5507	.06
28	608	641.0251	33.0251	1.70
29	542	555.2352	13.2352	.32
30	469	464.8959	4.1041	.04
31	429	376.6987	52.3013	7.26
32	294	295.6951	1.6951	.01
33	220	225.0765	5.0765	.11
34	147	166.2843	19.2843	2.24
35	110	119.3392	9.3392	.73
36	91	83.2685	7.7315	.72
37	55	56.5300	1.5300	.04
38	50	37.3676	12.6324	4.27
39	18	24.0675	6.0675	1.53
40	12	15.1137	3.1137	.64
41	12	9.2595	2.7405	.81
42	4	5.5378	1.5378	.43
X≥ 43	9	7.2145	1.7855	.44

The Chi-Square Test Statistic = 38.1468261125

There are 33 degrees of freedom.

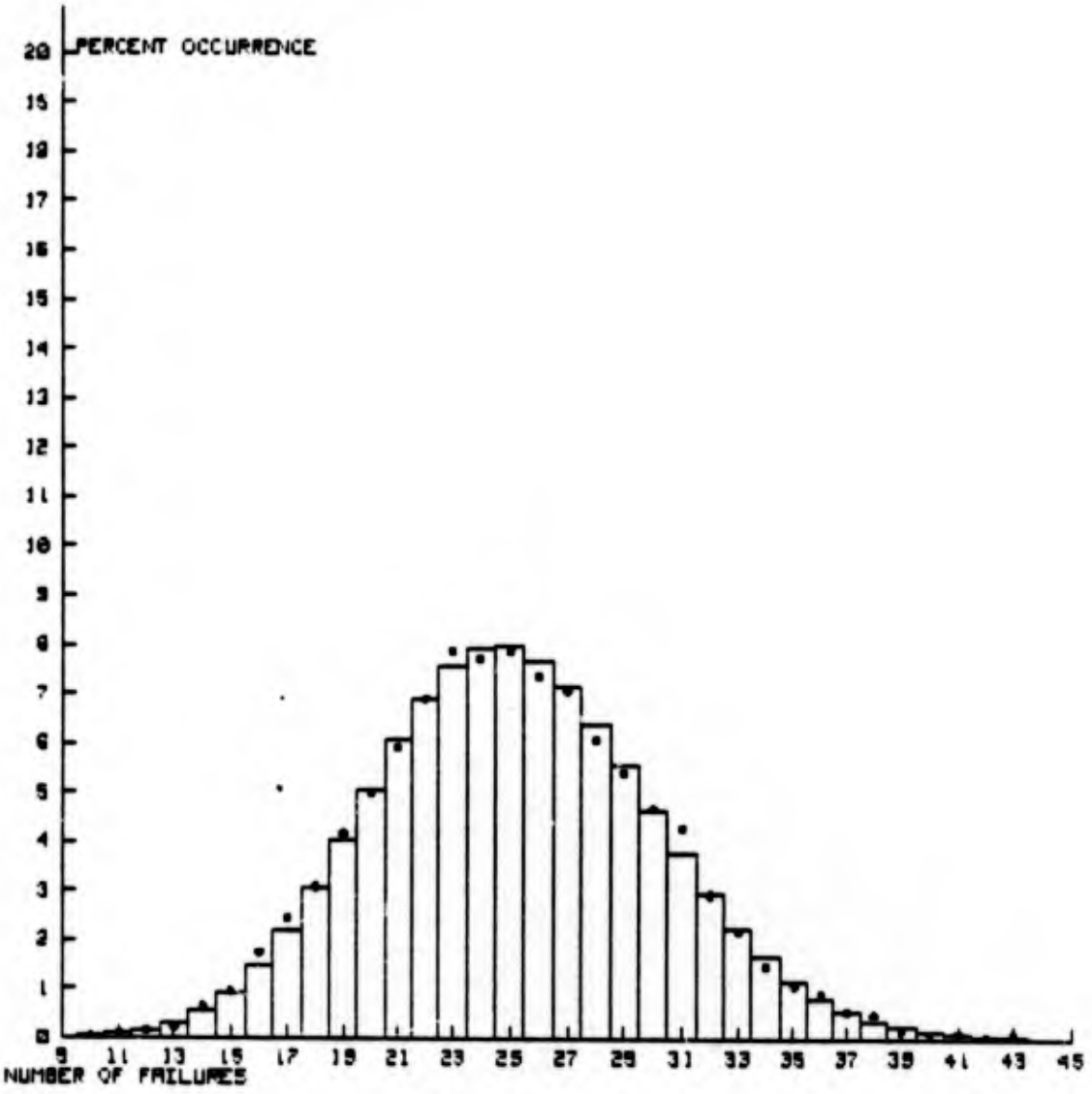

Figure A2. 20 - Theoritical Histogram Versus Simulated Frequencies For Scale= .00001 and Shape= 1.6 .

Table A2. 21 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .000002 and Shape Parameter = 1.7

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
X≤ 3	11	14.1638	3.1638	.71
4	30	34.9529	4.9529	.70
5	97	88.2151	8.7849	.87
6	197	185.5332	11.4668	.71
7	354	334.4672	19.5328	1.14
8	523	527.5864	4.5864	.04
9	764	739.7433	24.2567	.80
10	915	933.4930	18.4930	.37
11	1079	1070.8987	8.1013	.06
12	1137	1126.1523	10.8477	.10
13	1031	1093.1601	62.1601	3.53
14	996	985.3391	10.6609	.12
15	787	828.9426	41.9426	2.12
16	683	653.7843	29.2157	1.31
17	507	485.3059	21.6941	.97
18	336	340.2303	4.2303	.05
19	231	225.9693	5.0307	.11
20	154	142.5770	11.4230	.92
21	89	85.6762	3.3238	.13
22	42	49.1437	7.1437	1.04
23	16	26.9631	10.9631	4.46
24	7	14.1771	7.1771	3.63
25	5	7.1561	2.1561	.65
X≥ 26	9	6.3349	2.6651	1.12

The Chi-Square Test Statistic = 25.656584122

There are 23 degrees of freedom.

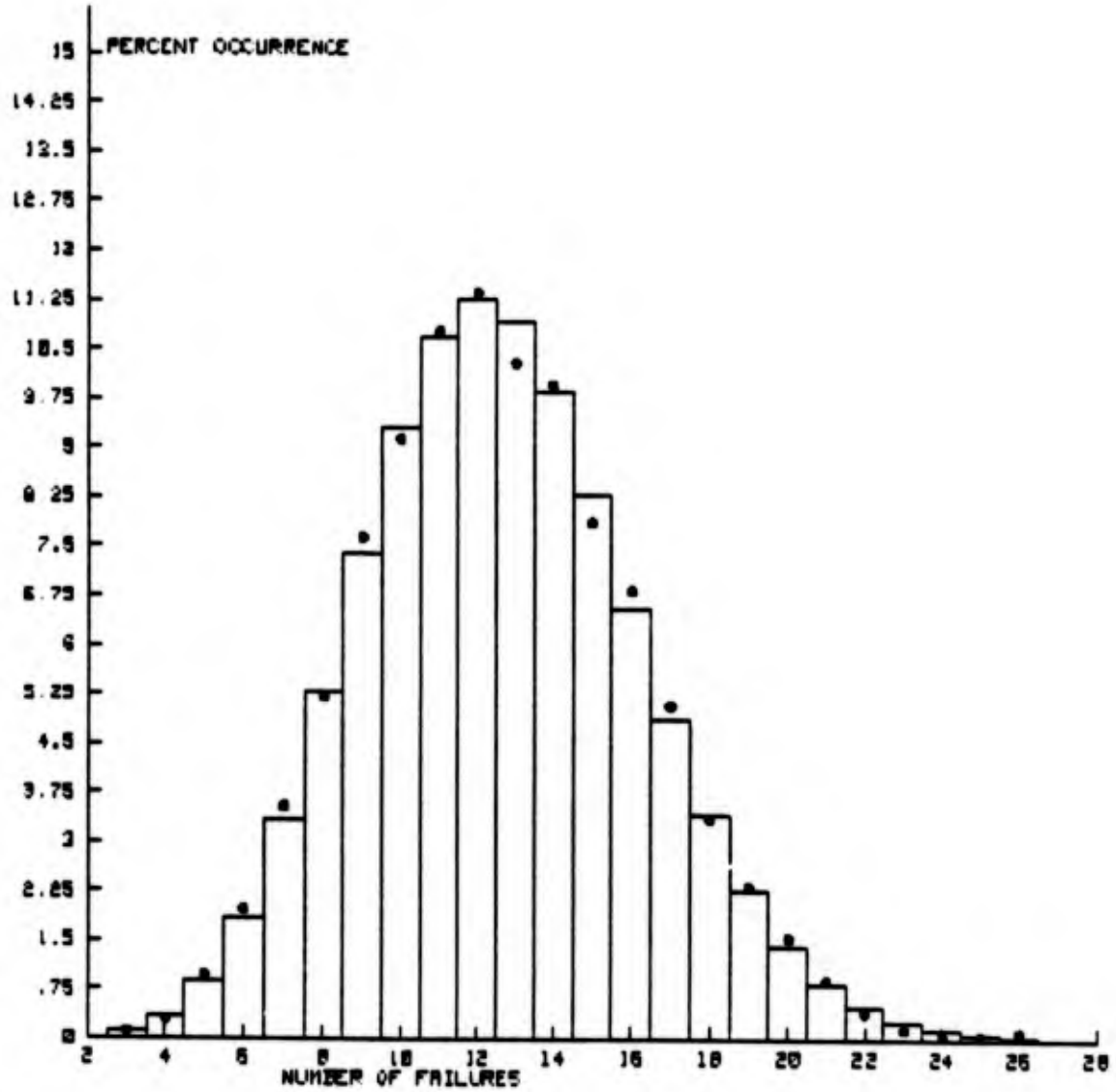

Figure A2. 21 - Theoritical Histogram Versus Simulated Frequencies For Scale= .000002 and Shape= 1.7 .

Table A2. 22 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .0000005 and Shape Parameter = 1.8

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
X≤ 1	31	32.2872	1.2872	.05
2	122	113.5947	8.4053	.62
3	297	300.0592	3.0592	.03
4	587	594.4522	7.4522	.09
5	951	942.1432	8.8568	.08
6	1243	1244.3303	1.3303	.00
7	1422	1408.6648	13.3352	.13
8	1402	1395.3645	6.6355	.03
9	1210	1228.6132	18.6132	.28
10	962	973.6103	11.6103	.14
11	680	701.3947	21.3947	.65
12	465	463.1815	1.8185	.01
13	271	282.3436	11.3436	.46
14	180	159.8159	20.1841	2.55
15	91	84.4304	6.5696	.51
16	52	41.8166	10.1834	2.48
17	21	19.4926	1.5074	.12
18	9	8.5816	.4184	.02
X≥ 19	4	5.5325	1.5325	.42

The Chi-Square Test Statistic = 8.67802723128

There are 18 degrees of freedom.

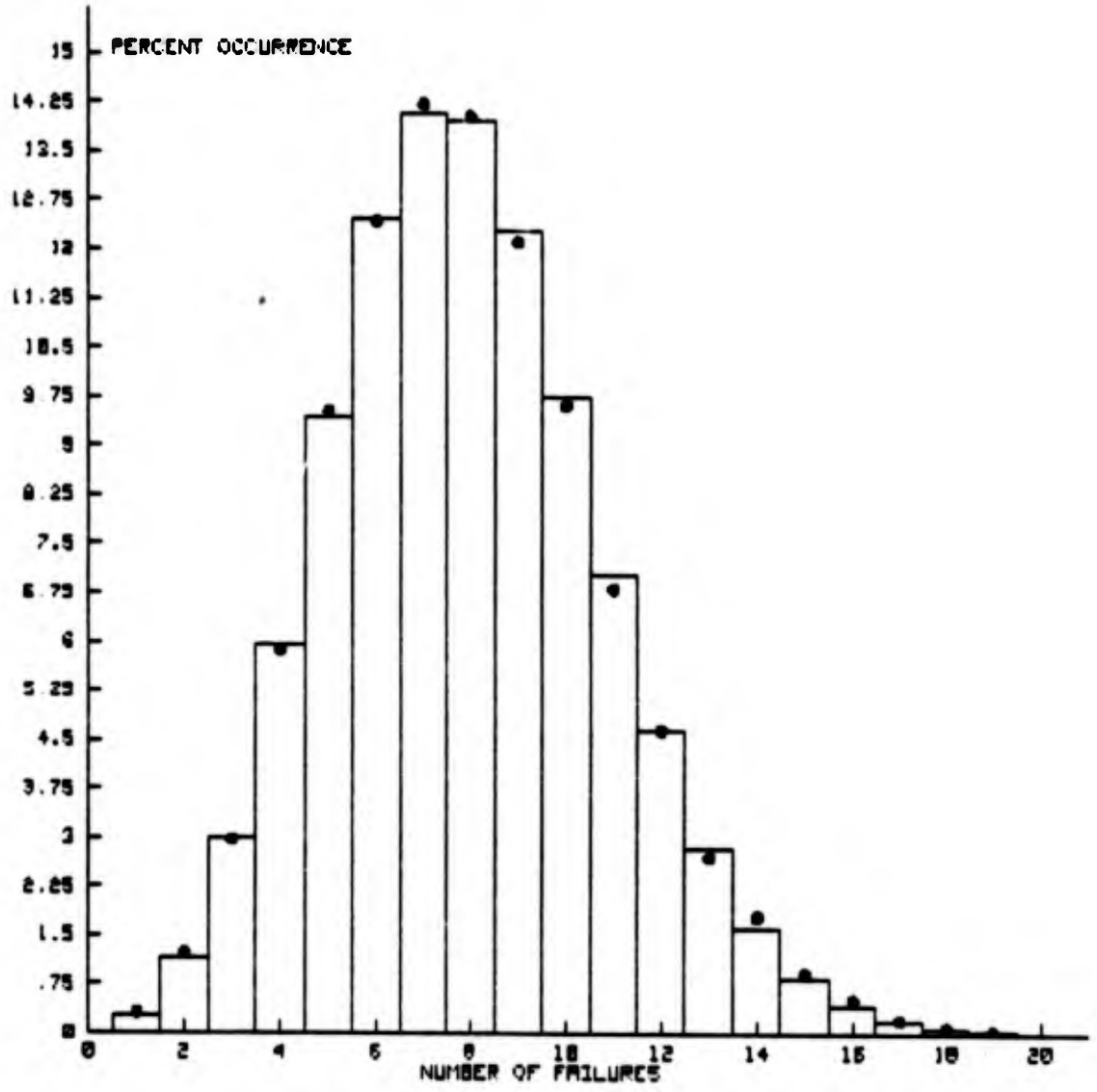

Figure A2. 22 - Theoritical Histogram Versus Simulated Frequencies For Scale= .0000005 and Shape= 1.8 .

Table A2. 23 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .0000005 and Shape Parameter = 1.9

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
X≤ 7	9	8.2969	.7031	.06
8	16	13.8501	2.1499	.33
9	27	30.6323	3.6323	.43
10	66	60.9747	5.0253	.41
11	109	110.3385	1.3385	.02
12	179	183.0272	4.0272	.09
13	346	280.2479	65.7521	15.43
14	401	398.4596	2.5404	.02
15	492	528.7655	36.7655	2.56
16	639	657.8291	18.8291	.54
17	776	770.2544	5.7456	.04
18	808	851.7883	43.7883	2.25
19	886	892.3764	6.3764	.05
20	875	888.1536	13.1536	.19
21	811	841.8579	30.8579	1.13
22	807	761.7038	45.2962	2.69
23	665	659.2169	5.7831	.05
24	564	546.7478	17.2522	.54
25	470	435.3285	34.6715	2.76
26	322	333.2834	11.2834	.38
27	219	245.7084	26.7084	2.90
28	184	174.6755	9.3245	.50
29	111	119.8958	8.8958	.66
30	82	79.5523	2.4477	.08
31	58	51.0812	6.9188	.94
32	27	31.7747	4.7747	.72
33	25	19.1662	5.8338	1.78
34	12	11.2209	.7791	.05
35	6	6.3816	.3816	.02
X≥ 36	8	7.3890	.6110	.05

The Chi-Square Test Statistic = 37.6728575847

There are 29 degrees of freedom.

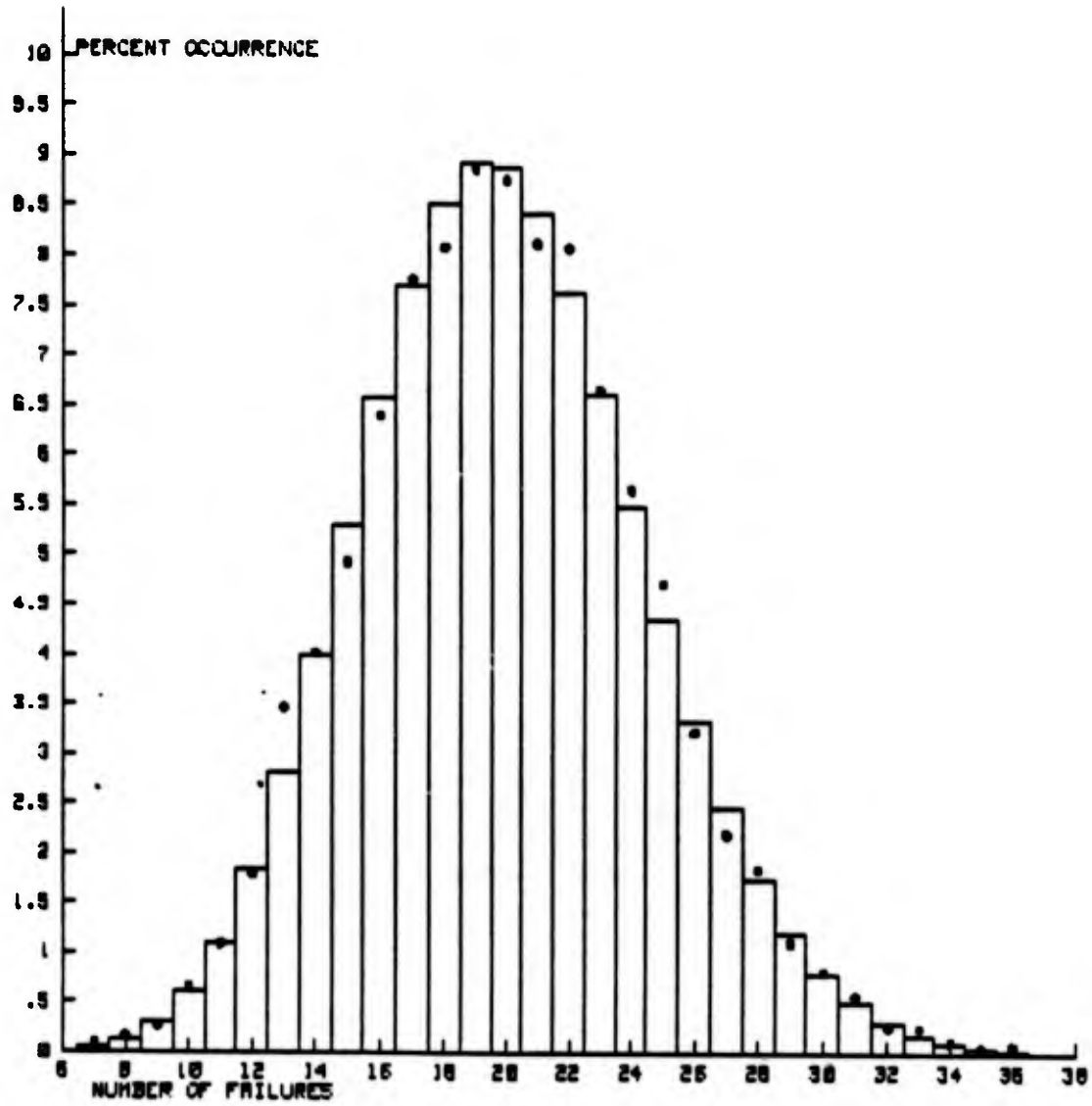

Figure A2. 23 - Theoritical Histogram Versus Simulated Frequencies For Scale= .0000005 and Shape= 1.9 .

Table A2. 24 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .0000001 and Shape Parameter = 2

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
X≤ 2	24	27.6940	3.6940	.49
3	71	75.6665	4.6665	.29
4	175	189.1664	14.1664	1.06
5	373	378.3327	5.3327	.08
6	627	630.5546	3.5546	.02
7	928	900.7923	27.2077	.82
8	1154	1125.9903	28.0097	.70
9	1327	1251.1004	75.8996	4.60
10	1241	1251.1004	10.1004	.08
11	1131	1137.3640	6.3640	.04
12	904	947.8033	43.8033	2.02
13	723	729.0795	6.0795	.05
14	497	520.7710	23.7710	1.09
15	339	347.1807	8.1807	.19
16	218	216.9879	1.0121	.00
17	118	127.6400	9.6400	.73
18	63	70.9111	7.9111	.88
19	42	37.3216	4.6784	.59
20	29	18.6608	10.3392	5.73
21	12	8.8861	3.1139	1.09
X≥ 22	4	5.7953	1.7953	.56

The Chi-Square Test Statistic = 21.1074319283

There are 20 degrees of freedom.

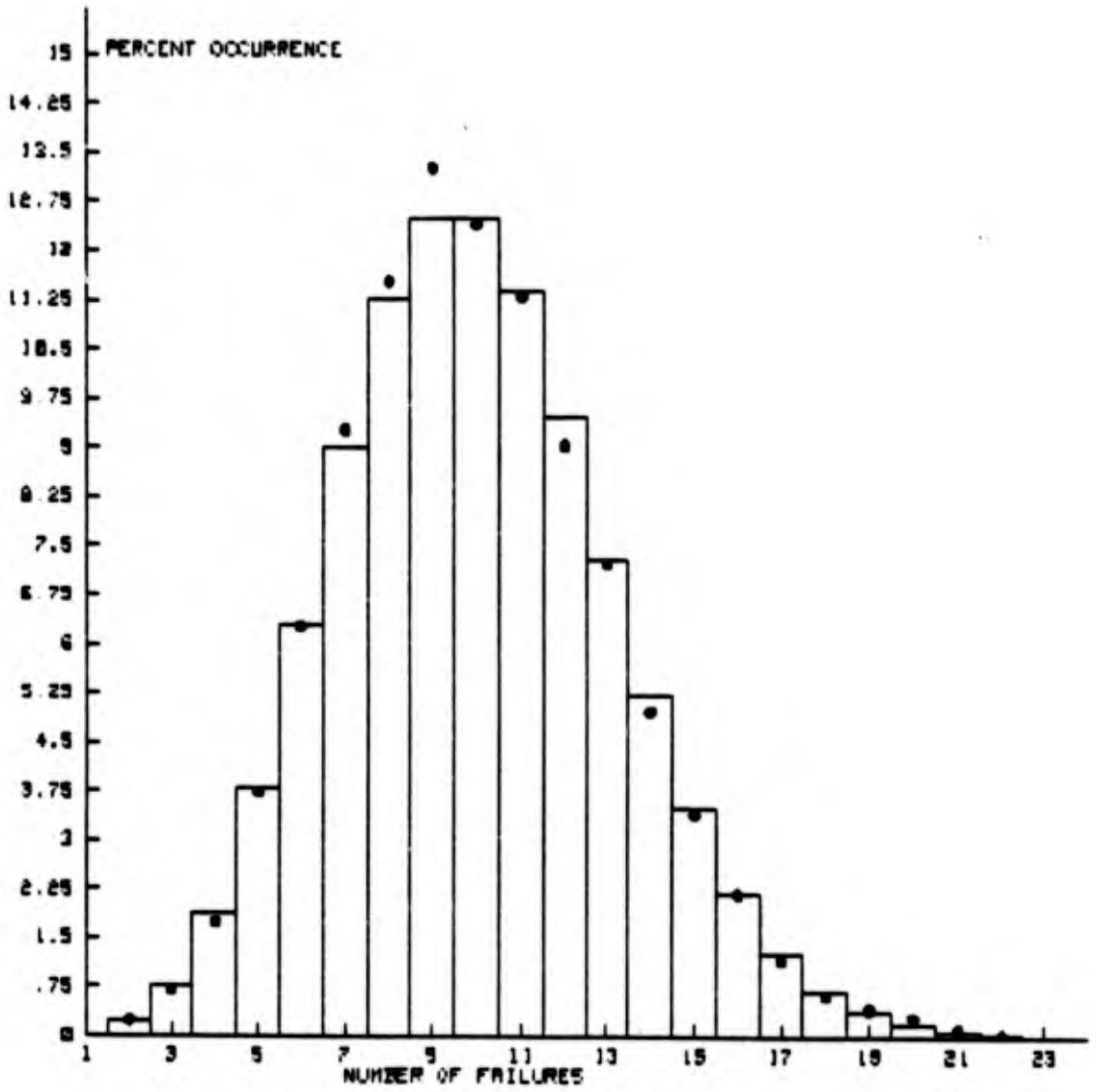

Figure A2. 24 - Theoritical Histogram Versus Simulated Frequencies For Scale= .0000001 and Shape= 2 .

Table A2. 25 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .0000000009 and Shape Parameter = 2.5

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
X≤ 1	14	12.3410	1.6590	.22
2	42	49.9810	7.9810	1.27
3	157	149.9429	7.0571	.33
4	329	337.3716	8.3716	.21
5	632	607.2688	24.7312	1.01
6	896	910.9032	14.9032	.24
7	1186	1171.1612	14.8388	.19
8	1390	1317.5564	72.4436	3.98
9	1276	1317.5564	41.5564	1.31
10	1181	1185.8008	4.8008	.02
11	960	970.2006	10.2006	.11
12	725	727.6505	2.6505	.01
13	498	503.7580	5.7580	.07
14	291	323.8444	32.8444	3.33
15	198	194.3067	3.6933	.07
16	119	109.2975	9.7025	.86
17	59	57.8634	1.1366	.02
18	27	28.9317	1.9317	.13
19	14	13.7045	.2955	.01
X≥ 20	6	8.8100	2.8100	.90

The Chi-Square Test Statistic = 14.2889358719

There are 19 degrees of freedom.

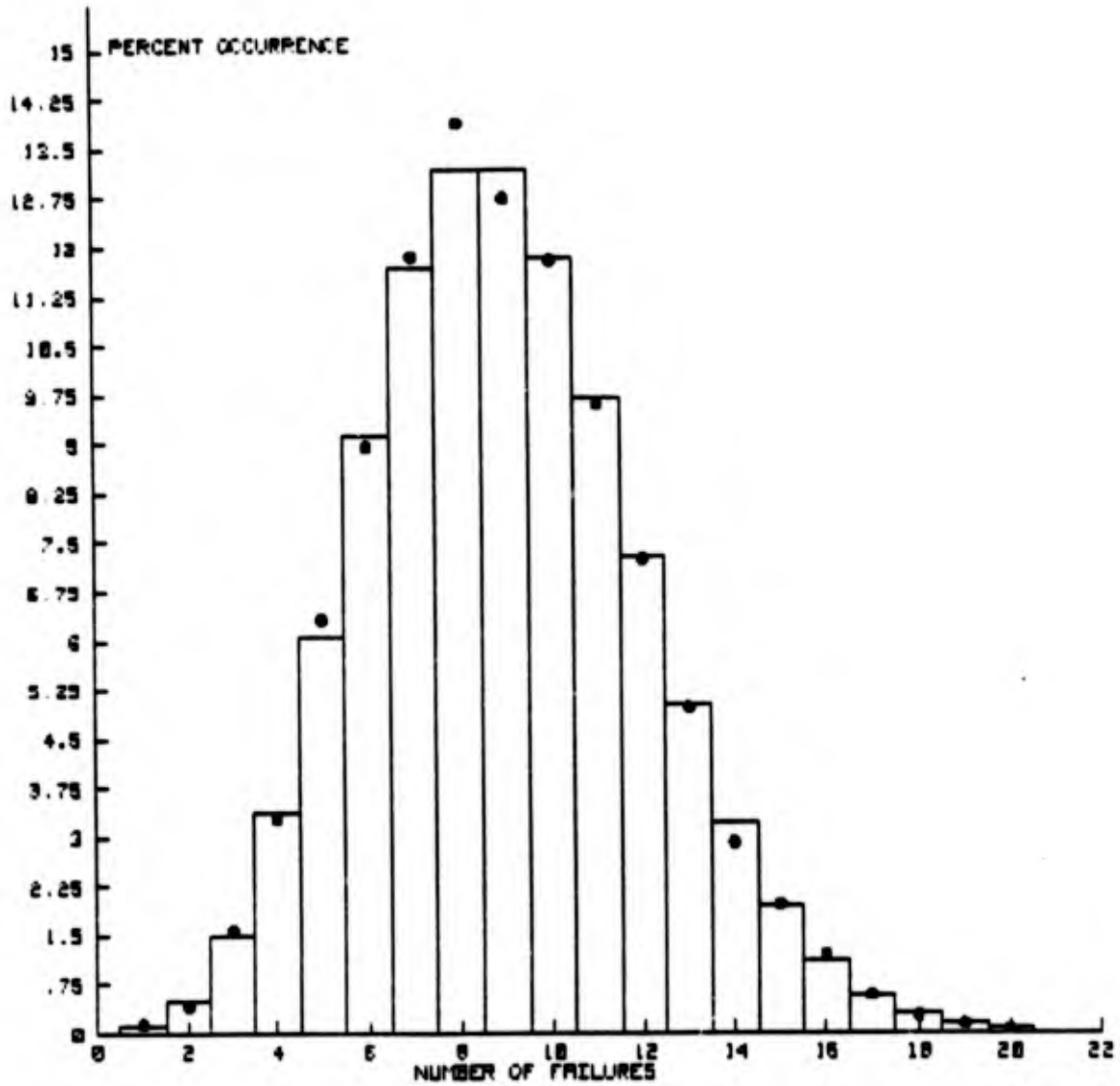

Figure A2. 25 - Theoritical Histogram Versus Simulated Frequencies For Scale= .0000000009 and Shape= 2.5 .

Table A2. 26 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = .000000000012 and Shape Parameter = 3

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
$X \leq 2$	6	5.2226	.7774	.12
3	20	17.6953	2.3047	.30
4	45	53.0860	8.0860	1.23
5	115	127.4064	12.4064	1.21
6	242	254.8128	12.8128	.64
7	453	436.8219	16.1781	.60
8	699	655.2328	43.7672	2.92
9	911	873.6438	37.3562	1.60
10	1024	1048.3726	24.3726	.57
11	1143	1143.6792	.6792	.00
12	1162	1143.6792	18.3208	.29
13	1031	1055.7038	24.7038	.58
14	910	904.8890	5.1110	.03
15	690	723.9112	33.9112	1.59
16	541	542.9334	1.9334	.01
17	384	383.2471	.7529	.00
18	258	255.4981	2.5019	.02
19	158	161.3672	3.3672	.07
20	78	96.8203	18.8203	3.66
21	59	55.3259	3.6741	.24
22	38	30.1778	7.8222	2.03
23	22	15.7449	6.2551	2.48
24	6	7.8725	1.8725	.45
$X \geq 25$	5	6.2980	1.2980	.27

The Chi-Square Test Statistic = 20.9067773372

There are 23 degrees of freedom.

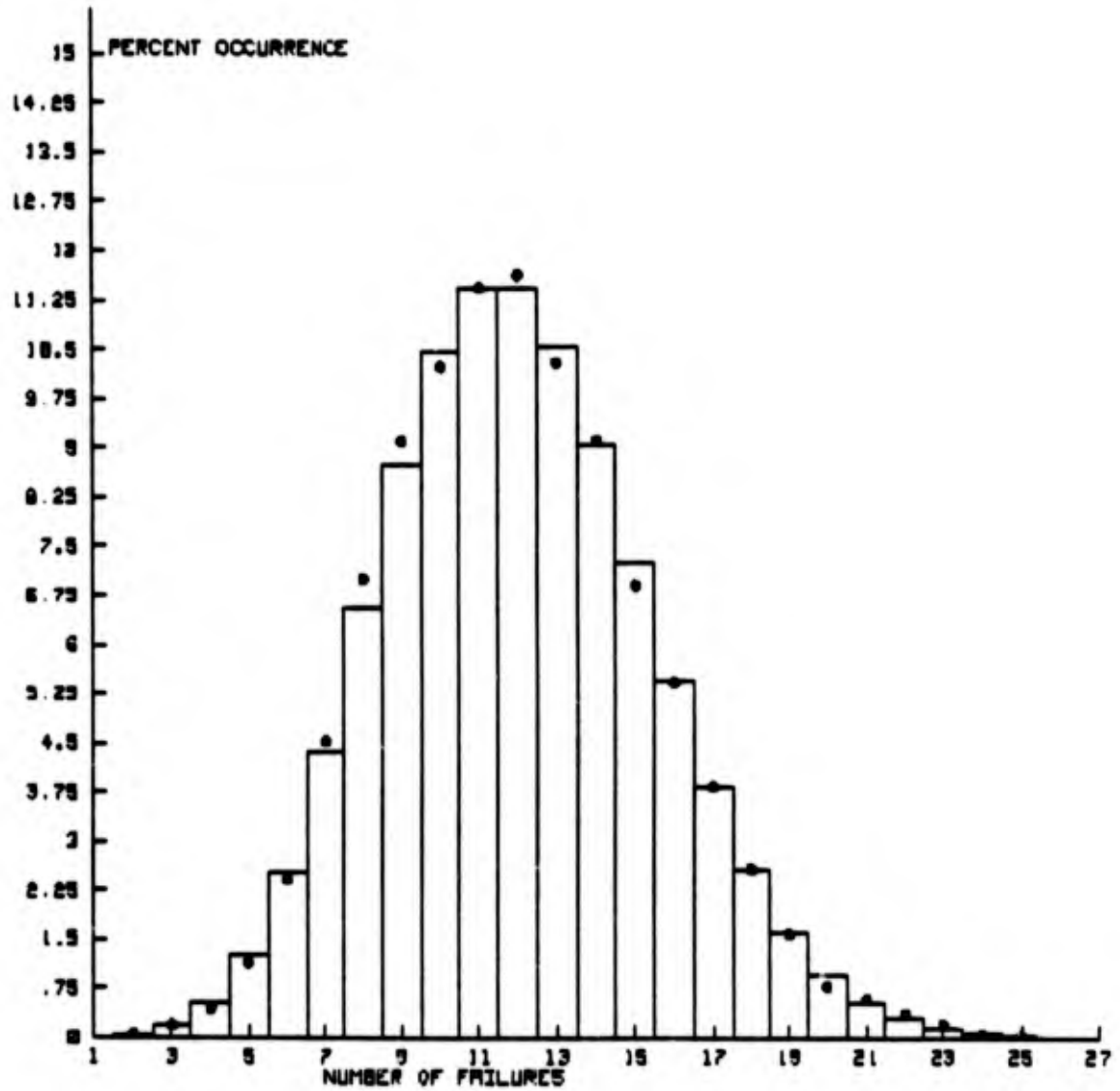

Figure A2. 26 - Theoritical Histogram Versus Simulated Frequencies For Scale= .000000000012 and Shape= 3 .

Table A2. 27 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = 1.60000000000E-15 and Shape Parameter = 4

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
X≤ 5	16	13.8379	2.1621	.34
6	24	26.2226	2.2226	.19
7	58	59.9374	1.9374	.06
8	105	119.8747	14.8747	1.85
9	223	213.1106	9.8894	.46
10	351	340.9770	10.0230	.29
11	500	495.9665	4.0335	.03
12	684	661.2887	22.7113	.78
13	820	813.8938	6.1062	.05
14	951	930.1644	20.8356	.47
15	970	992.1753	22.1753	.50
16	961	992.1753	31.1753	.98
17	914	933.8121	19.8121	.42
18	848	830.0552	17.9448	.39
19	712	698.9938	13.0062	.24
20	563	559.1951	3.8049	.03
21	396	426.0534	30.0534	2.12
22	318	309.8570	8.1430	.21
23	205	215.5527	10.5527	.52
24	146	143.7018	2.2982	.04
25	99	91.9692	7.0308	.54
26	56	56.5964	.5964	.01
27	39	33.5386	5.4614	.89
28	20	19.1649	.8351	.04
29	10	10.5737	.5737	.03
30	7	5.6393	1.3607	.33
X≥ 31	4	5.5554	1.5554	.44

The Chi-Square Test Statistic = 12.2165283143

There are 26 degrees of freedom.

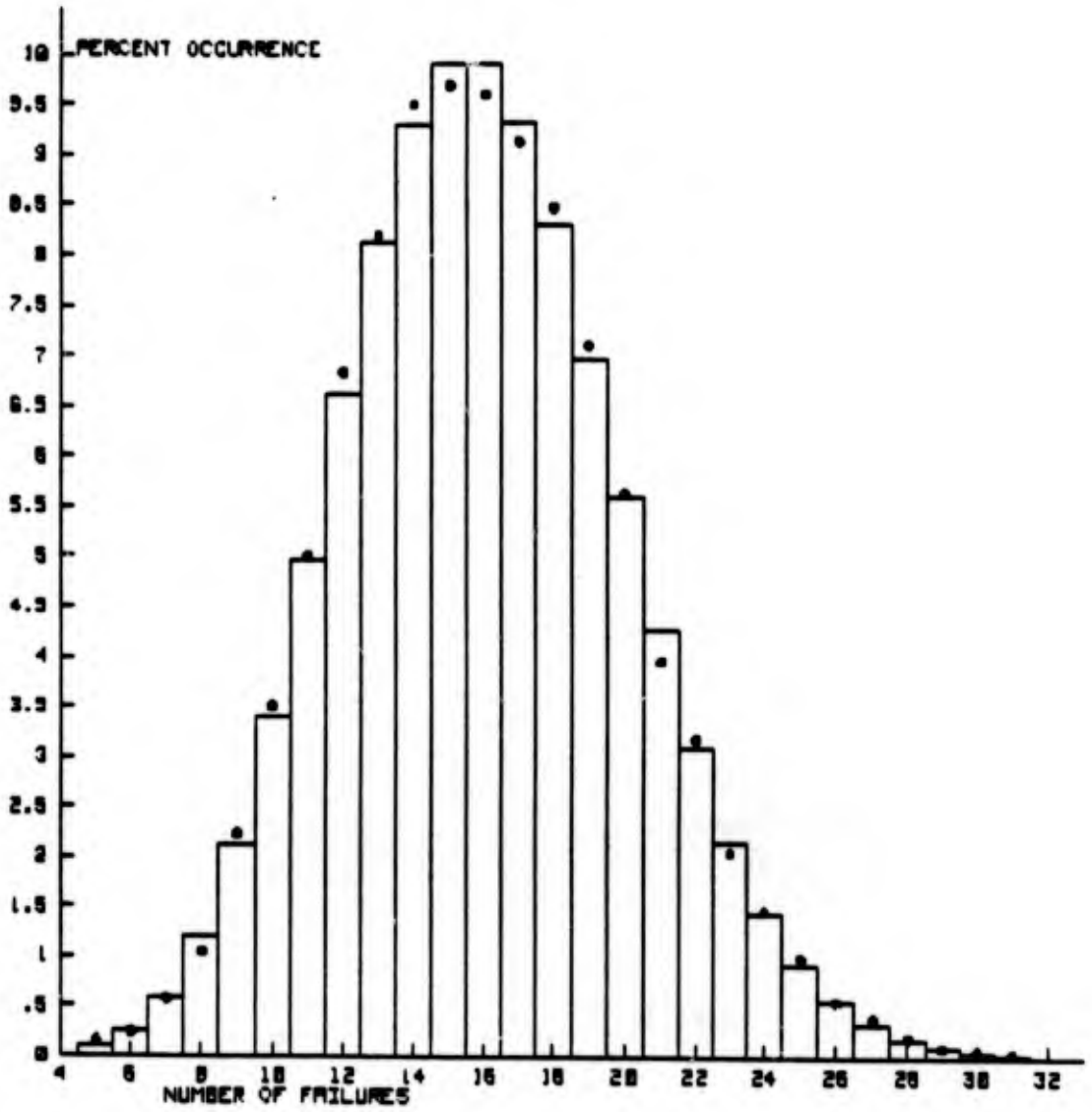

Figure A2. 27 - Theoritical Histogram Versus Simulated Frequencies For Scale= 1.60000000000E-15 and Shape= 4 .

Table A2. 28 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = 2.00000000000E-19 and Shape Parameter = 5

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
X≤ 7	11	7.7859	3.2141	1.33
8	14	13.0867	.9133	.06
9	28	29.0815	1.0815	.04
10	70	58.1631	11.8369	2.41
11	95	105.7510	10.7510	1.09
12	184	176.2517	7.7483	.34
13	282	271.1565	10.8435	.43
14	348	387.3664	39.3664	4.00
15	529	516.4885	12.5115	.30
16	656	645.6107	10.3893	.17
17	764	759.5420	4.4580	.03
18	800	843.9355	43.9355	2.29
19	948	888.3532	59.6468	4.00
20	865	888.3532	23.3532	.61
21	865	846.0506	18.9494	.42
22	750	769.1369	19.1369	.48
23	651	668.8147	17.8147	.47
24	571	557.3456	13.6544	.33
25	454	445.8765	8.1235	.15
26	358	342.9819	15.0181	.66
27	233	254.0607	21.0607	1.75
28	165	181.4719	16.4719	1.50
29	136	125.1530	10.8470	.94
30	88	83.4354	4.5646	.25
31	53	53.8293	.8293	.01
32	29	33.6433	4.6433	.64
33	23	20.3899	2.6101	.33
34	11	11.9940	.9940	.08
35	8	6.8537	1.1463	.19
X≥ 36	11	5.8658	5.1342	4.49

The Chi-Square Test Statistic = 29.8118017237

There are 29 degrees of freedom.

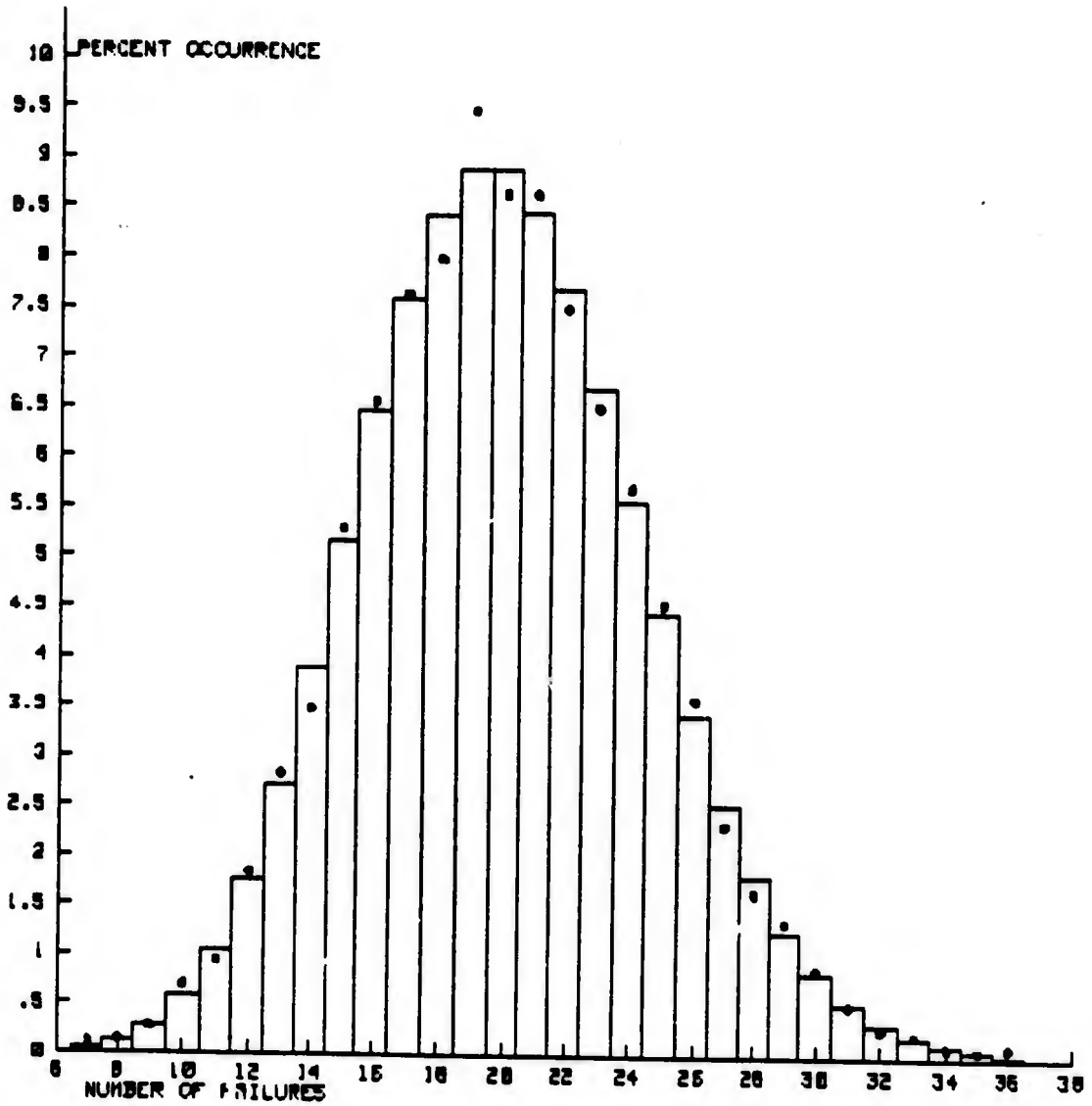

Figure A2. 28 - Theoritical Histogram Versus Simulated Frequencies For Scale= 2.00000000000E-19 and Shape= 5 .

Table A2. 29 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = 5.00000000000E-30 and Shape Parameter = 7.5

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
0	85	67.3795	17.6205	4.61
1	334	336.8974	2.8974	.02
2	840	842.2434	2.2434	.01
3	1425	1403.7390	21.2610	.32
4	1733	1754.6737	21.6737	.27
5	1800	1754.6737	45.3263	1.17
6	1494	1462.2281	31.7719	.69
7	1002	1044.4486	42.4486	1.73
8	652	652.7804	.7804	.00
9	324	362.6558	38.6558	4.12
10	179	181.3279	2.3279	.03
11	69	82.4218	13.4218	2.19
12	35	34.3424	.6576	.01
13	20	13.2086	6.7914	3.49
14	8	6.2898	1.7102	.46

The Chi-Square Test Statistic = 19.1212854592

There are 14 degrees of freedom.

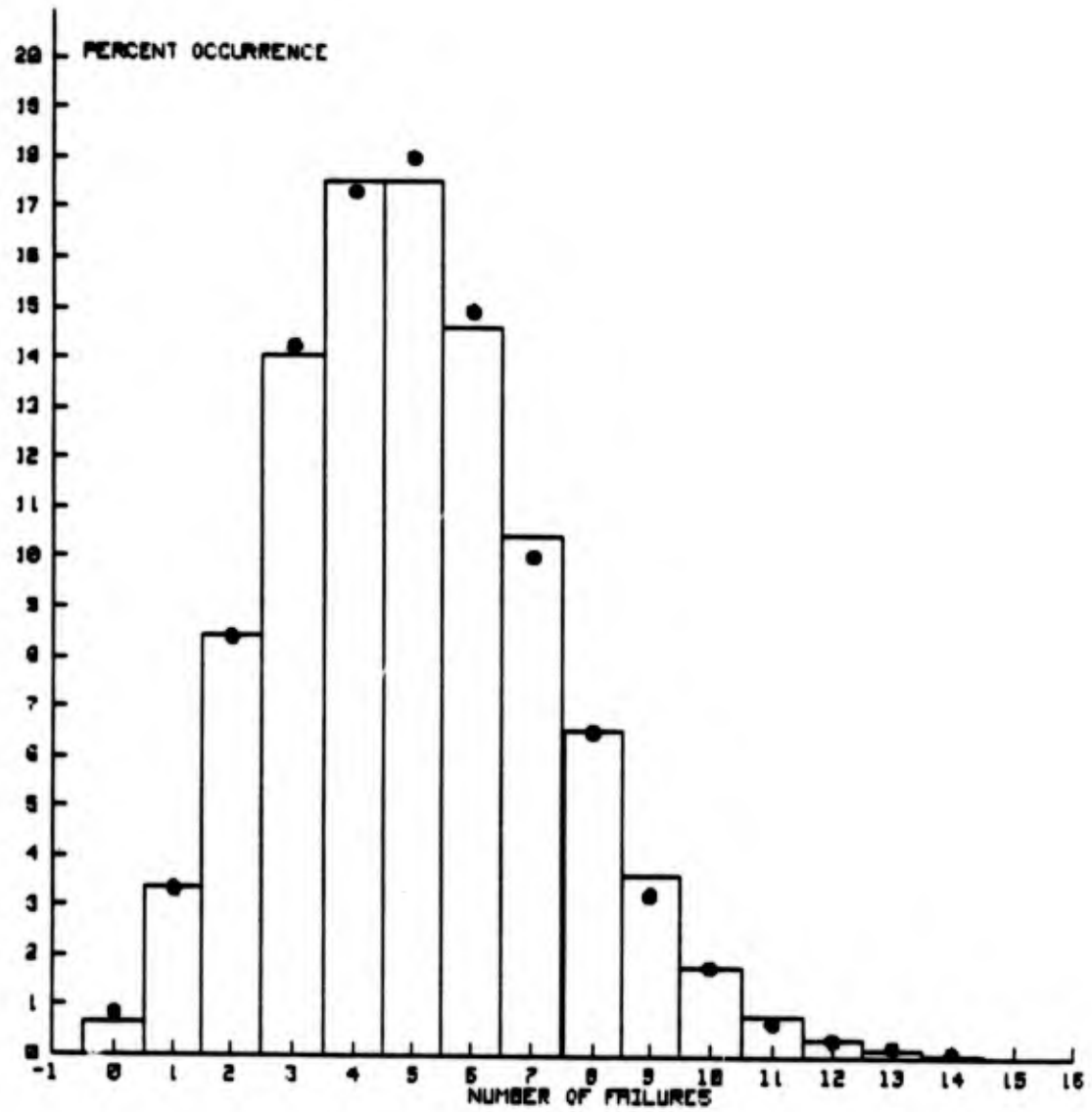

Figure A2. 29 - Theoritical Histogram Versus Simulated Frequencies For Scale= 5.000000000000E-30 and Shape= 7.5 .

Table A2. 30 - Simulation Summary Frequency Table For A Two Parameter Weibull: Scale Parameter = 4.00000000000E-40 and Shape Parameter = 10

Number of Failures	Frequency of Occurrence	Expected Occurrence Frequency	Absolute Value of Difference	Chi-Square Summing Elements
0	218	183.1564	34.8436	6.63
1	745	732.6256	12.3744	.21
2	1488	1465.2511	22.7489	.35
3	1921	1953.6681	32.6681	.55
4	1918	1953.6681	35.6681	.65
5	1600	1562.9345	37.0655	.88
6	1027	1041.9563	14.9563	.21
7	595	595.4036	.4036	.00
8	283	297.7018	14.7018	.73
9	128	132.3119	4.3119	.14
10	48	52.9248	4.9248	.46
11	23	19.2454	3.7546	.73
$X \geq 12$	6	6.4151	.4151	.03

The Chi-Square Test Statistic = 11.5664532843

There are 12 degrees of freedom.

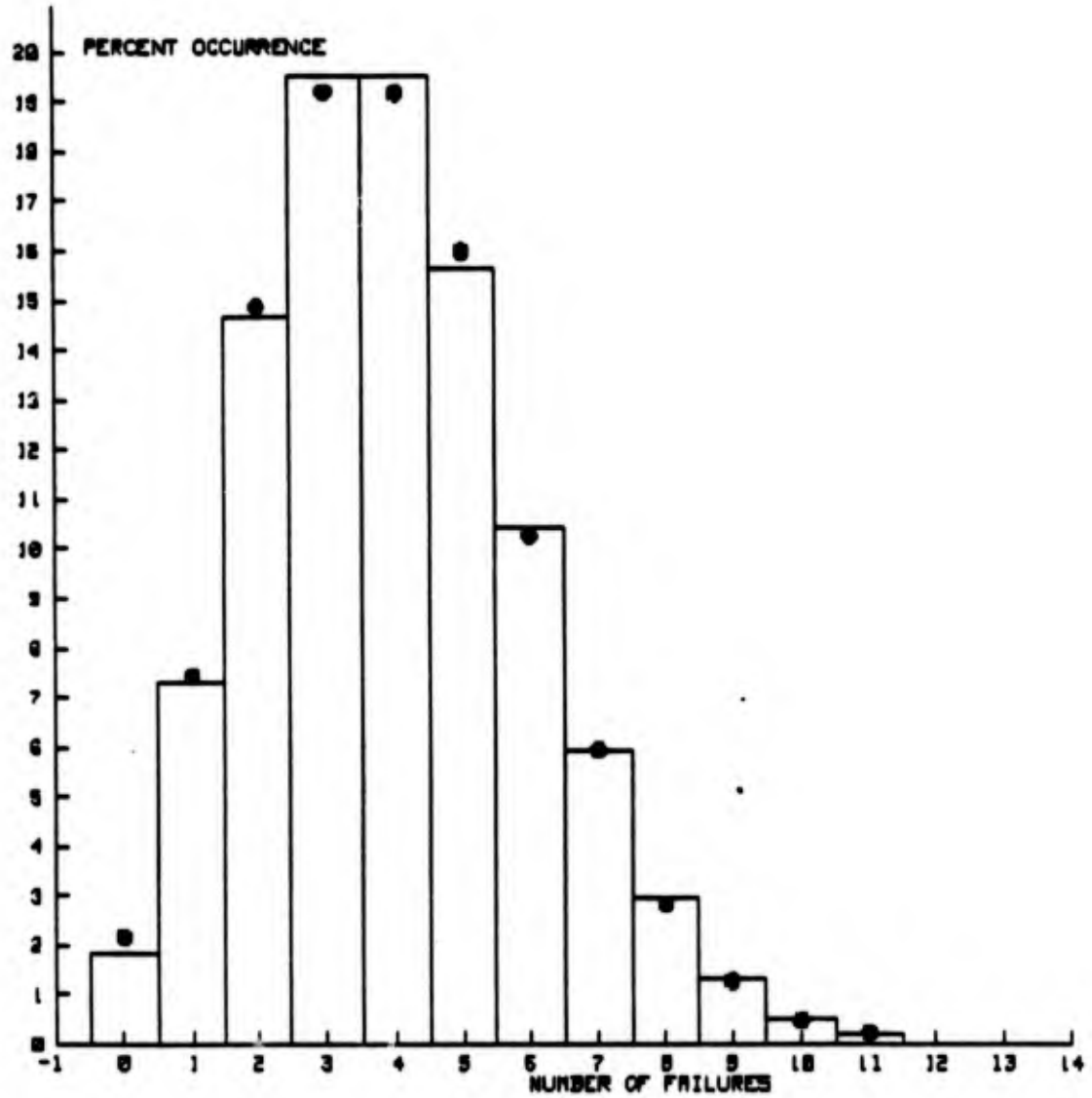

Figure A2. 30 - Theoritical Histogram Versus Simulated Frequencies For Scale= 4.00000000000E-40 and Shape= 10 .

Appendix 3

Probability Tables

Table A3. 1- Probability Tables For A Shape Parameter of .01

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	379	747	925	983	997	999	1000	1000	1000	1000	1000	1000
.10	376	744	924	982	997	999	1000	1000	1000	1000	1000	1000
.20	374	742	923	982	997	999	1000	1000	1000	1000	1000	1000
.25	373	741	922	982	997	999	1000	1000	1000	1000	1000	1000
.30	372	740	922	982	997	999	1000	1000	1000	1000	1000	1000
.40	371	739	921	982	996	999	1000	1000	1000	1000	1000	1000
.50	370	738	921	981	996	999	1000	1000	1000	1000	1000	1000
.60	370	738	921	981	996	999	1000	1000	1000	1000	1000	1000
.70	369	737	920	981	996	999	1000	1000	1000	1000	1000	1000
.75	369	737	920	981	996	999	1000	1000	1000	1000	1000	1000
.80	369	737	920	981	996	999	1000	1000	1000	1000	1000	1000
.90	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	367	735	919	981	996	999	1000	1000	1000	1000	1000	1000
1.50	366	734	919	981	996	999	1000	1000	1000	1000	1000	1000
1.75	366	734	919	981	996	999	1000	1000	1000	1000	1000	1000
2.00	365	733	918	981	996	999	1000	1000	1000	1000	1000	1000
2.25	365	733	918	981	996	999	1000	1000	1000	1000	1000	1000
2.50	365	732	918	980	996	999	1000	1000	1000	1000	1000	1000
2.75	364	732	918	980	996	999	1000	1000	1000	1000	1000	1000
3.00	364	732	918	980	996	999	1000	1000	1000	1000	1000	1000
3.50	363	731	917	980	996	999	1000	1000	1000	1000	1000	1000
4.00	363	731	917	980	996	999	1000	1000	1000	1000	1000	1000
4.50	362	730	917	980	996	999	1000	1000	1000	1000	1000	1000
5.00	362	730	917	980	996	999	1000	1000	1000	1000	1000	1000
6.00	361	729	916	980	996	999	1000	1000	1000	1000	1000	1000
7.00	361	729	916	980	996	999	1000	1000	1000	1000	1000	1000
8.00	360	728	916	980	996	999	1000	1000	1000	1000	1000	1000
9.00	360	728	916	980	996	999	1000	1000	1000	1000	1000	1000
10.00	359	727	915	980	996	999	1000	1000	1000	1000	1000	1000
11.00	359	727	915	979	996	999	1000	1000	1000	1000	1000	1000
12.00	359	727	915	979	996	999	1000	1000	1000	1000	1000	1000
13.00	358	726	915	979	996	999	1000	1000	1000	1000	1000	1000
14.00	358	726	915	979	996	999	1000	1000	1000	1000	1000	1000
15.00	358	726	915	979	996	999	1000	1000	1000	1000	1000	1000
16.00	358	725	914	979	996	999	1000	1000	1000	1000	1000	1000
17.00	357	725	914	979	996	999	1000	1000	1000	1000	1000	1000
18.00	357	725	914	979	996	999	1000	1000	1000	1000	1000	1000
19.00	357	725	914	979	996	999	1000	1000	1000	1000	1000	1000
20.00	357	725	914	979	996	999	1000	1000	1000	1000	1000	1000
21.00	357	724	914	979	996	999	1000	1000	1000	1000	1000	1000
22.00	357	724	914	979	996	999	1000	1000	1000	1000	1000	1000
23.00	356	724	914	979	996	999	1000	1000	1000	1000	1000	1000
24.00	356	724	914	979	996	999	1000	1000	1000	1000	1000	1000
25.00	356	724	914	979	996	999	1000	1000	1000	1000	1000	1000
30.00	355	723	913	979	996	999	1000	1000	1000	1000	1000	1000
35.00	355	722	913	979	996	999	1000	1000	1000	1000	1000	1000
40.00	354	722	913	979	996	999	1000	1000	1000	1000	1000	1000
45.00	354	721	912	979	996	999	1000	1000	1000	1000	1000	1000
50.00	353	721	912	978	996	999	1000	1000	1000	1000	1000	1000

Table A3. 2- Probability Tables For A Shape Parameter of .82

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	390	757	930	984	997	1000	1000	1000	1000	1000	1000	1000
.10	385	752	928	984	997	1000	1000	1000	1000	1000	1000	1000
.20	380	747	925	983	997	999	1000	1000	1000	1000	1000	1000
.25	378	746	925	983	997	999	1000	1000	1000	1000	1000	1000
.30	377	745	924	982	997	999	1000	1000	1000	1000	1000	1000
.40	375	742	923	982	997	999	1000	1000	1000	1000	1000	1000
.50	373	741	922	982	997	999	1000	1000	1000	1000	1000	1000
.60	372	739	922	982	996	999	1000	1000	1000	1000	1000	1000
.70	371	738	921	981	996	999	1000	1000	1000	1000	1000	1000
.75	370	738	921	981	996	999	1000	1000	1000	1000	1000	1000
.80	370	737	921	981	996	999	1000	1000	1000	1000	1000	1000
.90	369	737	920	981	996	999	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	366	734	919	981	996	999	1000	1000	1000	1000	1000	1000
1.50	365	733	918	981	996	999	1000	1000	1000	1000	1000	1000
1.75	364	732	918	980	996	999	1000	1000	1000	1000	1000	1000
2.00	363	731	917	980	996	999	1000	1000	1000	1000	1000	1000
2.25	362	730	917	980	996	999	1000	1000	1000	1000	1000	1000
2.50	361	729	916	980	996	999	1000	1000	1000	1000	1000	1000
2.75	360	728	916	980	996	999	1000	1000	1000	1000	1000	1000
3.00	360	728	916	980	996	999	1000	1000	1000	1000	1000	1000
3.50	359	726	915	979	996	999	1000	1000	1000	1000	1000	1000
4.00	358	725	914	979	996	999	1000	1000	1000	1000	1000	1000
4.50	357	725	914	979	996	999	1000	1000	1000	1000	1000	1000
5.00	356	724	914	979	996	999	1000	1000	1000	1000	1000	1000
6.00	355	722	913	979	996	999	1000	1000	1000	1000	1000	1000
7.00	354	721	912	978	996	999	1000	1000	1000	1000	1000	1000
8.00	353	720	912	978	996	999	1000	1000	1000	1000	1000	1000
9.00	352	719	911	978	996	999	1000	1000	1000	1000	1000	1000
10.00	351	718	911	978	996	999	1000	1000	1000	1000	1000	1000
11.00	350	718	910	978	996	999	1000	1000	1000	1000	1000	1000
12.00	350	717	910	978	995	999	1000	1000	1000	1000	1000	1000
13.00	349	716	910	978	995	999	1000	1000	1000	1000	1000	1000
14.00	348	716	909	978	995	999	1000	1000	1000	1000	1000	1000
15.00	348	715	909	977	995	999	1000	1000	1000	1000	1000	1000
16.00	347	715	909	977	995	999	1000	1000	1000	1000	1000	1000
17.00	347	714	909	977	995	999	1000	1000	1000	1000	1000	1000
18.00	347	714	908	977	995	999	1000	1000	1000	1000	1000	1000
19.00	346	713	908	977	995	999	1000	1000	1000	1000	1000	1000
20.00	346	713	908	977	995	999	1000	1000	1000	1000	1000	1000
21.00	345	713	908	977	995	999	1000	1000	1000	1000	1000	1000
22.00	345	712	908	977	995	999	1000	1000	1000	1000	1000	1000
23.00	345	712	907	977	995	999	1000	1000	1000	1000	1000	1000
24.00	345	712	907	977	995	999	1000	1000	1000	1000	1000	1000
25.00	344	711	907	977	995	999	1000	1000	1000	1000	1000	1000
30.00	343	710	906	976	995	999	1000	1000	1000	1000	1000	1000
35.00	342	709	906	976	995	999	1000	1000	1000	1000	1000	1000
40.00	341	708	905	976	995	999	1000	1000	1000	1000	1000	1000
45.00	340	707	905	976	995	999	1000	1000	1000	1000	1000	1000
50.00	339	706	904	976	995	999	1000	1000	1000	1000	1000	1000

Table A3. 3- Probability Tables For A Shape Parameter of .85

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	423	797	943	988	998	1000	1000	1000	1000	1000	1000	1000
.10	410	776	939	987	998	1000	1000	1000	1000	1000	1000	1000
.20	397	764	933	985	997	1000	1000	1000	1000	1000	1000	1000
.25	393	760	932	985	997	1000	1000	1000	1000	1000	1000	1000
.30	390	757	930	984	997	1000	1000	1000	1000	1000	1000	1000
.40	385	752	928	984	997	1000	1000	1000	1000	1000	1000	1000
.50	381	748	926	983	997	1000	1000	1000	1000	1000	1000	1000
.60	377	745	924	983	997	999	1000	1000	1000	1000	1000	1000
.70	374	742	923	982	997	999	1000	1000	1000	1000	1000	1000
.75	373	741	922	982	997	999	1000	1000	1000	1000	1000	1000
.80	372	740	922	982	997	999	1000	1000	1000	1000	1000	1000
.90	370	738	921	981	996	999	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	364	732	918	980	996	999	1000	1000	1000	1000	1000	1000
1.50	360	728	916	980	996	999	1000	1000	1000	1000	1000	1000
1.75	358	725	914	979	996	999	1000	1000	1000	1000	1000	1000
2.00	355	723	913	979	996	999	1000	1000	1000	1000	1000	1000
2.25	353	721	912	978	996	999	1000	1000	1000	1000	1000	1000
2.50	351	719	911	978	996	999	1000	1000	1000	1000	1000	1000
2.75	349	717	910	978	995	999	1000	1000	1000	1000	1000	1000
3.00	348	715	909	977	995	999	1000	1000	1000	1000	1000	1000
3.50	345	712	907	977	995	999	1000	1000	1000	1000	1000	1000
4.00	342	709	906	976	995	999	1000	1000	1000	1000	1000	1000
4.50	340	707	905	976	995	999	1000	1000	1000	1000	1000	1000
5.00	338	705	904	975	995	999	1000	1000	1000	1000	1000	1000
6.00	335	701	902	975	995	999	1000	1000	1000	1000	1000	1000
7.00	332	698	900	974	995	999	1000	1000	1000	1000	1000	1000
8.00	330	696	898	974	994	999	1000	1000	1000	1000	1000	1000
9.00	328	693	897	973	994	999	1000	1000	1000	1000	1000	1000
10.00	326	691	896	973	994	999	1000	1000	1000	1000	1000	1000
11.00	324	689	895	972	994	999	1000	1000	1000	1000	1000	1000
12.00	322	687	894	972	994	999	1000	1000	1000	1000	1000	1000
13.00	321	686	893	971	994	999	1000	1000	1000	1000	1000	1000
14.00	319	684	892	971	994	999	1000	1000	1000	1000	1000	1000
15.00	318	683	891	971	994	999	1000	1000	1000	1000	1000	1000
16.00	317	681	890	971	994	999	1000	1000	1000	1000	1000	1000
17.00	316	680	890	970	993	999	1000	1000	1000	1000	1000	1000
18.00	315	679	889	970	993	999	1000	1000	1000	1000	1000	1000
19.00	314	678	888	970	993	999	1000	1000	1000	1000	1000	1000
20.00	313	677	888	969	993	999	1000	1000	1000	1000	1000	1000
21.00	312	676	887	969	993	999	1000	1000	1000	1000	1000	1000
22.00	311	675	887	969	993	999	1000	1000	1000	1000	1000	1000
23.00	310	674	886	969	993	999	1000	1000	1000	1000	1000	1000
24.00	310	673	885	969	993	999	1000	1000	1000	1000	1000	1000
25.00	309	672	885	968	993	999	1000	1000	1000	1000	1000	1000
30.00	306	668	883	967	993	999	1000	1000	1000	1000	1000	1000
35.00	303	665	881	967	992	999	1000	1000	1000	1000	1000	1000
40.00	300	662	879	966	992	998	1000	1000	1000	1000	1000	1000
45.00	298	659	877	965	992	998	1000	1000	1000	1000	1000	1000
50.00	296	657	876	965	992	998	1000	1000	1000	1000	1000	1000

Table A3. 4- Probability Tables For A Shape Parameter of .10

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	477	830	961	993	999	1000	1000	1000	1000	1000	1000	1000
.10	452	811	953	991	999	1000	1000	1000	1000	1000	1000	1000
.20	427	790	945	989	998	1000	1000	1000	1000	1000	1000	1000
.25	419	783	942	988	998	1000	1000	1000	1000	1000	1000	1000
.30	412	777	939	987	998	1000	1000	1000	1000	1000	1000	1000
.40	402	768	935	986	998	1000	1000	1000	1000	1000	1000	1000
.50	393	760	932	985	997	1000	1000	1000	1000	1000	1000	1000
.60	387	754	929	984	997	1000	1000	1000	1000	1000	1000	1000
.70	381	749	926	983	997	1000	1000	1000	1000	1000	1000	1000
.75	378	746	925	983	997	999	1000	1000	1000	1000	1000	1000
.80	376	744	924	982	997	999	1000	1000	1000	1000	1000	1000
.90	372	740	922	982	996	999	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	360	727	916	980	996	999	1000	1000	1000	1000	1000	1000
1.50	353	721	912	978	996	999	1000	1000	1000	1000	1000	1000
1.75	347	715	909	977	995	999	1000	1000	1000	1000	1000	1000
2.00	342	709	906	976	995	999	1000	1000	1000	1000	1000	1000
2.25	338	705	904	975	995	999	1000	1000	1000	1000	1000	1000
2.50	334	701	901	975	995	999	1000	1000	1000	1000	1000	1000
2.75	331	697	899	974	994	999	1000	1000	1000	1000	1000	1000
3.00	328	693	897	973	994	999	1000	1000	1000	1000	1000	1000
3.50	322	687	894	972	994	999	1000	1000	1000	1000	1000	1000
4.00	317	681	890	971	994	999	1000	1000	1000	1000	1000	1000
4.50	313	676	888	969	993	999	1000	1000	1000	1000	1000	1000
5.00	309	672	885	968	993	999	1000	1000	1000	1000	1000	1000
6.00	302	664	880	967	992	999	1000	1000	1000	1000	1000	1000
7.00	297	657	876	965	992	998	1000	1000	1000	1000	1000	1000
8.00	292	651	873	963	991	998	1000	1000	1000	1000	1000	1000
9.00	288	646	869	962	991	998	1000	1000	1000	1000	1000	1000
10.00	284	641	866	961	991	998	1000	1000	1000	1000	1000	1000
11.00	281	637	864	960	990	998	1000	1000	1000	1000	1000	1000
12.00	277	633	861	959	990	998	1000	1000	1000	1000	1000	1000
13.00	275	630	859	958	990	998	1000	1000	1000	1000	1000	1000
14.00	272	628	857	957	989	998	1000	1000	1000	1000	1000	1000
15.00	270	623	855	956	989	998	1000	1000	1000	1000	1000	1000
16.00	267	620	853	955	989	998	1000	1000	1000	1000	1000	1000
17.00	265	617	851	954	988	998	1000	1000	1000	1000	1000	1000
18.00	263	614	849	953	988	997	1000	1000	1000	1000	1000	1000
19.00	261	612	847	953	988	997	1000	1000	1000	1000	1000	1000
20.00	259	609	846	952	988	997	999	1000	1000	1000	1000	1000
21.00	258	607	844	951	987	997	999	1000	1000	1000	1000	1000
22.00	256	605	843	950	987	997	999	1000	1000	1000	1000	1000
23.00	255	603	841	950	987	997	999	1000	1000	1000	1000	1000
24.00	253	601	840	949	987	997	999	1000	1000	1000	1000	1000
25.00	252	599	838	949	987	997	999	1000	1000	1000	1000	1000
30.00	245	590	832	946	986	997	999	1000	1000	1000	1000	1000
35.00	240	583	827	943	985	996	999	1000	1000	1000	1000	1000
40.00	235	578	822	941	984	996	999	1000	1000	1000	1000	1000
45.00	231	570	818	939	983	996	999	1000	1000	1000	1000	1000
50.00	228	565	814	937	982	996	999	1000	1000	1000	1000	1000

Table A3. 5- Probability Tables For A Shape Parameter of .15

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	528	865	973	996	999	1000	1000	1000	1000	1000	1000	1000
.10	493	841	965	994	999	1000	1000	1000	1000	1000	1000	1000
.20	456	814	955	991	999	1000	1000	1000	1000	1000	1000	1000
.25	444	804	951	990	998	1000	1000	1000	1000	1000	1000	1000
.30	434	796	947	990	998	1000	1000	1000	1000	1000	1000	1000
.40	418	783	942	988	998	1000	1000	1000	1000	1000	1000	1000
.50	406	772	937	986	998	1000	1000	1000	1000	1000	1000	1000
.60	396	763	933	985	997	1000	1000	1000	1000	1000	1000	1000
.70	388	755	929	984	997	1000	1000	1000	1000	1000	1000	1000
.75	384	751	927	983	997	1000	1000	1000	1000	1000	1000	1000
.80	380	748	926	983	997	1000	1000	1000	1000	1000	1000	1000
.90	374	742	923	982	997	999	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	356	723	913	979	996	999	1000	1000	1000	1000	1000	1000
1.50	346	713	908	977	995	999	1000	1000	1000	1000	1000	1000
1.75	337	704	903	975	995	999	1000	1000	1000	1000	1000	1000
2.00	330	696	898	974	994	999	1000	1000	1000	1000	1000	1000
2.25	323	688	894	972	994	999	1000	1000	1000	1000	1000	1000
2.50	317	682	891	971	994	999	1000	1000	1000	1000	1000	1000
2.75	312	676	887	969	993	999	1000	1000	1000	1000	1000	1000
3.00	308	670	884	968	993	999	1000	1000	1000	1000	1000	1000
3.50	299	660	878	966	992	998	1000	1000	1000	1000	1000	1000
4.00	292	651	873	963	991	998	1000	1000	1000	1000	1000	1000
4.50	286	644	868	961	991	998	1000	1000	1000	1000	1000	1000
5.00	280	636	863	960	990	998	1000	1000	1000	1000	1000	1000
6.00	270	624	855	956	989	998	1000	1000	1000	1000	1000	1000
7.00	262	613	848	953	988	997	1000	1000	1000	1000	1000	1000
8.00	255	604	842	950	987	997	999	1000	1000	1000	1000	1000
9.00	249	595	836	947	986	997	999	1000	1000	1000	1000	1000
10.00	244	588	830	945	985	997	999	1000	1000	1000	1000	1000
11.00	239	581	825	942	984	996	999	1000	1000	1000	1000	1000
12.00	234	574	821	940	984	996	999	1000	1000	1000	1000	1000
13.00	230	568	817	938	983	996	999	1000	1000	1000	1000	1000
14.00	226	563	812	936	982	996	999	1000	1000	1000	1000	1000
15.00	223	557	809	934	981	996	999	1000	1000	1000	1000	1000
16.00	220	553	805	932	981	995	999	1000	1000	1000	1000	1000
17.00	217	548	801	931	980	995	999	1000	1000	1000	1000	1000
18.00	214	544	798	929	979	995	999	1000	1000	1000	1000	1000
19.00	211	539	795	927	979	995	999	1000	1000	1000	1000	1000
20.00	209	536	792	926	978	995	999	1000	1000	1000	1000	1000
21.00	206	532	789	924	977	994	999	1000	1000	1000	1000	1000
22.00	204	528	786	923	977	994	999	1000	1000	1000	1000	1000
23.00	202	525	783	921	976	994	999	1000	1000	1000	1000	1000
24.00	200	521	781	920	976	994	999	1000	1000	1000	1000	1000
25.00	198	518	778	918	975	994	999	1000	1000	1000	1000	1000
30.00	189	504	766	912	973	993	998	1000	1000	1000	1000	1000
35.00	182	492	756	906	970	992	998	1000	1000	1000	1000	1000
40.00	176	481	747	901	968	991	998	1000	1000	1000	1000	1000
45.00	170	472	739	896	966	990	998	999	1000	1000	1000	1000
50.00	166	463	731	892	964	990	997	999	1000	1000	1000	1000

Table A3. 6- Probability Tables For A Shape Parameter of .20

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	377	895	982	998	1000	1000	1000	1000	1000	1000	1000	1000
.10	532	868	974	996	1000	1000	1000	1000	1000	1000	1000	1000
.20	484	836	963	994	999	1000	1000	1000	1000	1000	1000	1000
.25	469	824	958	992	999	1000	1000	1000	1000	1000	1000	1000
.30	456	814	955	991	999	1000	1000	1000	1000	1000	1000	1000
.40	435	797	948	990	998	1000	1000	1000	1000	1000	1000	1000
.50	419	783	942	988	998	1000	1000	1000	1000	1000	1000	1000
.60	405	771	937	986	998	1000	1000	1000	1000	1000	1000	1000
.70	394	761	932	985	997	1000	1000	1000	1000	1000	1000	1000
.75	389	756	930	984	997	1000	1000	1000	1000	1000	1000	1000
.80	384	752	928	984	997	1000	1000	1000	1000	1000	1000	1000
.90	376	743	923	982	997	999	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	351	719	911	978	996	999	1000	1000	1000	1000	1000	1000
1.50	338	705	904	975	995	999	1000	1000	1000	1000	1000	1000
1.75	327	692	897	973	994	999	1000	1000	1000	1000	1000	1000
2.00	317	681	890	971	994	999	1000	1000	1000	1000	1000	1000
2.25	308	671	885	968	993	999	1000	1000	1000	1000	1000	1000
2.50	301	662	879	966	992	998	1000	1000	1000	1000	1000	1000
2.75	294	654	874	964	992	998	1000	1000	1000	1000	1000	1000
3.00	288	646	869	962	991	998	1000	1000	1000	1000	1000	1000
3.50	277	632	861	958	990	998	1000	1000	1000	1000	1000	1000
4.00	267	620	853	955	989	998	1000	1000	1000	1000	1000	1000
4.50	259	609	845	952	988	997	999	1000	1000	1000	1000	1000
5.00	252	599	838	949	987	997	999	1000	1000	1000	1000	1000
6.00	239	581	826	943	984	996	999	1000	1000	1000	1000	1000
7.00	229	566	815	937	983	996	999	1000	1000	1000	1000	1000
8.00	220	553	805	932	981	995	999	1000	1000	1000	1000	1000
9.00	212	541	796	928	979	995	999	1000	1000	1000	1000	1000
10.00	205	530	787	923	977	994	999	1000	1000	1000	1000	1000
11.00	199	520	779	919	975	994	999	1000	1000	1000	1000	1000
12.00	193	511	772	915	974	993	998	1000	1000	1000	1000	1000
13.00	188	503	765	911	972	993	998	1000	1000	1000	1000	1000
14.00	184	495	758	908	971	992	998	1000	1000	1000	1000	1000
15.00	179	487	752	904	969	992	998	1000	1000	1000	1000	1000
16.00	175	481	746	901	968	991	998	1000	1000	1000	1000	1000
17.00	172	474	741	897	966	991	998	1000	1000	1000	1000	1000
18.00	168	468	735	894	965	990	998	999	1000	1000	1000	1000
19.00	165	462	730	891	963	990	997	999	1000	1000	1000	1000
20.00	162	457	725	888	962	989	997	999	1000	1000	1000	1000
21.00	159	452	720	885	961	989	997	999	1000	1000	1000	1000
22.00	156	446	716	882	959	988	997	999	1000	1000	1000	1000
23.00	154	442	711	879	958	988	997	999	1000	1000	1000	1000
24.00	151	437	707	877	957	987	997	999	1000	1000	1000	1000
25.00	149	433	703	874	956	987	997	999	1000	1000	1000	1000
30.00	139	413	684	862	950	984	996	999	1000	1000	1000	1000
35.00	131	396	667	851	944	982	995	999	1000	1000	1000	1000
40.00	124	382	652	840	939	980	994	999	1000	1000	1000	1000
45.00	118	369	639	831	934	978	994	998	1000	1000	1000	1000
50.00	112	358	626	822	929	976	993	998	1000	1000	1000	1000

Table A3. 7- Probability Tables For A Shape Parameter of .25

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	623	918	988	999	1000	1000	1000	1000	1000	1000	1000	1000
.10	570	890	980	997	1000	1000	1000	1000	1000	1000	1000	1000
.20	512	855	970	995	999	1000	1000	1000	1000	1000	1000	1000
.25	493	842	965	994	999	1000	1000	1000	1000	1000	1000	1000
.30	477	830	961	993	999	1000	1000	1000	1000	1000	1000	1000
.40	451	810	953	991	999	1000	1000	1000	1000	1000	1000	1000
.50	431	794	947	989	998	1000	1000	1000	1000	1000	1000	1000
.60	415	780	940	988	998	1000	1000	1000	1000	1000	1000	1000
.70	401	767	935	986	997	1000	1000	1000	1000	1000	1000	1000
.75	394	761	932	985	997	1000	1000	1000	1000	1000	1000	1000
.80	388	756	929	984	997	1000	1000	1000	1000	1000	1000	1000
.90	378	745	924	983	997	999	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	347	715	909	977	995	999	1000	1000	1000	1000	1000	1000
1.50	331	697	899	974	994	999	1000	1000	1000	1000	1000	1000
1.75	317	681	890	970	993	999	1000	1000	1000	1000	1000	1000
2.00	304	667	882	967	993	999	1000	1000	1000	1000	1000	1000
2.25	294	654	874	964	992	998	1000	1000	1000	1000	1000	1000
2.50	284	642	867	961	991	998	1000	1000	1000	1000	1000	1000
2.75	276	631	860	958	990	998	1000	1000	1000	1000	1000	1000
3.00	268	621	853	955	989	998	1000	1000	1000	1000	1000	1000
3.50	255	603	841	950	987	997	999	1000	1000	1000	1000	1000
4.00	243	587	830	945	985	997	999	1000	1000	1000	1000	1000
4.50	233	572	820	940	983	996	999	1000	1000	1000	1000	1000
5.00	224	559	810	935	982	996	999	1000	1000	1000	1000	1000
6.00	209	536	792	926	978	995	999	1000	1000	1000	1000	1000
7.00	197	516	776	917	975	993	999	1000	1000	1000	1000	1000
8.00	186	499	762	910	972	992	998	1000	1000	1000	1000	1000
9.00	177	483	749	902	968	991	998	1000	1000	1000	1000	1000
10.00	169	469	736	895	965	990	998	999	1000	1000	1000	1000
11.00	162	457	725	888	962	989	997	999	1000	1000	1000	1000
12.00	155	445	714	881	959	988	997	999	1000	1000	1000	1000
13.00	150	434	704	875	956	987	997	999	1000	1000	1000	1000
14.00	145	424	694	869	953	986	996	999	1000	1000	1000	1000
15.00	140	415	685	863	950	985	996	999	1000	1000	1000	1000
16.00	135	406	677	857	947	983	995	999	1000	1000	1000	1000
17.00	131	398	668	852	945	982	995	999	1000	1000	1000	1000
18.00	127	390	661	846	942	981	995	999	1000	1000	1000	1000
19.00	124	383	653	841	939	980	994	999	1000	1000	1000	1000
20.00	121	376	646	836	936	979	994	998	1000	1000	1000	1000
21.00	118	369	639	831	934	978	994	998	1000	1000	1000	1000
22.00	115	363	632	826	931	977	993	998	1000	1000	1000	1000
23.00	112	357	625	821	929	976	993	998	1000	1000	1000	1000
24.00	109	351	619	817	926	974	992	998	1000	1000	1000	1000
25.00	107	346	613	812	924	973	992	998	999	1000	1000	1000
30.00	96	322	585	791	911	968	990	997	999	1000	1000	1000
35.00	88	301	561	772	900	962	988	996	999	1000	1000	1000
40.00	81	284	540	754	889	957	985	996	999	1000	1000	1000
45.00	75	269	521	738	879	952	983	995	999	1000	1000	1000
50.00	70	256	504	723	869	946	981	994	998	1000	1000	1000

Table A3. 8- Probability Tables For A Shape Parameter of .30

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	666	937	992	999	1000	1000	1000	1000	1000	1000	1000	1000
.10	606	909	986	998	1000	1000	1000	1000	1000	1000	1000	1000
.20	540	872	975	996	1000	1000	1000	1000	1000	1000	1000	1000
.25	517	858	971	995	999	1000	1000	1000	1000	1000	1000	1000
.30	498	845	966	994	999	1000	1000	1000	1000	1000	1000	1000
.40	468	823	958	992	999	1000	1000	1000	1000	1000	1000	1000
.50	444	804	951	990	998	1000	1000	1000	1000	1000	1000	1000
.60	424	788	944	989	998	1000	1000	1000	1000	1000	1000	1000
.70	407	773	937	987	998	1000	1000	1000	1000	1000	1000	1000
.75	400	766	934	986	997	1000	1000	1000	1000	1000	1000	1000
.80	392	760	931	985	997	1000	1000	1000	1000	1000	1000	1000
.90	380	747	925	983	997	999	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	343	710	907	976	995	999	1000	1000	1000	1000	1000	1000
1.50	323	688	894	972	994	999	1000	1000	1000	1000	1000	1000
1.75	306	669	883	968	993	999	1000	1000	1000	1000	1000	1000
2.00	292	651	873	963	991	998	1000	1000	1000	1000	1000	1000
2.25	279	636	863	959	990	998	1000	1000	1000	1000	1000	1000
2.50	268	621	853	955	989	998	1000	1000	1000	1000	1000	1000
2.75	258	608	844	951	987	997	999	1000	1000	1000	1000	1000
3.00	249	595	836	947	986	997	999	1000	1000	1000	1000	1000
3.50	233	573	820	940	983	996	999	1000	1000	1000	1000	1000
4.00	220	553	805	932	981	995	999	1000	1000	1000	1000	1000
4.50	208	535	791	925	978	994	999	1000	1000	1000	1000	1000
5.00	198	518	778	918	975	994	999	1000	1000	1000	1000	1000
6.00	181	490	754	905	970	992	998	1000	1000	1000	1000	1000
7.00	166	465	733	892	964	990	997	999	1000	1000	1000	1000
8.00	155	443	713	880	959	988	997	999	1000	1000	1000	1000
9.00	145	424	695	869	953	986	996	999	1000	1000	1000	1000
10.00	136	407	678	858	948	984	996	999	1000	1000	1000	1000
11.00	128	392	662	847	942	981	995	999	1000	1000	1000	1000
12.00	122	378	648	837	937	979	994	998	1000	1000	1000	1000
13.00	115	365	634	827	932	977	993	998	1000	1000	1000	1000
14.00	110	353	621	818	927	975	992	998	1000	1000	1000	1000
15.00	105	342	608	809	922	972	992	998	999	1000	1000	1000
16.00	101	331	597	800	917	970	991	997	999	1000	1000	1000
17.00	96	322	586	791	912	968	990	997	999	1000	1000	1000
18.00	93	313	575	783	907	966	989	997	999	1000	1000	1000
19.00	89	304	565	775	902	963	988	997	999	1000	1000	1000
20.00	86	296	555	767	897	961	987	996	999	1000	1000	1000
21.00	83	289	546	759	892	958	986	996	999	1000	1000	1000
22.00	80	282	537	752	887	956	985	995	999	1000	1000	1000
23.00	77	275	528	744	883	954	984	995	999	1000	1000	1000
24.00	75	268	520	737	878	951	983	995	999	1000	1000	1000
25.00	72	262	512	730	874	949	982	994	998	1000	1000	1000
30.00	62	236	476	698	852	937	977	992	998	999	1000	1000
35.00	55	214	445	668	831	925	971	990	997	999	1000	1000
40.00	49	196	418	642	811	914	965	988	996	999	1000	1000
45.00	44	180	394	617	792	902	959	985	995	998	1000	1000
50.00	39	167	373	595	775	891	953	982	994	998	999	1000

Table A3. 9- Probability Tables For A Shape Parameter of .35

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	704	951	994	1000	1000	1000	1000	1000	1000	1000	1000	1000
.10	640	926	989	999	1000	1000	1000	1000	1000	1000	1000	1000
.20	566	888	980	997	1000	1000	1000	1000	1000	1000	1000	1000
.25	540	873	975	996	1000	1000	1000	1000	1000	1000	1000	1000
.30	519	859	971	995	999	1000	1000	1000	1000	1000	1000	1000
.40	484	835	963	993	999	1000	1000	1000	1000	1000	1000	1000
.50	456	814	955	991	999	1000	1000	1000	1000	1000	1000	1000
.60	433	796	947	989	998	1000	1000	1000	1000	1000	1000	1000
.70	414	779	940	987	998	1000	1000	1000	1000	1000	1000	1000
.75	405	771	936	986	998	1000	1000	1000	1000	1000	1000	1000
.80	397	763	933	985	997	1000	1000	1000	1000	1000	1000	1000
.90	381	749	926	983	997	1000	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	339	706	904	976	995	999	1000	1000	1000	1000	1000	1000
1.50	316	680	890	970	993	999	1000	1000	1000	1000	1000	1000
1.75	296	657	876	965	992	998	1000	1000	1000	1000	1000	1000
2.00	280	636	863	959	990	998	1000	1000	1000	1000	1000	1000
2.25	265	617	851	954	988	998	1000	1000	1000	1000	1000	1000
2.50	252	599	839	949	987	997	999	1000	1000	1000	1000	1000
2.75	241	583	827	943	985	997	999	1000	1000	1000	1000	1000
3.00	230	568	817	938	983	996	999	1000	1000	1000	1000	1000
3.50	212	541	796	928	979	995	999	1000	1000	1000	1000	1000
4.00	197	517	777	918	975	994	999	1000	1000	1000	1000	1000
4.50	184	495	759	908	971	992	998	1000	1000	1000	1000	1000
5.00	173	476	742	898	967	991	998	1000	1000	1000	1000	1000
6.00	154	442	711	879	958	988	997	999	1000	1000	1000	1000
7.00	139	413	683	861	949	984	996	999	1000	1000	1000	1000
8.00	126	387	658	844	941	981	995	999	1000	1000	1000	1000
9.00	116	365	634	828	932	977	993	998	1000	1000	1000	1000
10.00	107	345	612	812	923	973	992	998	999	1000	1000	1000
11 00	99	327	592	796	915	969	990	997	999	1000	1000	1000
12.00	92	311	573	782	906	965	989	997	999	1000	1000	1000
13.00	86	297	556	767	897	961	987	996	999	1000	1000	1000
14.00	81	284	539	754	889	957	985	996	999	1000	1000	1000
15.00	76	271	523	740	880	952	983	995	999	1000	1000	1000
16.00	71	260	509	727	872	948	982	994	998	1000	1000	1000
17.00	68	249	495	715	864	944	980	993	998	1000	1000	1000
18.00	64	240	481	703	855	939	978	993	998	999	1000	1000
19.00	61	231	469	691	847	935	975	992	998	999	1000	1000
20.00	58	222	457	680	839	930	973	991	997	999	1000	1000
21.00	55	214	445	669	831	926	971	990	997	999	1000	1000
22.00	52	207	434	658	824	921	969	989	997	999	1000	1000
23.00	50	200	424	648	816	916	967	988	996	999	1000	1000
24.00	48	193	414	638	808	912	964	987	996	999	1000	1000
25.00	46	187	404	628	801	907	962	986	995	999	1000	1000
30.00	37	160	362	583	765	884	950	981	993	998	999	1000
35.00	31	139	326	543	731	861	937	974	991	997	999	1000
40.00	26	122	296	507	699	839	924	968	988	996	999	1000
45.00	23	108	271	476	670	817	910	960	984	994	998	999
50.00	20	97	248	447	642	796	896	953	981	993	998	999

Table A3.10- Probability Tables For A Shape Parameter of .40

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	740	963	996	1000	1000	1000	1000	1000	1000	1000	1000	1000
.10	672	939	992	999	1000	1000	1000	1000	1000	1000	1000	1000
.20	591	902	984	998	1000	1000	1000	1000	1000	1000	1000	1000
.25	563	886	979	997	1000	1000	1000	1000	1000	1000	1000	1000
.30	539	872	975	996	1000	1000	1000	1000	1000	1000	1000	1000
.40	500	847	967	994	999	1000	1000	1000	1000	1000	1000	1000
.50	469	824	958	992	999	1000	1000	1000	1000	1000	1000	1000
.60	443	803	950	990	998	1000	1000	1000	1000	1000	1000	1000
.70	420	785	942	988	998	1000	1000	1000	1000	1000	1000	1000
.75	410	776	939	987	998	1000	1000	1000	1000	1000	1000	1000
.80	401	767	935	986	997	1000	1000	1000	1000	1000	1000	1000
.90	383	751	927	983	997	1000	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	335	701	902	975	995	999	1000	1000	1000	1000	1000	1000
1.50	308	671	885	968	993	999	1000	1000	1000	1000	1000	1000
1.75	286	644	868	962	991	998	1000	1000	1000	1000	1000	1000
2.00	267	620	853	955	989	998	1000	1000	1000	1000	1000	1000
2.25	251	598	838	948	986	997	999	1000	1000	1000	1000	1000
2.50	236	577	823	941	984	996	999	1000	1000	1000	1000	1000
2.75	223	558	809	935	981	996	999	1000	1000	1000	1000	1000
3.00	212	541	796	928	979	995	999	1000	1000	1000	1000	1000
3.50	192	509	770	914	973	993	998	1000	1000	1000	1000	1000
4.00	175	481	746	901	968	991	998	1000	1000	1000	1000	1000
4.50	161	455	724	887	962	989	997	999	1000	1000	1000	1000
5.00	149	433	703	874	956	987	997	999	1000	1000	1000	1000
6.00	129	393	664	848	943	982	995	999	1000	1000	1000	1000
7.00	113	360	629	824	930	976	993	998	1000	1000	1000	1000
8.00	101	331	597	800	917	970	991	997	999	1000	1000	1000
9.00	90	307	568	777	903	964	988	997	999	1000	1000	1000
10.00	81	285	541	755	890	957	985	996	999	1000	1000	1000
11.00	74	266	516	734	876	950	983	995	998	1000	1000	1000
12.00	67	248	493	714	863	943	979	993	998	999	1000	1000
13.00	61	233	472	694	849	936	976	992	998	999	1000	1000
14.00	56	219	452	675	836	928	972	991	997	999	1000	1000
15.00	52	206	434	657	823	921	969	989	997	999	1000	1000
16.00	48	195	416	640	810	913	965	987	996	999	1000	1000
17.00	45	184	400	624	797	905	961	986	995	999	1000	1000
18.00	42	174	385	607	785	897	957	984	995	998	1000	1000
19.00	39	165	370	592	772	889	952	982	994	998	999	1000
20.00	36	157	357	577	760	881	948	980	993	998	999	1000
21.00	34	149	344	563	748	873	944	978	992	997	999	1000
22.00	32	142	331	549	736	865	939	975	991	997	999	1000
23.00	30	135	320	536	724	857	934	973	990	997	999	1000
24.00	28	129	309	523	713	849	930	971	989	996	999	1000
25.00	27	123	299	510	702	841	925	968	988	996	999	1000
30.00	20	99	253	454	649	801	900	955	982	993	998	999
35.00	16	81	217	405	600	762	874	940	974	990	996	999
40.00	13	68	188	364	556	724	847	923	965	986	995	998
45.00	10	57	164	328	516	688	820	906	956	981	992	997
50.00	8	48	144	297	480	654	793	888	945	975	990	996

Table A3.11- Probability Tables For A Shape Parameter of .45

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	771	972	998	1000	1000	1000	1000	1000	1000	1000	1000	1000
.10	701	950	994	1000	1000	1000	1000	1000	1000	1000	1000	1000
.20	616	914	987	998	1000	1000	1000	1000	1000	1000	1000	1000
.25	585	899	983	998	1000	1000	1000	1000	1000	1000	1000	1000
.30	559	884	979	997	1000	1000	1000	1000	1000	1000	1000	1000
.40	516	857	970	995	999	1000	1000	1000	1000	1000	1000	1000
.50	481	833	962	993	999	1000	1000	1000	1000	1000	1000	1000
.60	452	811	953	991	999	1000	1000	1000	1000	1000	1000	1000
.70	427	790	945	989	998	1000	1000	1000	1000	1000	1000	1000
.75	415	780	941	988	998	1000	1000	1000	1000	1000	1000	1000
.80	405	771	936	986	998	1000	1000	1000	1000	1000	1000	1000
.90	385	753	928	984	997	1000	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	331	697	899	974	994	999	1000	1000	1000	1000	1000	1000
1.50	301	663	879	966	992	998	1000	1000	1000	1000	1000	1000
1.75	276	632	860	958	990	998	1000	1000	1000	1000	1000	1000
2.00	255	604	842	950	987	997	999	1000	1000	1000	1000	1000
2.25	237	578	824	942	984	996	999	1000	1000	1000	1000	1000
2.50	221	554	806	933	981	995	999	1000	1000	1000	1000	1000
2.75	207	533	789	924	978	994	999	1000	1000	1000	1000	1000
3.00	194	512	773	916	974	993	998	1000	1000	1000	1000	1000
3.50	173	476	742	898	967	991	998	1000	1000	1000	1000	1000
4.00	155	443	713	880	959	988	997	999	1000	1000	1000	1000
4.50	140	415	685	863	950	985	996	999	1000	1000	1000	1000
5.00	127	389	660	846	941	981	995	999	1000	1000	1000	1000
6.00	107	345	612	812	923	973	992	998	999	1000	1000	1000
7.00	91	308	570	779	904	964	988	997	999	1000	1000	1000
8.00	78	277	531	747	885	955	984	995	999	1000	1000	1000
9.00	68	251	497	717	865	944	980	994	998	1000	1000	1000
10.00	60	228	465	688	845	933	975	992	997	999	1000	1000
11.00	53	208	436	660	825	922	969	989	997	999	1000	1000
12.00	47	190	410	634	805	910	963	987	996	999	1000	1000
13.00	42	175	386	609	786	898	957	984	995	998	1000	1000
14.00	38	161	364	585	766	885	950	981	993	998	999	1000
15.00	34	149	343	562	747	873	943	978	992	997	999	1000
16.00	31	138	324	540	729	860	936	974	990	997	999	1000
17.00	28	128	307	520	711	847	928	970	989	996	999	1000
18.00	25	119	290	500	693	834	921	966	987	995	999	1000
19.00	23	111	275	481	675	821	913	962	985	995	998	999
20.00	21	103	261	463	658	808	904	957	983	994	998	999
21.00	20	96	248	446	641	795	896	953	980	993	997	999
22.00	18	90	235	430	625	782	887	948	978	992	997	999
23.00	17	85	224	414	609	769	879	943	976	990	997	999
24.00	15	79	213	399	594	757	870	937	973	989	996	999
25.00	14	74	203	385	579	744	861	932	970	988	996	998
30.00	10	55	160	322	509	682	815	903	954	980	992	997
35.00	7	42	129	272	449	624	769	872	935	970	987	995
40.00	5	33	104	230	396	571	723	838	914	958	981	992
45.00	4	26	86	197	350	521	679	804	890	944	973	988
50.00	3	20	71	169	311	476	636	769	866	928	965	984

Table A3.12- Probability Tables For A Shape Parameter of .50

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	800	978	998	1000	1000	1000	1000	1000	1000	1000	1000	1000
.10	729	959	996	1000	1000	1000	1000	1000	1000	1000	1000	1000
.20	639	925	989	999	1000	1000	1000	1000	1000	1000	1000	1000
.25	607	910	986	998	1000	1000	1000	1000	1000	1000	1000	1000
.30	578	895	982	998	1000	1000	1000	1000	1000	1000	1000	1000
.40	531	867	974	996	1000	1000	1000	1000	1000	1000	1000	1000
.50	493	842	965	994	999	1000	1000	1000	1000	1000	1000	1000
.60	461	818	956	992	999	1000	1000	1000	1000	1000	1000	1000
.70	433	796	947	989	998	1000	1000	1000	1000	1000	1000	1000
.75	421	785	943	988	998	1000	1000	1000	1000	1000	1000	1000
.80	409	775	938	987	998	1000	1000	1000	1000	1000	1000	1000
.90	387	755	929	984	997	1000	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	327	692	897	973	994	999	1000	1000	1000	1000	1000	1000
1.50	294	654	874	964	992	998	1000	1000	1000	1000	1000	1000
1.75	266	619	852	955	989	998	1000	1000	1000	1000	1000	1000
2.00	243	587	830	945	985	997	999	1000	1000	1000	1000	1000
2.25	223	558	809	934	981	996	999	1000	1000	1000	1000	1000
2.50	206	531	788	924	977	994	999	1000	1000	1000	1000	1000
2.75	190	506	768	913	973	993	998	1000	1000	1000	1000	1000
3.00	177	483	749	902	968	991	998	1000	1000	1000	1000	1000
3.50	154	442	712	880	958	988	997	999	1000	1000	1000	1000
4.00	135	406	677	857	947	983	995	999	1000	1000	1000	1000
4.50	120	374	644	835	936	979	994	998	1000	1000	1000	1000
5.00	107	346	613	812	924	973	992	998	999	1000	1000	1000
6.00	86	298	557	768	898	961	987	996	999	1000	1000	1000
7.00	71	259	507	726	871	948	981	994	998	1000	1000	1000
8.00	59	226	463	686	843	932	974	991	997	999	1000	1000
9.00	50	199	423	647	815	916	966	988	996	999	1000	1000
10.00	42	176	388	611	787	899	958	984	995	998	1000	1000
11.00	36	157	356	577	760	881	948	980	993	998	999	1000
12.00	31	140	328	544	732	862	937	975	991	997	999	1000
13.00	27	125	302	514	705	843	926	969	988	996	999	1000
14.00	24	112	278	485	679	824	914	963	985	995	998	999
15.00	21	101	257	459	654	805	902	956	982	993	998	999
16.00	18	92	238	433	629	785	889	949	979	992	997	999
17.00	16	83	221	410	605	766	876	941	975	990	996	999
18.00	14	75	205	388	582	746	863	933	971	988	996	999
19.00	13	69	190	367	559	727	849	925	966	986	995	998
20.00	11	63	177	347	537	708	835	916	961	984	994	998
21.00	10	57	165	329	517	689	820	906	956	981	992	997
22.00	9	52	153	311	496	670	806	897	950	978	991	997
23.00	8	48	143	295	477	652	791	887	944	975	990	996
24.00	7	44	133	279	458	634	777	877	938	972	988	995
25.00	7	40	125	265	440	616	762	867	932	968	986	995
30.00	4	27	90	204	361	533	690	812	896	947	975	989
35.00	3	19	66	159	296	459	620	755	856	922	961	982
40.00	2	13	49	125	244	395	554	698	812	892	942	972
45.00	1	9	37	98	201	340	494	642	766	859	921	959
50.00	1	7	28	78	167	292	439	588	720	823	896	943

Table A3.12- Probability Tables For A Shape Parameter of .50(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	12	13	14	15	16	17	18	19	20	21	22	23
14.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
15.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
16.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
17.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
18.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
19.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
20.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
21.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
22.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
23.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
24.00	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
25.00	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
30.00	996	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
35.00	992	997	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
40.00	987	994	998	999	1000	1000	1000	1000	1000	1000	1000	1000
45.00	980	991	996	998	999	1000	1000	1000	1000	1000	1000	1000
50.00	971	986	994	997	999	1000	1000	1000	1000	1000	1000	1000

Table A3.13- Probability Tables For A Shape Parameter of .55

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	825	984	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
.10	754	967	997	1000	1000	1000	1000	1000	1000	1000	1000	1000
.20	662	935	991	999	1000	1000	1000	1000	1000	1000	1000	1000
.25	627	920	988	999	1000	1000	1000	1000	1000	1000	1000	1000
.30	597	905	984	998	1000	1000	1000	1000	1000	1000	1000	1000
.40	547	877	976	997	1000	1000	1000	1000	1000	1000	1000	1000
.50	505	850	968	995	999	1000	1000	1000	1000	1000	1000	1000
.60	470	825	959	993	999	1000	1000	1000	1000	1000	1000	1000
.70	440	801	949	990	998	1000	1000	1000	1000	1000	1000	1000
.75	426	789	945	989	998	1000	1000	1000	1000	1000	1000	1000
.80	413	778	940	987	998	1000	1000	1000	1000	1000	1000	1000
.90	389	756	930	984	997	1000	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	323	688	894	972	994	999	1000	1000	1000	1000	1000	1000
1.50	287	645	869	962	991	998	1000	1000	1000	1000	1000	1000
1.75	257	606	843	951	987	997	999	1000	1000	1000	1000	1000
2.00	231	570	818	939	983	996	999	1000	1000	1000	1000	1000
2.25	210	537	793	926	978	995	999	1000	1000	1000	1000	1000
2.50	191	507	769	913	973	993	998	1000	1000	1000	1000	1000
2.75	175	480	745	900	967	991	998	1000	1000	1000	1000	1000
3.00	160	454	723	886	961	989	997	999	1000	1000	1000	1000
3.50	136	408	679	859	948	984	996	999	1000	1000	1000	1000
4.00	117	369	638	830	933	978	993	998	1000	1000	1000	1000
4.50	102	334	599	802	918	971	991	997	999	1000	1000	1000
5.00	89	303	564	774	901	963	988	996	999	1000	1000	1000
6.00	69	252	499	719	866	945	980	994	998	1000	1000	1000
7.00	54	212	442	666	829	924	971	990	997	999	1000	1000
8.00	43	179	393	616	792	901	959	985	995	998	1000	1000
9.00	35	153	350	570	754	877	946	979	992	998	999	1000
10.00	29	131	312	526	716	851	931	971	989	996	999	1000
11.00	24	113	279	486	680	824	915	963	985	995	998	999
12.00	20	97	250	449	644	797	897	953	981	993	998	999
13.00	17	85	224	414	610	769	879	943	976	990	997	999
14.00	14	74	201	383	576	742	859	931	969	988	995	998
15.00	12	64	181	353	545	714	839	919	963	984	994	998
16.00	10	57	163	327	514	687	819	905	955	981	992	997
17.00	9	50	147	302	485	660	798	891	947	976	990	996
18.00	7	44	133	279	458	633	776	877	938	972	988	995
19.00	6	39	120	258	432	607	755	861	929	966	985	994
20.00	6	34	109	239	407	582	733	846	918	961	982	993
21.00	5	31	99	221	384	557	712	829	908	954	979	991
22.00	4	27	90	205	362	533	690	813	897	948	975	989
23.00	4	24	82	190	341	510	669	796	885	940	971	987
24.00	3	22	74	176	321	488	648	779	873	933	967	985
25.00	3	19	68	163	302	466	627	761	860	925	962	983
30.00	2	11	43	112	225	370	528	674	792	878	934	966
35.00	1	7	28	78	167	292	440	589	720	824	897	944
40.00	0	4	19	55	125	230	364	509	647	764	853	914
45.00	0	3	13	39	93	181	300	437	577	702	804	880
50.00	0	2	9	28	70	142	246	373	510	640	752	840

Table A3.13- Probability Tables For A Shape Parameter of .55(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	12	13	14	15	16	17	18	19	20	21	22	23
11.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
12.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
13.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
14.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
15.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
16.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
17.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
18.00	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
19.00	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
20.00	997	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
21.00	997	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
22.00	996	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
23.00	995	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
24.00	994	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
25.00	993	997	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
30.00	984	993	997	999	1000	1000	1000	1000	1000	1000	1000	1000
35.00	971	986	994	997	999	1000	1000	1000	1000	1000	1000	1000
40.00	953	976	988	995	998	999	1000	1000	1000	1000	1000	1000
45.00	931	962	981	991	996	998	999	1000	1000	1000	1000	1000
50.00	903	945	970	985	993	997	999	999	1000	1000	1000	1000

Table A3.14- Probability Tables For A Shape Parameter of .60

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	847	988	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
.10	778	973	998	1000	1000	1000	1000	1000	1000	1000	1000	1000
.20	683	944	993	999	1000	1000	1000	1000	1000	1000	1000	1000
.25	647	929	990	999	1000	1000	1000	1000	1000	1000	1000	1000
.30	615	914	987	998	1000	1000	1000	1000	1000	1000	1000	1000
.40	562	886	979	997	1000	1000	1000	1000	1000	1000	1000	1000
.50	517	858	971	995	999	1000	1000	1000	1000	1000	1000	1000
.60	479	832	961	993	999	1000	1000	1000	1000	1000	1000	1000
.70	446	806	952	991	999	1000	1000	1000	1000	1000	1000	1000
.75	431	794	946	989	998	1000	1000	1000	1000	1000	1000	1000
.80	417	782	941	988	998	1000	1000	1000	1000	1000	1000	1000
.90	391	758	931	985	997	1000	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	319	683	892	971	994	999	1000	1000	1000	1000	1000	1000
1.50	279	636	863	959	990	998	1000	1000	1000	1000	1000	1000
1.75	247	592	834	946	986	997	999	1000	1000	1000	1000	1000
2.00	220	553	805	932	981	995	999	1000	1000	1000	1000	1000
2.25	197	516	776	917	975	993	999	1000	1000	1000	1000	1000
2.50	177	483	749	902	968	991	998	1000	1000	1000	1000	1000
2.75	160	453	721	886	961	989	997	999	1000	1000	1000	1000
3.00	145	424	695	869	953	986	996	999	1000	1000	1000	1000
3.50	120	374	644	835	936	979	994	998	1000	1000	1000	1000
4.00	101	331	597	800	917	970	991	997	999	1000	1000	1000
4.50	85	294	553	765	896	960	987	996	999	1000	1000	1000
5.00	72	262	512	730	874	949	982	994	998	1000	1000	1000
6.00	53	210	439	663	827	923	970	990	997	999	1000	1000
7.00	40	169	377	599	778	893	955	983	994	998	999	1000
8.00	31	138	324	540	729	860	936	974	990	997	999	1000
9.00	24	113	279	486	680	825	915	963	985	995	998	999
10.00	19	93	241	437	633	788	891	950	979	992	997	999
11.00	15	77	208	393	587	751	866	935	972	989	996	999
12.00	12	64	180	352	543	713	838	918	962	984	994	998
13.00	9	54	156	316	502	675	810	900	952	979	991	997
14.00	8	45	136	284	463	638	781	880	940	973	988	996
15.00	6	38	118	254	427	602	751	858	927	965	985	994
16.00	5	32	103	228	393	567	721	836	912	957	981	992
17.00	4	27	90	205	362	533	690	813	897	948	975	989
18.00	3	23	79	184	332	501	660	789	880	937	970	986
19.00	3	20	69	165	305	470	630	764	862	926	963	983
20.00	2	17	60	148	281	440	601	739	844	914	956	979
21.00	2	14	53	133	258	412	572	714	824	901	948	975
22.00	2	12	47	120	236	385	544	689	805	887	939	970
23.00	1	11	41	108	217	360	517	664	784	872	930	964
24.00	1	9	36	97	199	336	490	639	763	857	919	958
25.00	1	8	32	87	182	314	465	614	742	841	909	951
30.00	0	4	17	52	118	221	352	496	635	754	845	909
35.00	0	2	10	31	77	154	262	393	531	661	770	854
40.00	0	1	6	19	50	107	194	307	437	568	689	789
45.00	0	1	3	12	33	74	142	237	354	481	606	718
50.00	0	0	2	7	22	52	104	182	284	402	526	644

Table A3.14- Probability Tables For A Shape Parameter of .60(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	12	13	14	15	16	17	18	19	20	21	22	23
9.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
10.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
11.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
12.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
13.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
14.00	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
15.00	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
16.00	997	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
17.00	996	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
18.00	994	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
19.00	993	997	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
20.00	991	996	999	999	1000	1000	1000	1000	1000	1000	1000	1000
21.00	988	995	998	999	1000	1000	1000	1000	1000	1000	1000	1000
22.00	986	994	997	999	1000	1000	1000	1000	1000	1000	1000	1000
23.00	983	992	997	999	1000	1000	1000	1000	1000	1000	1000	1000
24.00	979	991	996	998	999	1000	1000	1000	1000	1000	1000	1000
25.00	976	989	995	998	999	1000	1000	1000	1000	1000	1000	1000
30.00	950	974	987	994	997	999	1000	1000	1000	1000	1000	1000
35.00	913	951	974	987	994	997	999	1000	1000	1000	1000	1000
40.00	865	919	954	975	987	994	997	999	999	1000	1000	1000
45.00	809	878	926	957	977	988	994	997	999	999	1000	1000
50.00	746	829	891	934	962	979	989	994	997	999	999	1000

Table A3.15- Probability Tables For A Chapa Parameter of .65

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	867	991	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
.10	799	978	998	1000	1000	1000	1000	1000	1000	1000	1000	1000
.20	704	951	994	1000	1000	1000	1000	1000	1000	1000	1000	1000
.25	666	937	992	999	1000	1000	1000	1000	1000	1000	1000	1000
.30	633	922	989	999	1000	1000	1000	1000	1000	1000	1000	1000
.40	576	894	981	998	1000	1000	1000	1000	1000	1000	1000	1000
.50	529	866	973	996	999	1000	1000	1000	1000	1000	1000	1000
.60	488	838	964	994	999	1000	1000	1000	1000	1000	1000	1000
.70	452	811	954	991	999	1000	1000	1000	1000	1000	1000	1000
.75	436	798	948	990	998	1000	1000	1000	1000	1000	1000	1000
.80	421	785	943	988	998	1000	1000	1000	1000	1000	1000	1000
.90	393	760	931	985	997	1000	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	315	679	889	970	993	999	1000	1000	1000	1000	1000	1000
1.50	272	626	857	957	989	998	1000	1000	1000	1000	1000	1000
1.75	237	579	824	942	984	996	999	1000	1000	1000	1000	1000
2.00	208	535	791	925	978	994	999	1000	1000	1000	1000	1000
2.25	184	495	759	908	971	992	998	1000	1000	1000	1000	1000
2.50	163	459	727	889	963	989	997	999	1000	1000	1000	1000
2.75	145	425	696	870	953	986	996	999	1000	1000	1000	1000
3.00	130	395	665	849	943	982	995	999	1000	1000	1000	1000
3.50	105	341	607	808	921	972	991	998	999	1000	1000	1000
4.00	85	295	554	766	896	960	987	996	999	1000	1000	1000
4.50	70	256	504	723	869	947	981	994	998	1000	1000	1000
5.00	58	223	458	682	840	931	974	991	997	999	1000	1000
6.00	41	171	379	601	780	894	955	983	994	998	999	1000
7.00	29	131	313	527	717	852	931	972	989	996	999	1000
8.00	21	102	259	461	655	806	903	957	982	994	998	999
9.00	15	80	214	401	595	758	871	938	973	989	996	999
10.00	11	63	177	348	538	709	835	916	961	984	994	998
11.00	9	50	147	302	485	659	797	891	947	976	990	996
12.00	7	39	122	261	435	611	758	864	930	967	986	994
13.00	5	32	102	226	390	564	718	834	911	956	980	992
14.00	4	25	85	195	348	519	677	802	889	943	973	988
15.00	3	20	71	169	311	476	636	769	866	928	965	984
16.00	2	16	59	146	277	436	596	735	841	912	955	978
17.00	2	13	50	126	246	398	557	701	814	893	943	972
18.00	1	11	42	109	219	362	519	666	786	873	931	965
19.00	1	9	35	94	194	330	483	632	757	852	916	956
20.00	1	7	29	81	172	300	448	597	728	830	901	946
21.00	1	6	25	70	153	272	415	564	698	806	884	935
22.00	1	5	21	61	135	246	384	531	668	781	866	923
23.00	0	4	18	53	120	223	355	499	638	756	847	910
24.00	0	3	15	46	106	201	327	468	608	730	827	896
25.00	0	3	13	40	94	182	301	439	578	704	806	880
30.00	0	1	6	19	51	108	196	310	440	571	691	791
35.00	0	0	3	10	28	64	125	213	323	447	572	687
40.00	0	0	1	5	15	38	79	143	232	341	460	579
45.00	0	0	1	3	8	22	49	95	163	254	361	476
50.00	0	0	0	1	5	13	31	63	114	185	277	383

Table A3.15- Probability Tables For A Shape Parameter of .65(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	12	13	14	15	16	17	18	19	20	21	22	23
8.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
9.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
10.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
11.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
12.00	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
13.00	997	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
14.00	995	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
15.00	993	997	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
16.00	990	996	998	999	1000	1000	1000	1000	1000	1000	1000	1000
17.00	987	994	998	999	1000	1000	1000	1000	1000	1000	1000	1000
18.00	983	992	997	999	1000	1000	1000	1000	1000	1000	1000	1000
19.00	978	990	996	998	999	1000	1000	1000	1000	1000	1000	1000
20.00	973	987	994	998	999	1000	1000	1000	1000	1000	1000	1000
21.00	966	984	992	997	999	999	1000	1000	1000	1000	1000	1000
22.00	959	979	990	996	998	999	1000	1000	1000	1000	1000	1000
23.00	951	974	988	994	998	999	1000	1000	1000	1000	1000	1000
24.00	941	969	985	993	997	999	999	1000	1000	1000	1000	1000
25.00	931	963	981	991	996	998	999	1000	1000	1000	1000	1000
30.00	867	920	954	975	987	994	997	999	999	1000	1000	1000
35.00	784	858	912	948	971	985	992	996	998	999	1000	1000
40.00	689	781	854	907	944	968	982	991	995	998	999	1000
45.00	590	695	783	853	905	942	966	981	990	995	997	999
50.00	495	604	704	788	855	905	941	965	980	989	994	997

Table A3.16- Probability Tables For A Shape Parameter of .70

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	884	993	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
.10	819	983	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
.20	723	958	996	1000	1000	1000	1000	1000	1000	1000	1000	1000
.25	685	944	993	999	1000	1000	1000	1000	1000	1000	1000	1000
.30	650	930	990	999	1000	1000	1000	1000	1000	1000	1000	1000
.40	591	902	984	998	1000	1000	1000	1000	1000	1000	1000	1000
.50	540	873	975	996	1000	1000	1000	1000	1000	1000	1000	1000
.60	497	844	966	994	999	1000	1000	1000	1000	1000	1000	1000
.70	459	816	956	992	999	1000	1000	1000	1000	1000	1000	1000
.75	441	802	950	990	998	1000	1000	1000	1000	1000	1000	1000
.80	425	789	944	989	998	1000	1000	1000	1000	1000	1000	1000
.90	395	762	932	985	997	1000	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	311	674	886	969	993	999	1000	1000	1000	1000	1000	1000
1.50	265	617	851	954	988	998	1000	1000	1000	1000	1000	1000
1.75	228	565	814	937	982	996	999	1000	1000	1000	1000	1000
2.00	197	517	777	918	975	994	999	1000	1000	1000	1000	1000
2.25	171	474	749	897	966	991	998	1000	1000	1000	1000	1000
2.50	150	434	704	875	956	987	997	999	1000	1000	1000	1000
2.75	131	398	669	852	945	982	995	999	1000	1000	1000	1000
3.00	116	365	634	828	932	977	993	998	1000	1000	1000	1000
3.50	90	308	569	778	904	964	988	997	999	1000	1000	1000
4.00	71	260	509	727	872	948	982	994	998	1000	1000	1000
4.50	57	220	454	677	837	929	973	991	997	999	1000	1000
5.00	46	187	404	628	801	907	962	986	995	999	1000	1000
6.00	30	135	320	536	724	857	934	973	990	997	999	1000
7.00	20	99	252	452	647	800	899	954	981	993	998	999
8.00	14	73	199	379	573	739	857	930	969	987	995	998
9.00	10	54	157	317	503	676	811	900	952	979	992	997
10.00	7	40	124	263	438	614	760	865	931	968	986	994
11.00	5	30	98	218	380	553	708	827	906	953	979	991
12.00	3	23	77	181	328	496	655	785	877	936	969	986
13.00	2	17	61	149	282	442	603	741	845	915	956	979
14.00	2	13	48	123	242	392	551	696	810	890	942	971
15.00	1	10	38	102	207	347	502	650	773	864	924	961
16.00	1	8	30	84	176	305	455	604	734	834	904	948
17.00	1	6	24	69	150	268	411	559	694	802	882	934
18.00	1	4	19	57	128	235	370	515	653	769	857	917
19.00	0	3	15	47	108	205	331	473	613	734	830	898
20.00	0	3	12	38	92	179	296	433	573	699	802	878
21.00	0	2	10	32	78	155	264	395	533	663	772	855
22.00	0	2	8	26	66	135	235	360	495	626	741	831
23.00	0	1	6	22	56	117	209	326	458	590	709	805
24.00	0	1	5	18	47	101	185	295	423	554	676	778
25.00	0	1	4	15	40	88	164	267	390	519	643	750
30.00	0	0	1	6	17	42	87	156	249	361	482	601
35.00	0	0	1	2	7	20	45	88	152	238	342	456
40.00	0	0	0	1	3	9	23	48	90	151	233	331
45.00	0	0	0	0	1	4	11	26	52	93	153	231
50.00	0	0	0	0	1	2	6	14	29	56	98	156

Table A3.16- Probability Tables For A Shape Parameter of .70(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	12	13	14	15	16	17	18	19	20	21	22	23
7.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
8.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
9.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
10.00	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
11.00	996	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
12.00	994	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
13.00	991	996	999	999	1000	1000	1000	1000	1000	1000	1000	1000
14.00	987	994	998	999	1000	1000	1000	1000	1000	1000	1000	1000
15.00	981	991	996	999	999	1000	1000	1000	1000	1000	1000	1000
16.00	974	988	995	998	999	1000	1000	1000	1000	1000	1000	1000
17.00	965	983	992	997	999	999	1000	1000	1000	1000	1000	1000
18.00	955	977	989	995	998	999	1000	1000	1000	1000	1000	1000
19.00	943	970	985	993	997	999	999	1000	1000	1000	1000	1000
20.00	929	961	980	990	996	998	999	1000	1000	1000	1000	1000
21.00	914	952	974	987	994	997	999	1000	1000	1000	1000	1000
22.00	896	940	967	983	992	996	998	999	1000	1000	1000	1000
23.00	877	927	959	978	989	995	998	999	1000	1000	1000	1000
24.00	857	913	950	973	986	993	997	999	999	1000	1000	1000
25.00	835	897	939	966	982	991	996	998	999	1000	1000	1000
30.00	709	798	867	917	951	972	985	992	996	998	999	1000
35.00	571	677	768	841	896	935	961	978	988	994	997	998
40.00	438	548	652	743	819	878	921	951	971	983	991	995
45.00	324	427	532	633	724	800	861	908	941	964	978	988
50.00	231	320	419	521	619	709	785	848	896	932	957	974

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	24	25	26	27	28	29	30	31	32	33	34	35
35.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
40.00	998	999	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
45.00	993	996	998	999	1000	1000	1000	1000	1000	1000	1000	1000
50.00	984	991	995	997	999	999	1000	1000	1000	1000	1000	1000

Table A3.17- Probability Tables For A Shape Parameter of .75

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	900	995	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
.10	837	986	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
.20	742	963	996	1000	1000	1000	1000	1000	1000	1000	1000	1000
.25	702	950	994	1000	1000	1000	1000	1000	1000	1000	1000	1000
.30	667	937	992	999	1000	1000	1000	1000	1000	1000	1000	1000
.40	605	909	985	998	1000	1000	1000	1000	1000	1000	1000	1000
.50	552	880	977	997	1000	1000	1000	1000	1000	1000	1000	1000
.60	506	851	968	995	999	1000	1000	1000	1000	1000	1000	1000
.70	465	821	957	992	999	1000	1000	1000	1000	1000	1000	1000
.75	447	807	952	991	999	1000	1000	1000	1000	1000	1000	1000
.80	429	792	946	989	998	1000	1000	1000	1000	1000	1000	1000
.90	397	764	933	985	997	1000	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	307	669	883	968	993	999	1000	1000	1000	1000	1000	1000
1.50	258	607	844	951	987	997	999	1000	1000	1000	1000	1000
1.75	218	551	803	932	980	995	999	1000	1000	1000	1000	1000
2.00	186	499	762	910	972	992	998	1000	1000	1000	1000	1000
2.25	159	452	721	885	961	989	997	999	1000	1000	1000	1000
2.50	137	409	680	859	948	984	996	999	1000	1000	1000	1000
2.75	118	371	640	832	934	978	994	998	1000	1000	1000	1000
3.00	102	336	601	804	919	971	991	998	999	1000	1000	1000
3.50	77	275	529	745	885	954	984	995	999	1000	1000	1000
4.00	59	226	463	686	843	932	974	991	997	999	1000	1000
4.50	46	186	403	627	800	907	962	986	995	999	1000	1000
5.00	35	153	351	571	755	878	946	979	993	998	999	1000
6.00	22	105	264	467	661	811	906	958	983	994	998	999
7.00	14	72	197	377	570	736	855	929	968	987	995	998
8.00	9	49	147	301	484	659	797	891	947	976	990	996
9.00	6	34	109	239	407	582	733	845	918	960	982	993
10.00	4	24	81	188	339	508	667	794	884	940	971	987
11.00	2	17	60	148	280	439	600	738	843	913	956	979
12.00	2	12	45	116	230	377	535	680	798	882	936	968
13.00	1	8	33	90	187	321	473	622	749	846	912	953
14.00	1	6	25	70	152	271	415	563	698	806	884	935
15.00	0	4	18	55	123	228	362	507	645	762	852	913
16.00	0	3	14	42	100	191	313	453	593	717	816	888
17.00	0	2	10	33	80	159	270	402	541	670	777	859
18.00	0	2	8	26	64	132	232	355	491	622	736	828
19.00	0	1	6	20	52	110	198	312	442	574	694	793
20.00	0	1	4	15	41	91	168	273	397	527	651	757
21.00	0	1	3	12	33	75	143	238	355	482	607	718
22.00	0	0	2	9	26	61	120	206	315	438	563	679
23.00	0	0	2	7	21	50	102	178	279	397	520	638
24.00	0	0	1	6	17	41	85	154	246	358	479	598
25.00	0	0	1	4	13	34	72	132	216	321	439	558
30.00	0	0	0	1	4	12	29	59	108	178	268	372
35.00	0	0	0	0	1	4	11	25	51	92	151	229
40.00	0	0	0	0	0	1	4	11	23	45	81	132
45.00	0	0	0	0	0	1	2	4	10	21	41	72
50.00	0	0	0	0	0	0	1	2	4	10	20	38

Table A3.17- Probability Tables For A Shape Parameter of .75(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	12	13	14	15	16	17	18	19	20	21	22	23
6.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
7.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
8.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
9.00	997	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
10.00	995	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
11.00	991	996	999	999	1000	1000	1000	1000	1000	1000	1000	1000
12.00	985	993	997	999	1000	1000	1000	1000	1000	1000	1000	1000
13.00	977	989	995	998	999	1000	1000	1000	1000	1000	1000	1000
14.00	966	983	992	997	999	999	1000	1000	1000	1000	1000	1000
15.00	953	976	988	995	998	999	1000	1000	1000	1000	1000	1000
16.00	936	966	983	992	996	998	999	1000	1000	1000	1000	1000
17.00	917	953	976	988	994	997	999	1000	1000	1000	1000	1000
18.00	894	939	966	983	991	996	998	999	1000	1000	1000	1000
19.00	868	921	955	976	988	994	997	999	999	1000	1000	1000
20.00	840	901	942	968	983	991	996	998	999	1000	1000	1000
21.00	809	878	926	956	977	988	994	997	999	999	1000	1000
22.00	776	853	908	946	969	984	992	996	998	999	1000	1000
23.00	742	825	888	932	960	978	988	994	997	999	999	1000
24.00	706	796	865	916	950	971	984	992	996	998	999	1000
25.00	669	764	841	897	937	963	980	989	994	997	999	999
30.00	483	593	694	779	848	900	937	962	978	988	993	997
35.00	321	424	529	630	721	798	860	906	940	963	978	987
40.00	199	282	376	476	575	668	750	819	873	915	945	965
45.00	117	177	252	338	432	528	621	705	779	840	888	924
50.00	66	106	160	228	307	396	488	579	664	741	806	860

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	24	25	26	27	28	29	30	31	32	33	34	35
25.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
30.00	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
35.00	993	996	998	999	1000	1000	1000	1000	1000	1000	1000	1000
40.00	979	988	993	996	998	999	999	1000	1000	1000	1000	1000
45.00	950	968	981	989	993	996	998	999	999	1000	1000	1000
50.00	902	933	956	972	983	990	994	997	998	999	999	1000

Table A3.18- Probability Tables For A Shape Parameter of .80

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	913	996	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
.10	853	989	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
.20	759	968	997	1000	1000	1000	1000	1000	1000	1000	1000	1000
.25	719	956	995	1000	1000	1000	1000	1000	1000	1000	1000	1000
.30	683	943	993	999	1000	1000	1000	1000	1000	1000	1000	1000
.40	619	916	987	998	1000	1000	1000	1000	1000	1000	1000	1000
.50	563	886	979	997	1000	1000	.000	1000	1000	1000	1000	1000
.60	515	856	970	995	999	1000	1000	1000	1000	1000	1000	1000
.70	472	826	959	993	999	1000	1000	1000	1000	1000	1000	1000
.75	452	811	953	991	999	1000	1000	1000	1000	1000	1000	1000
.80	433	796	947	989	998	1000	1000	1000	1000	1000	1000	1000
.90	399	765	934	986	997	1000	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	303	664	880	967	992	999	1000	1000	1000	1000	1000	1000
1.50	251	598	838	948	986	997	999	1000	1000	1000	1000	1000
1.75	209	536	792	926	978	995	999	1000	1000	1000	1000	1000
2.00	175	481	746	901	968	991	998	1000	1000	1000	1000	1000
2.25	148	430	700	872	955	986	996	999	1000	1000	1000	1000
2.50	125	384	655	842	940	980	994	999	1000	1000	1000	1000
2.75	106	343	610	810	922	973	992	998	999	1000	1000	1000
3.00	90	307	568	777	903	964	988	997	999	1000	1000	1000
3.50	66	244	488	709	859	941	979	993	998	999	1000	1000
4.00	48	195	416	640	810	913	965	987	996	999	1000	1000
4.50	36	155	353	574	757	879	947	979	993	998	999	1000
5.00	27	123	299	510	702	841	925	968	988	996	999	1000
6.00	15	78	211	397	591	754	868	937	972	989	996	999
7.00	9	50	148	303	487	661	799	892	947	977	990	996
8.00	5	32	103	228	393	567	721	836	912	957	981	992
9.00	3	21	72	170	313	478	638	771	867	929	965	984
10.00	2	13	49	126	246	397	557	700	814	893	943	972
11.00	1	9	34	92	191	326	478	627	754	849	914	955
12.00	1	6	24	67	147	264	406	554	689	799	879	932
13.00	0	4	16	49	113	212	341	484	623	743	837	903
14.00	0	2	11	36	86	169	283	417	557	684	789	869
15.00	0	2	8	26	65	133	233	357	492	623	738	829
16.00	0	1	5	19	49	105	190	302	431	562	683	784
17.00	0	1	4	13	37	82	154	254	374	503	627	736
18.00	0	0	3	10	27	63	124	212	322	446	571	686
19.00	0	0	2	7	20	49	99	175	275	392	515	634
20.00	0	0	1	5	15	38	79	144	233	342	462	581
21.00	0	0	1	4	11	29	63	118	197	296	410	529
22.00	0	0	1	3	8	22	50	96	165	255	363	478
23.00	0	0	0	2	6	17	39	78	137	218	318	429
24.00	0	0	0	1	5	13	31	63	114	186	277	383
25.00	0	0	0	1	3	10	24	50	94	157	240	340
30.00	0	0	0	0	1	2	7	16	34	64	109	172
35.00	0	0	0	0	0	1	2	5	11	24	45	78
40.00	0	0	0	0	0	0	0	1	4	8	17	33
45.00	0	0	0	0	0	0	0	0	1	3	6	13
50.00	0	0	0	0	0	0	0	0	0	1	2	5

Table A3.18- Probability Tables For A Shape Parameter of .80(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	12	13	14	15	16	17	18	19	20	21	22	23
6.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
7.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
8.00	997	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
9.00	993	997	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
10.00	987	994	998	999	1000	1000	1000	1000	1000	1000	1000	1000
11.00	978	990	996	998	999	1000	1000	1000	1000	1000	1000	1000
12.00	964	982	992	996	999	999	1000	1000	1000	1000	1000	1000
13.00	946	972	986	994	997	999	1000	1000	1000	1000	1000	1000
14.00	923	958	978	989	995	998	999	1000	1000	1000	1000	1000
15.00	895	939	967	983	992	996	998	999	1000	1000	1000	1000
16.00	862	916	952	974	987	993	997	999	999	1000	1000	1000
17.00	824	889	934	962	980	990	995	998	999	1000	1000	1000
18.00	782	857	911	948	971	984	992	996	998	999	1000	1000
19.00	737	822	885	930	959	977	988	994	997	999	999	1000
20.00	690	783	855	908	945	968	983	991	995	998	999	1000
21.00	642	741	822	883	927	957	975	987	993	997	998	999
22.00	592	697	785	855	906	942	966	981	990	995	997	999
23.00	543	651	746	823	882	925	955	974	985	992	996	998
24.00	495	605	704	789	856	906	941	965	980	989	994	997
25.00	449	558	662	752	826	883	925	954	973	984	991	996
30.00	252	345	446	548	645	732	805	864	909	941	963	978
35.00	126	189	266	355	450	546	638	721	792	851	896	930
40.00	57	94	143	207	282	367	458	549	636	715	784	842
45.00	24	43	71	110	62	226	300	383	470	556	639	715
50.00	10	19	33	55	86	128	182	246	320	400	483	566

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	24	25	26	27	28	29	30	31	32	33	34	35
21.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
22.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
23.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
24.00	999	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
25.00	998	999	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
30.00	987	993	996	998	999	999	1000	1000	1000	1000	1000	1000
35.00	955	972	983	990	994	997	998	999	1000	1000	1000	1000
40.00	888	923	948	966	979	987	992	996	998	999	999	1000
45.00	781	837	882	917	943	962	976	985	991	994	997	998
50.00	645	717	781	835	879	913	940	959	973	983	989	993

Table A3.19- Probability Tables For A Shape Parameter of .85

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	925	997	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
.10	868	991	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
.20	775	973	998	1000	1000	1000	1000	1000	1000	1000	1000	1000
.25	735	961	996	1000	1000	1000	1000	1000	1000	1000	1000	1000
.30	698	949	994	999	1000	1000	1000	1000	1000	1000	1000	1000
.40	632	922	989	999	1000	1000	1000	1000	1000	1000	1000	1000
.50	574	893	981	997	1000	1000	1000	1000	1000	1000	1000	1000
.60	523	862	972	996	999	1000	1000	1000	1000	1000	1000	1000
.70	478	831	961	993	999	1000	1000	1000	1000	1000	1000	1000
.75	457	815	955	992	999	1000	1000	1000	1000	1000	1000	1000
.80	437	799	949	990	998	1000	1000	1000	1000	1000	1000	1000
.90	401	767	935	986	997	1000	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	299	659	878	965	992	998	1000	1000	1000	1000	1000	1000
1.50	244	588	831	945	985	997	999	1000	1000	1000	1000	1000
1.75	200	522	781	920	976	994	999	1000	1000	1000	1000	1000
2.00	165	462	730	891	963	990	997	999	1000	1000	1000	1000
2.25	136	408	679	859	948	984	996	999	1000	1000	1000	1000
2.50	113	360	628	823	930	976	993	998	1000	1000	1000	1000
2.75	94	317	579	786	909	967	989	997	999	1000	1000	1000
3.00	79	278	533	748	885	955	985	995	999	1000	1000	1000
3.50	55	215	446	670	832	926	971	990	997	999	1000	1000
4.00	39	165	370	592	772	889	952	982	994	998	999	1000
4.50	28	127	304	517	708	845	927	970	988	996	999	1000
5.00	20	97	249	448	643	796	897	953	981	993	998	999
6.00	10	57	164	328	516	688	820	906	956	981	992	997
7.00	5	33	107	234	401	576	728	842	916	959	982	992
8.00	3	20	69	164	305	469	629	764	862	926	963	983
9.00	2	12	44	114	227	373	531	677	795	880	935	967
10.00	1	7	28	78	166	291	438	587	719	822	896	943
11.00	0	4	18	53	120	223	354	499	638	756	847	910
12.00	0	2	11	35	85	168	282	416	555	683	789	868
13.00	0	1	7	24	60	125	221	342	476	607	724	817
14.00	0	1	4	16	42	92	171	277	401	532	655	760
15.00	0	1	3	10	29	67	131	221	334	459	584	698
16.00	0	0	2	7	20	49	99	174	274	391	514	632
17.00	0	0	1	5	14	35	74	136	222	328	446	566
18.00	0	0	1	3	10	25	55	105	178	273	383	500
19.00	0	0	0	2	7	18	41	80	141	224	325	437
20.00	0	0	0	1	4	13	30	61	111	182	273	378
21.00	0	0	0	1	3	9	22	46	87	147	227	323
22.00	0	0	0	1	2	6	16	35	67	117	187	274
23.00	0	0	0	0	1	4	11	26	52	93	152	230
24.00	0	0	0	0	1	3	8	19	39	73	123	191
25.00	0	0	0	0	1	2	6	14	30	57	99	158
30.00	0	0	0	0	0	0	1	3	7	15	30	55
35.00	0	0	0	0	0	0	0	1	1	4	8	16
40.00	0	0	0	0	0	0	0	0	0	1	2	4
45.00	0	0	0	0	0	0	0	0	0	0	0	1
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Table A3.19- Probability Tables For A Shape Parameter of .15(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	12	13	14	15	16	17	18	19	20	21	22	23
5.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
6.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
7.00	997	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
8.00	993	997	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
9.00	984	993	997	999	1000	1000	1000	1000	1000	1000	1000	1000
10.00	971	986	994	997	999	1000	1000	1000	1000	1000	1000	1000
11.00	951	974	988	994	998	999	1000	1000	1000	1000	1000	1000
12.00	923	957	978	989	995	998	999	1000	1000	1000	1000	1000
13.00	887	934	963	981	990	996	998	999	1000	1000	1000	1000
14.00	843	903	943	969	983	992	996	998	999	1000	1000	1000
15.00	792	865	917	952	973	986	993	997	998	999	1000	1000
16.00	736	821	884	929	959	977	988	994	997	999	999	1000
17.00	676	771	846	901	940	965	981	990	995	997	999	999
18.00	614	716	801	867	916	949	970	984	991	996	998	999
19.00	551	659	752	828	887	928	957	975	986	993	996	998
20.00	490	599	699	784	852	903	939	963	979	988	994	997
21.00	430	540	644	736	813	873	918	949	969	982	990	995
22.00	375	482	588	685	770	839	891	930	957	974	985	992
23.00	323	426	531	632	723	800	861	907	941	963	978	988
24.00	276	373	476	578	674	757	826	881	921	950	969	982
25.00	234	324	423	525	623	712	788	850	898	933	958	974
30.00	91	142	207	286	374	468	561	650	730	798	854	898
35.00	31	53	86	131	188	258	338	424	512	598	679	750
40.00	9	17	31	52	82	123	175	238	310	389	472	555
45.00	2	5	10	18	32	51	79	117	164	222	289	362
50.00	1	1	3	6	11	19	32	51	78	113	157	210

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	24	25	26	27	28	29	30	31	32	33	34	35
17.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
18.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
19.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
20.00	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
21.00	997	999	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
22.00	996	998	999	999	1000	1000	1000	1000	1000	1000	1000	1000
23.00	993	996	998	999	1000	1000	1000	1000	1000	1000	1000	1000
24.00	990	994	997	998	999	1000	1000	1000	1000	1000	1000	1000
25.00	985	991	995	997	999	999	1000	1000	1000	1000	1000	1000
30.00	931	955	972	983	990	994	997	998	999	1000	1000	1000
35.00	812	862	902	933	955	971	981	989	993	996	998	999
40.00	634	708	772	827	873	908	936	956	971	981	988	993
45.00	440	519	597	670	736	794	843	884	916	940	959	972
50.00	272	340	414	490	565	637	703	763	815	859	895	924

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	36	37	38	39	40	41	42	43	44	45	46	47
35.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
40.00	996	997	999	999	1000	1000	1000	1000	1000	1000	1000	1000
45.00	982	988	991	995	997	998	999	999	1000	1000	1000	1000
50.00	946	962	974	983	989	993	996	997	999	999	999	1000

Table A3.20- Probability Tables For A Shape Parameter of .90

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	935	998	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
.10	882	993	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
.20	791	976	998	1000	1000	1000	1000	1000	1000	1000	1000	1000
.25	750	966	997	1000	1000	1000	1000	1000	1000	1000	1000	1000
.30	713	954	995	1000	1000	1000	1000	1000	1000	1000	1000	1000
.40	645	928	990	999	1000	1000	1000	1000	1000	1000	1000	1000
.50	585	899	983	998	1000	1000	1000	1000	1000	1000	1000	1000
.60	532	868	974	996	1000	1000	1000	1000	1000	1000	1000	1000
.70	484	835	963	993	999	1000	1000	1000	1000	1000	1000	1000
.75	462	819	957	992	999	1000	1000	1000	1000	1000	1000	1000
.80	441	802	950	990	998	1000	1000	1000	1000	1000	1000	1000
.90	403	769	936	986	998	1000	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	295	655	875	964	992	998	1000	1000	1000	1000	1000	1000
1.50	237	578	824	942	984	996	999	1000	1000	1000	1000	1000
1.75	191	507	769	913	973	993	998	1000	1000	1000	1000	1000
2.00	155	443	713	880	959	988	997	999	1000	1000	1000	1000
2.25	126	386	656	843	940	981	994	999	1000	1000	1000	1000
2.50	102	335	601	803	918	971	991	998	999	1000	1000	1000
2.75	83	290	548	761	893	959	986	996	999	1000	1000	1000
3.00	68	251	497	717	865	944	980	994	998	1000	1000	1000
3.50	46	186	404	628	800	907	962	986	995	999	1000	1000
4.00	31	138	324	540	729	860	936	974	990	997	999	1000
4.50	21	101	258	459	654	805	902	956	982	993	998	999
5.00	14	74	203	385	579	744	861	932	970	988	996	998
6.00	7	40	123	263	438	613	760	865	931	968	986	994
7.00	3	21	73	174	318	485	644	776	871	931	966	985
8.00	2	11	43	112	224	369	527	673	792	878	933	966
9.00	1	6	25	71	153	273	417	565	699	807	885	936
10.00	0	3	14	44	103	196	320	461	600	724	821	892
11.00	0	2	8	27	68	138	240	366	502	633	746	835
12.00	0	1	5	16	44	96	176	283	409	540	663	767
13.00	0	0	3	10	28	65	126	215	326	451	576	690
14.00	0	0	1	6	18	43	89	160	255	368	490	609
15.00	0	0	1	4	11	29	62	117	195	295	408	527
16.00	0	0	0	2	7	19	43	84	147	232	334	447
17.00	0	0	0	1	4	12	29	60	109	179	269	373
18.00	0	0	0	1	3	8	19	42	80	136	213	306
19.00	0	0	0	0	2	5	13	29	58	102	166	247
20.00	0	0	0	0	1	3	9	20	41	76	127	197
21.00	0	0	0	0	1	2	6	14	29	56	97	154
22.00	0	0	0	0	0	1	4	9	20	40	72	120
23.00	0	0	0	0	0	1	2	6	14	29	54	92
24.00	0	0	0	0	0	0	2	4	10	20	39	69
25.00	0	0	0	0	0	0	1	3	7	14	29	52
30.00	0	0	0	0	0	0	0	0	1	2	5	11
35.00	0	0	0	0	0	0	0	0	0	0	1	2
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Table A3.21- Probability Tables For A Shape Parameter of .95(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	12	13	14	15	16	17	18	19	20	21	22	23
4.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
4.50	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
5.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
6.00	996	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
7.00	986	994	998	999	1000	1000	1000	1000	1000	1000	1000	1000
8.00	967	984	993	997	999	999	1000	1000	1000	1000	1000	1000
9.00	933	964	982	991	996	998	999	1000	1000	1000	1000	1000
10.00	882	930	961	980	990	995	998	999	1000	1000	1000	1000
11.00	814	882	929	959	978	989	994	997	999	999	1000	1000
12.00	732	817	882	927	958	976	987	994	997	999	999	1000
13.00	640	739	821	882	926	956	975	986	993	996	998	999
14.00	545	653	747	824	883	926	955	974	986	992	996	998
15.00	452	562	665	755	828	885	926	955	973	985	992	996
16.00	366	472	578	676	762	832	887	926	954	972	984	991
17.00	288	387	491	593	687	769	836	888	927	954	972	984
18.00	223	310	408	509	608	698	776	841	891	928	954	972
19.00	168	243	331	428	526	622	708	783	845	893	928	954
20.00	124	187	264	352	447	543	635	718	790	849	895	929
21.00	90	141	206	284	372	465	559	648	728	797	853	897
22.00	65	104	158	225	304	391	483	574	660	737	803	857
23.00	45	76	119	175	244	323	410	500	589	672	746	809
24.00	31	54	88	133	192	262	342	429	517	603	683	755
25.00	21	38	64	100	149	209	281	361	447	533	617	694
30.00	3	6	11	19	33	54	83	121	170	229	296	371
35.00	0	1	1	3	5	10	18	29	46	69	101	141
40.00	0	0	0	0	1	1	3	5	9	16	25	39
45.00	0	0	0	0	0	0	0	1	2	3	5	9
50.00	0	0	0	0	0	0	0	0	0	0	1	2

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	24	25	26	27	28	29	30	31	32	33	34	35
13.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
14.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
15.00	998	999	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
16.00	995	998	999	999	1000	1000	1000	1000	1000	1000	1000	1000
17.00	991	995	997	999	999	1000	1000	1000	1000	1000	1000	1000
18.00	983	990	995	997	999	999	1000	1000	1000	1000	1000	1000
19.00	971	983	990	994	997	998	999	1000	1000	1000	1000	1000
20.00	954	971	983	990	994	997	998	999	1000	1000	1000	1000
21.00	931	955	971	982	989	994	997	998	999	999	1000	1000
22.00	900	932	955	971	982	989	994	996	998	999	999	1000
23.00	861	902	933	956	971	982	989	994	996	998	999	999
24.00	816	865	905	934	956	972	982	989	993	996	998	999
25.00	763	822	869	907	936	957	972	982	989	993	996	998
30.00	449	529	606	678	744	801	849	888	919	943	961	974
35.00	189	246	311	380	453	527	599	667	729	785	833	872
40.00	59	85	118	159	207	262	324	390	459	528	596	660
45.00	14	22	34	51	72	100	134	176	224	278	337	400
50.00	3	5	8	13	20	30	44	62	86	115	150	192

Table A3.20- Probability Tables For A Shape Parameter of .90(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	36	37	38	39	40	41	42	43	44	45	46	47
30.00	999	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
35.00	989	993	996	997	999	999	1000	1000	1000	1000	1000	1000
40.00	949	964	976	984	990	993	996	997	999	999	999	1000
45.00	850	886	915	938	956	969	979	986	991	994	996	998
50.00	686	743	793	837	873	904	928	948	962	974	982	988

Table A3.21- Probability Tables For A Shape Parameter of .95

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	944	998	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
.10	894	994	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
.20	805	980	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
.25	765	970	997	1000	1000	1000	1000	1000	1000	1000	1000	1000
.30	727	959	996	1000	1000	1000	1000	1000	1000	1000	1000	1000
.40	658	933	991	999	1000	1000	1000	1000	1000	1000	1000	1000
.50	595	904	984	998	1000	1000	1000	1000	1000	1000	1000	1000
.60	540	873	975	996	1000	1000	1000	1000	1000	1000	1000	1000
.70	490	840	964	994	999	1000	1000	1000	1000	1000	1000	1000
.75	467	823	958	992	999	1000	1000	1000	1000	1000	1000	1000
.80	445	806	951	991	999	1000	1000	1000	1000	1000	1000	1000
.90	405	771	936	986	998	1000	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	291	650	872	963	991	998	1000	1000	1000	1000	1000	1000
1.50	230	568	816	938	983	996	999	1000	1000	1000	1000	1000
1.75	182	493	757	907	970	992	998	1000	1000	1000	1000	1000
2.00	145	425	695	869	953	986	996	999	1000	1000	1000	1000
2.25	115	364	633	827	932	977	993	998	1000	1000	1000	1000
2.50	92	311	573	781	906	965	989	997	999	1000	1000	1000
2.75	73	265	515	733	875	950	982	994	998	1000	1000	1000
3.00	58	224	460	683	841	931	974	991	997	999	1000	1000
3.50	37	160	362	583	765	884	950	981	993	998	999	1000
4.00	24	113	280	487	681	825	915	963	986	995	998	999
4.50	15	80	214	400	595	757	870	938	973	989	996	999
5.00	10	56	161	324	511	683	816	904	954	980	992	997
6.00	4	27	89	203	360	531	688	811	896	947	975	989
7.00	2	13	48	123	241	391	550	694	809	890	941	971
8.00	1	6	25	71	155	275	419	567	701	809	886	937
9.00	0	3	13	41	96	185	306	444	584	709	810	883
10.00	0	1	7	23	58	121	215	334	467	599	716	811
11.00	0	1	3	12	34	77	146	243	361	489	613	724
12.00	0	0	2	7	20	48	97	171	270	386	509	627
13.00	0	0	1	4	11	29	62	117	196	295	409	527
14.00	0	0	0	2	6	17	39	78	138	220	320	431
15.00	0	0	0	1	3	10	24	51	95	159	243	343
16.00	0	0	0	1	2	6	15	33	64	113	180	266
17.00	0	0	0	0	1	3	9	21	43	78	131	202
18.00	0	0	0	0	1	2	5	13	28	53	93	149
19.00	0	0	0	0	0	1	3	8	18	36	65	108
20.00	0	0	0	0	0	1	2	5	11	23	44	77
21.00	0	0	0	0	0	0	1	3	7	15	30	54
22.00	0	0	0	0	0	0	1	2	4	10	20	37
23.00	0	0	0	0	0	0	0	1	3	6	13	25
24.00	0	0	0	0	0	0	0	1	2	4	8	17
25.00	0	0	0	0	0	0	0	0	1	2	5	11
30.00	0	0	0	0	0	0	0	0	0	0	0	1
35.00	0	0	0	0	0	0	0	0	0	0	0	0
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Table A3.20- Probability Tables For A Shape Parameter of .90(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	12	13	14	15	16	17	18	19	20	21	22	23
4.50	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
5.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
6.00	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
7.00	994	997	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
8.00	984	993	997	999	1000	1000	1000	1000	1000	1000	1000	1000
9.00	967	984	993	997	999	999	1000	1000	1000	1000	1000	1000
10.00	939	967	984	992	997	999	999	1000	1000	1000	1000	1000
11.00	899	943	969	984	992	996	998	999	1000	1000	1000	1000
12.00	848	907	946	970	984	992	996	998	999	1000	1000	1000
13.00	786	860	913	949	972	985	992	996	998	999	1000	1000
14.00	715	804	871	920	953	973	986	993	996	998	999	1000
15.00	640	739	820	882	926	956	975	986	993	996	998	999
16.00	562	668	761	835	892	932	959	977	987	993	997	998
17.00	485	594	695	781	849	901	938	962	978	988	994	997
18.00	411	520	625	720	799	862	909	943	965	980	989	994
19.00	343	448	554	654	742	816	874	917	948	968	981	989
20.00	283	380	484	586	681	764	832	885	924	952	971	983
21.00	229	318	417	518	617	706	783	846	895	931	956	973
22.00	183	262	354	452	551	645	730	802	860	904	937	960
23.00	145	214	296	389	486	582	672	752	818	872	913	943
24.00	113	172	245	330	424	519	612	697	772	834	883	921
25.00	87	137	200	277	365	458	551	640	721	791	848	894
30.00	21	37	62	98	145	205	276	356	441	527	611	689
35.00	4	8	16	27	46	72	108	154	211	278	352	431
40.00	1	2	3	6	12	21	34	54	82	118	163	218
45.00	0	0	1	1	3	5	9	16	26	42	63	91
50.00	0	0	0	0	1	1	2	4	7	13	21	32

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	24	25	26	27	28	29	30	31	32	33	34	35
15.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
16.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
17.00	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
18.00	997	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
19.00	994	997	998	999	1000	1000	1000	1000	1000	1000	1000	1000
20.00	990	995	997	999	999	1000	1000	1000	1000	1000	1000	1000
21.00	984	991	995	997	999	999	1000	1000	1000	1000	1000	1000
22.00	975	985	992	995	998	999	999	1000	1000	1000	1000	1000
23.00	964	978	987	992	996	998	999	999	1000	1000	1000	1000
24.00	948	967	980	988	993	996	998	999	999	1000	1000	1000
25.00	928	952	970	981	989	994	996	998	999	999	1000	1000
30.00	758	818	866	905	934	955	971	981	988	993	996	998
35.00	511	590	665	733	792	843	884	916	941	960	973	982
40.00	281	350	425	501	576	647	713	772	823	865	900	928
45.00	128	172	225	285	352	422	494	565	634	698	756	806
50.00	49	71	101	137	182	233	291	355	421	490	558	624

Table A3.21- Probability Tables For A Shape Parameter of .95(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	36	37	38	39	40	41	42	43	44	45	46	47
23.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
24.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
25.00	999	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
30.00	983	989	993	996	997	999	999	1000	1000	1000	1000	1000
35.00	905	931	951	965	976	984	990	993	996	997	998	999
40.00	719	773	820	860	893	920	941	957	970	979	986	990
45.00	465	530	594	656	712	764	810	849	982	910	932	950
50.00	240	292	350	410	472	534	595	653	708	757	802	841

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	48	49	50	51	52	53	54	55	56	57	58	59
35.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
40.00	994	996	997	998	999	999	1000	1000	1000	1000	1000	1000
45.00	964	974	982	987	991	994	996	998	998	999	999	1000
50.00	874	902	925	943	958	969	978	984	989	993	995	997

Table A3.22- Probability Tables For A Shape Parameter of 1.00

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	951	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
.10	905	995	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
.20	819	982	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
.25	779	974	998	1000	1000	1000	1000	1000	1000	1000	1000	1000
.30	741	963	996	1000	1000	1000	1000	1000	1000	1000	1000	1000
.40	670	938	992	999	1000	1000	1000	1000	1000	1000	1000	1000
.50	607	910	986	998	1000	1000	1000	1000	1000	1000	1000	1000
.60	549	878	977	997	1000	1000	1000	1000	1000	1000	1000	1000
.70	497	844	966	994	999	1000	1000	1000	1000	1000	1000	1000
.75	472	827	959	993	999	1000	1000	1000	1000	1000	1000	1000
.80	449	809	953	991	999	1000	1000	1000	1000	1000	1000	1000
.90	407	772	937	987	998	1000	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	287	645	868	962	991	998	1000	1000	1000	1000	1000	1000
1.50	223	558	809	934	981	996	999	1000	1000	1000	1000	1000
1.75	174	478	744	899	967	991	998	1000	1000	1000	1000	1000
2.00	135	406	677	857	947	983	995	999	1000	1000	1000	1000
2.25	105	343	609	809	922	973	992	998	999	1000	1000	1000
2.50	82	287	544	758	891	958	986	996	999	1000	1000	1000
2.75	64	240	481	703	855	939	978	993	998	999	1000	1000
3.00	50	199	423	647	815	916	966	988	996	999	1000	1000
3.50	30	136	321	537	725	858	935	973	990	997	999	1000
4.00	18	92	238	433	629	785	889	949	979	992	997	999
4.50	11	61	174	342	532	703	831	913	960	983	993	998
5.00	7	40	125	265	440	616	762	867	932	968	986	995
6.00	2	17	62	151	285	446	606	744	847	916	957	980
7.00	1	7	30	82	173	301	450	599	729	830	901	947
8.00	0	3	14	42	100	191	313	453	593	717	816	888
9.00	0	1	6	21	55	116	207	324	456	587	706	803
10.00	0	0	3	10	29	67	130	220	333	458	583	697
11.00	0	0	1	5	15	38	79	143	232	341	460	579
12.00	0	0	1	2	8	20	46	90	155	242	347	462
13.00	0	0	0	1	4	11	26	54	100	166	252	353
14.00	0	0	0	0	2	6	14	32	62	109	176	260
15.00	0	0	0	0	1	3	8	18	37	70	118	185
16.00	0	0	0	0	0	1	4	10	22	43	77	127
17.00	0	0	0	0	0	1	2	5	13	26	49	85
18.00	0	0	0	0	0	0	1	3	7	15	30	55
19.00	0	0	0	0	0	0	1	2	4	9	18	35
20.00	0	0	0	0	0	0	0	1	2	5	11	21
21.00	0	0	0	0	0	0	0	0	1	3	6	13
22.00	0	0	0	0	0	0	0	0	1	2	4	8
23.00	0	0	0	0	0	0	0	0	0	1	2	4
24.00	0	0	0	0	0	0	0	0	0	0	1	3
25.00	0	0	0	0	0	0	0	0	0	0	1	1
30.00	0	0	0	0	0	0	0	0	0	0	0	0
35.00	0	0	0	0	0	0	0	0	0	0	0	0
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Table A3.22- Probability Tables For A Shape Parameter of 1.00(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	12	13	14	15	16	17	18	19	20	21	22	23
4.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
4.50	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
5.00	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
6.00	991	996	999	999	1000	1000	1000	1000	1000	1000	1000	1000
7.00	973	987	994	998	999	1000	1000	1000	1000	1000	1000	1000
8.00	936	966	983	992	996	998	999	1000	1000	1000	1000	1000
9.00	876	926	959	978	989	995	998	999	1000	1000	1000	1000
10.00	792	864	917	951	973	986	993	997	998	999	1000	1000
11.00	689	781	854	907	944	968	982	991	995	998	999	1000
12.00	576	682	772	844	899	937	963	979	988	994	997	999
13.00	463	573	675	764	835	890	930	957	975	986	992	996
14.00	358	464	570	669	756	827	883	923	952	971	983	991
15.00	268	363	466	568	664	749	819	875	917	947	967	981
16.00	193	275	368	467	566	659	742	812	868	911	942	963
17.00	135	201	281	371	468	564	655	736	805	861	905	937
18.00	92	143	208	287	375	469	562	651	731	799	855	899
19.00	61	98	150	215	292	378	469	561	647	725	793	849
20.00	39	66	105	157	221	297	381	470	559	644	721	787
21.00	25	43	72	111	163	227	302	384	471	558	640	716
22.00	15	28	48	77	117	169	232	306	387	472	556	637
23.00	9	17	31	52	82	123	175	238	310	389	472	555
24.00	5	11	20	34	56	87	128	180	243	314	392	473
25.00	3	6	12	22	38	60	92	134	185	247	318	394
30.00	0	0	1	2	4	7	13	22	35	54	81	115
35.00	0	0	0	0	0	1	1	2	4	8	13	21
40.00	0	0	0	0	0	0	0	0	0	1	1	3
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	24	25	26	27	28	29	30	31	32	33	34	35
12.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
13.00	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
14.00	995	997	999	999	1000	1000	1000	1000	1000	1000	1000	1000
15.00	989	994	997	998	999	1000	1000	1000	1000	1000	1000	1000
16.00	978	987	993	996	998	999	999	1000	1000	1000	1000	1000
17.00	959	975	985	991	995	997	999	999	1000	1000	1000	1000
18.00	932	955	972	983	990	994	997	998	999	1000	1000	1000
19.00	893	927	951	969	980	988	993	996	998	999	999	1000
20.00	843	888	922	948	966	978	987	992	995	997	999	999
21.00	782	838	883	917	944	963	976	985	991	994	997	998
22.00	712	777	832	877	913	940	959	973	983	989	994	996
23.00	635	708	772	827	873	908	936	956	971	981	988	993
24.00	554	632	704	768	823	868	904	932	953	969	979	987
25.00	473	553	629	700	763	818	863	900	929	950	966	978
30.00	157	208	267	333	403	476	548	619	685	744	797	843
35.00	32	49	70	99	134	177	227	283	345	410	478	545
40.00	4	8	12	19	29	43	62	86	115	151	194	242
45.00	0	1	2	3	4	7	12	18	26	38	54	74
50.00	0	0	0	0	1	1	2	3	4	7	11	16

Table A3.22- Probability Tables For A Shape Parameter of 1.00(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	36	37	38	39	40	41	42	43	44	45	46	47
20.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
21.00	999	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
22.00	998	999	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
23.00	996	997	999	999	1000	1000	1000	1000	1000	1000	1000	1000
24.00	992	995	997	998	999	999	1000	1000	1000	1000	1000	1000
25.00	985	991	994	997	998	999	999	1000	1000	1000	1000	1000
30.00	880	911	935	954	968	978	985	990	994	996	998	999
35.00	610	672	729	780	825	863	895	921	941	958	970	979
40.00	296	355	416	479	542	603	662	716	766	810	848	880
45.00	99	130	166	208	256	307	363	421	480	540	598	653
50.00	24	34	47	65	86	112	144	180	221	267	317	370

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	48	49	50	51	52	53	54	55	56	57	58	59
30.00	999	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
35.00	985	990	993	996	997	998	999	999	1000	1000	1000	1000
40.00	908	930	947	961	972	980	986	990	993	996	997	998
45.00	705	753	796	834	867	895	918	937	953	965	974	981
50.00	425	481	538	593	646	696	742	784	822	855	884	908

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	60	61	62	63	64	65	66	67	68	69	70	71
40.00	999	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
45.00	987	991	994	996	997	998	999	999	999	1000	1000	1000
50.00	928	944	958	968	976	983	988	991	994	996	997	998

Table A3.23- Probability Tables For A Shape Parameter of 1.25

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	977	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
.10	945	998	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
.20	875	992	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
.25	838	986	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
.30	801	979	998	1000	1000	1000	1000	1000	1000	1000	1000	1000
.40	728	959	996	1000	1000	1000	1000	1000	1000	1000	1000	1000
.50	657	933	991	999	1000	1000	1000	1000	1000	1000	1000	1000
.60	590	901	983	998	1000	1000	1000	1000	1000	1000	1000	1000
.70	527	865	973	996	999	1000	1000	1000	1000	1000	1000	1000
.75	498	845	966	994	999	1000	1000	1000	1000	1000	1000	1000
.80	469	824	959	992	999	1000	1000	1000	1000	1000	1000	1000
.90	416	781	941	988	998	1000	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	267	619	852	955	989	998	1000	1000	1000	1000	1000	1000
1.50	190	506	768	913	973	993	998	1000	1000	1000	1000	1000
1.75	134	403	673	855	946	983	995	999	1000	1000	1000	1000
2.00	93	313	575	783	907	966	989	997	999	1000	1000	1000
2.25	64	239	480	702	855	939	977	993	998	999	1000	1000
2.50	43	179	392	615	791	901	959	985	995	998	1000	1000
2.75	29	132	313	528	718	852	931	972	989	996	999	1000
3.00	19	95	246	444	639	793	895	952	980	993	997	999
3.50	8	48	144	296	479	653	793	888	945	975	990	996
4.00	3	23	79	185	334	502	661	790	881	938	970	987
4.50	1	11	41	108	218	361	518	665	785	873	930	964
5.00	1	5	21	60	134	244	381	528	665	779	864	922
6.00	0	1	5	16	43	94	173	280	405	536	659	764
7.00	0	0	1	4	12	30	64	120	200	300	415	533
8.00	0	0	0	1	3	8	20	43	81	138	215	309
9.00	0	0	0	0	1	2	5	13	27	53	93	149
10.00	0	0	0	0	0	0	1	3	8	17	34	60
11.00	0	0	0	0	0	0	0	1	2	5	11	21
12.00	0	0	0	0	0	0	0	0	0	1	3	6
13.00	0	0	0	0	0	0	0	0	0	0	1	2
14.00	0	0	0	0	0	0	0	0	0	0	0	0
15.00	0	0	0	0	0	0	0	0	0	0	0	0
16.00	0	0	0	0	0	0	0	0	0	0	0	0
17.00	0	0	0	0	0	0	0	0	0	0	0	0
18.00	0	0	0	0	0	0	0	0	0	0	0	0
19.00	0	0	0	0	0	0	0	0	0	0	0	0
20.00	0	0	0	0	0	0	0	0	0	0	0	0
21.00	0	0	0	0	0	0	0	0	0	0	0	0
22.00	0	0	0	0	0	0	0	0	0	0	0	0
23.00	0	0	0	0	0	0	0	0	0	0	0	0
24.00	0	0	0	0	0	0	0	0	0	0	0	0
25.00	0	0	0	0	0	0	0	0	0	0	0	0
30.00	0	0	0	0	0	0	0	0	0	0	0	0
35.00	0	0	0	0	0	0	0	0	0	0	0	0
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Table A3.23- Probability Tables For A Shape Parameter of 1.25(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	12	13	14	15	16	17	18	19	20	21	22	23
3.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
3.50	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
4.00	994	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
4.50	983	992	997	999	1000	1000	1000	1000	1000	1000	1000	1000
5.00	958	979	990	996	998	999	1000	1000	1000	1000	1000	1000
6.00	846	905	944	969	984	992	996	998	999	1000	1000	1000
7.00	646	744	825	885	929	958	976	987	993	997	998	999
8.00	414	523	628	722	801	864	911	944	966	980	989	994
9.00	222	309	407	508	607	697	776	840	890	927	954	971
10.00	100	154	223	304	394	489	583	670	748	814	867	908
11.00	38	65	104	155	219	295	379	467	556	641	718	785
12.00	13	24	41	68	104	152	212	282	360	444	528	610
13.00	4	8	14	26	43	68	102	147	202	267	340	418
14.00	1	2	4	9	15	26	43	67	99	140	191	251
15.00	0	1	1	3	5	9	16	27	42	64	94	132
16.00	0	0	0	1	1	3	5	9	16	26	41	61
17.00	0	0	0	0	0	1	2	3	5	9	16	25
18.00	0	0	0	0	0	0	0	1	2	3	5	9
19.00	0	0	0	0	0	0	0	0	0	1	2	3
20.00	0	0	0	0	0	0	0	0	0	0	0	1
21.00	0	0	0	0	0	0	0	0	0	0	0	0
22.00	0	0	0	0	0	0	0	0	0	0	0	0
23.00	0	0	0	0	0	0	0	0	0	0	0	0
24.00	0	0	0	0	0	0	0	0	0	0	0	0
25.00	0	0	0	0	0	0	0	0	0	0	0	0
30.00	0	0	0	0	0	0	0	0	0	0	0	0
35.00	0	0	0	0	0	0	0	0	0	0	0	0
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Table A3.23- Probability Tables For A Shape Parameter of 1.25(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	24	25	26	27	28	29	30	31	32	33	34	35
7.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
8.00	997	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
9.00	983	990	995	997	998	999	1000	1000	1000	1000	1000	1000
10.00	939	960	975	985	991	995	997	998	999	1000	1000	1000
11.00	841	886	921	947	965	978	986	992	995	997	998	999
12.00	687	755	813	862	901	930	952	968	980	987	992	995
13.00	499	578	653	722	783	835	877	911	937	957	971	981
14.00	319	392	468	545	619	686	750	805	851	889	919	942
15.00	179	234	297	365	437	511	583	652	716	772	822	863
16.00	88	123	166	216	274	338	406	476	547	615	679	738
17.00	38	57	82	113	152	198	252	311	375	442	510	577
18.00	15	23	36	53	75	103	139	181	230	285	344	408
19.00	5	9	14	22	33	48	68	94	126	164	208	259
20.00	2	3	5	8	13	20	30	43	61	84	113	147
21.00	0	1	2	3	5	7	12	18	27	39	55	75
22.00	0	0	0	1	1	3	4	7	11	16	24	35
23.00	0	0	0	0	0	1	1	2	4	6	9	14
24.00	0	0	0	0	0	0	0	1	1	2	3	5
25.00	0	0	0	0	0	0	0	0	0	1	1	2
30.00	0	0	0	0	0	0	0	0	0	0	0	0
35.00	0	0	0	0	0	0	0	0	0	0	0	0
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	36	37	38	39	40	41	42	43	44	45	46	47
11.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
12.00	997	998	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
13.00	988	992	995	997	998	999	999	1000	1000	1000	1000	1000
14.00	960	973	982	988	992	995	997	998	999	999	1000	1000
15.00	898	925	946	962	974	982	988	992	995	997	998	999
16.00	790	835	873	904	929	949	964	975	983	988	992	995
17.00	641	701	756	804	846	881	910	933	951	965	975	983
18.00	473	539	602	663	719	770	815	854	887	913	935	952
19.00	315	374	437	500	563	624	681	734	782	824	860	891
20.00	188	234	286	341	400	461	523	583	641	696	746	791
21.00	101	132	168	210	258	310	365	423	483	542	600	656
22.00	49	67	89	117	150	188	231	279	331	386	443	501
23.00	21	30	43	58	78	103	132	167	206	250	299	350
24.00	8	13	18	27	37	51	69	90	116	147	183	223
25.00	3	5	7	11	16	23	32	44	60	79	102	129
30.00	0	0	0	0	0	0	0	0	1	1	1	2
35.00	0	0	0	0	0	0	0	0	0	0	0	0
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Table A3.23- Probability Tables For A Shape Parameter of 1.25(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	48	49	50	51	52	53	54	55	56	57	58	59
15.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
16.00	997	998	999	999	1000	1000	1000	1000	1000	1000	1000	1000
17.00	988	992	995	997	998	999	999	1000	1000	1000	1000	1000
18.00	965	975	983	988	992	995	997	998	999	999	999	1000
19.00	916	937	953	966	975	983	988	992	994	996	998	998
20.00	831	865	894	918	938	953	966	975	982	987	991	994
21.00	708	755	798	836	869	896	919	938	953	965	975	982
22.00	559	614	668	717	763	804	840	871	898	920	938	953
23.00	405	461	517	572	626	677	725	769	808	843	873	899
24.00	268	316	367	421	475	530	584	636	685	731	773	811
25.00	161	197	238	283	331	382	434	487	541	593	643	691
30.00	3	5	7	10	14	20	27	36	47	61	78	98
35.00	0	0	0	0	0	0	0	0	1	1	1	2
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	60	61	62	63	64	65	66	67	68	69	70	71
19.00	999	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
20.00	996	997	998	999	999	1000	1000	1000	1000	1000	1000	1000
21.00	987	991	994	996	997	998	999	999	999	1000	1000	1000
22.00	965	974	981	986	990	993	995	997	998	999	999	999
23.00	920	938	952	964	973	980	986	990	993	995	996	998
24.00	844	874	899	920	937	952	963	972	979	985	989	992
25.00	735	776	813	845	874	898	919	936	950	962	971	978
30.00	122	149	179	214	251	292	335	380	427	474	522	569
35.00	3	4	5	7	10	14	19	25	32	42	53	67
40.00	0	0	0	0	0	0	0	0	0	1	1	1
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Table A3.23- Probability Tables For A Shape Parameter of 1.25(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	72	73	74	75	76	77	78	79	80	81	82	83
22.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
23.00	998	999	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
24.00	994	996	997	998	999	999	999	1000	1000	1000	1000	1000
25.00	984	988	992	994	996	997	998	999	999	999	1000	1000
30.00	615	659	701	740	776	809	839	865	889	909	926	940
35.00	83	102	123	148	175	206	239	275	313	353	394	437
40.00	2	2	3	5	6	9	11	15	20	25	32	41
45.00	0	0	0	0	0	0	0	0	0	0	0	1
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	84	85	86	87	88	89	90	91	92	93	94	95
30.00	953	963	971	978	983	987	990	993	995	996	997	998
35.00	480	523	566	608	648	687	724	758	790	819	845	869
40.00	51	63	77	94	112	133	157	183	211	242	275	310
45.00	1	1	2	3	3	5	6	8	11	14	18	23
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	96	97	98	99	100	101	102	103	104	105	106	107
30.00	999	999	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
35.00	890	908	924	937	949	959	967	974	980	984	988	991
40.00	347	385	424	463	503	543	582	620	657	692	726	757
45.00	29	36	44	54	66	79	95	112	131	153	176	202
50.00	0	1	1	1	2	2	3	4	5	7	9	12

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	108	109	110	111	112	113	114	115	116	117	118	119
35.00	993	995	996	997	998	998	999	999	999	1000	1000	1000
40.00	787	814	839	861	881	899	915	929	941	951	960	968
45.00	230	260	291	324	359	394	431	467	504	541	577	613
50.00	15	19	23	29	35	43	52	62	74	88	103	120

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	120	121	122	123	124	125	126	127	128	129	130	131
40.00	974	979	983	987	990	992	994	995	996	997	998	998
45.00	648	681	713	743	771	798	822	845	865	884	900	915
50.00	139	160	183	207	234	262	291	322	354	387	421	455

Table A1.23- Probability Tables For A Shape Parameter of 1.25(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	132	133	134	135	136	137	138	139	140	141	142	143
40.00	999	999	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
45.00	928	939	949	958	965	971	977	981	985	988	990	992
50.00	490	525	559	593	626	658	689	718	746	773	797	820

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	144	145	146	147	148	149	150	151	152	153	154	155
45.00	994	995	996	997	998	998	999	999	999	999	1000	1000
50.00	842	861	879	895	909	922	934	944	953	960	967	972

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	156	157	158	159	160	161	162	163	164	165	166	167
50.00	977	981	985	988	990	992	994	995	996	997	998	998

Table A3.24- Probability Tables For A Shape Parameter of 1.50

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	0	1	2	3	4	5	6	7	8	9	10	11
.05	989	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
.10	969	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
.20	914	996	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
.25	882	993	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
.30	848	986	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
.40	776	973	998	1000	1000	1000	1000	1000	1000	1000	1000	1000
.50	702	950	994	1000	1000	1000	1000	1000	1000	1000	1000	1000
.60	628	920	988	999	1000	1000	1000	1000	1000	1000	1000	1000
.70	557	883	978	997	1000	1000	1000	1000	1000	1000	1000	1000
.75	522	862	972	996	999	1000	1000	1000	1000	1000	1000	1000
.80	489	839	964	994	999	1000	1000	1000	1000	1000	1000	1000
.90	426	789	945	989	998	1000	1000	1000	1000	1000	1000	1000
1.00	368	736	920	981	996	999	1000	1000	1000	1000	1000	1000
1.25	247	593	834	947	986	997	999	1000	1000	1000	1000	1000
1.50	159	452	721	885	961	989	997	999	1000	1000	1000	1000
1.75	99	327	592	796	914	969	990	997	999	1000	1000	1000
2.00	59	226	463	686	843	932	974	991	997	999	1000	1000
2.25	34	150	345	564	749	874	944	978	992	997	999	1000
2.50	19	95	245	443	638	792	894	952	980	992	997	999
2.75	10	58	167	332	521	693	823	908	957	981	993	997
3.00	6	34	109	239	407	582	733	845	918	960	982	993
3.50	1	11	42	109	218	362	519	666	786	873	930	965
4.00	0	3	14	42	100	191	313	453	593	717	816	888
4.50	0	1	4	14	39	86	161	264	386	516	640	747
5.00	0	0	1	4	13	34	72	132	216	321	439	558
6.00	0	0	0	0	1	3	9	21	44	80	134	206
7.00	0	0	0	0	0	0	1	2	5	12	23	43
8.00	0	0	0	0	0	0	0	0	0	1	2	5
9.00	0	0	0	0	0	0	0	0	0	0	0	0
10.00	0	0	0	0	0	0	0	0	0	0	0	0
11.00	0	0	0	0	0	0	0	0	0	0	0	0
12.00	0	0	0	0	0	0	0	0	0	0	0	0
13.00	0	0	0	0	0	0	0	0	0	0	0	0
14.00	0	0	0	0	0	0	0	0	0	0	0	0
15.00	0	0	0	0	0	0	0	0	0	0	0	0
16.00	0	0	0	0	0	0	0	0	0	0	0	0
17.00	0	0	0	0	0	0	0	0	0	0	0	0
18.00	0	0	0	0	0	0	0	0	0	0	0	0
19.00	0	0	0	0	0	0	0	0	0	0	0	0
20.00	0	0	0	0	0	0	0	0	0	0	0	0
21.00	0	0	0	0	0	0	0	0	0	0	0	0
22.00	0	0	0	0	0	0	0	0	0	0	0	0
23.00	0	0	0	0	0	0	0	0	0	0	0	0
24.00	0	0	0	0	0	0	0	0	0	0	0	0
25.00	0	0	0	0	0	0	0	0	0	0	0	0
30.00	0	0	0	0	0	0	0	0	0	0	0	0
35.00	0	0	0	0	0	0	0	0	0	0	0	0
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Table A3.24- Probability Tables For A Shape Parameter of 3.50(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	12	13	14	15	16	17	18	19	20	21	22	23
2.50	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
2.75	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
3.00	997	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
3.50	983	992	997	999	1000	1000	1000	1000	1000	1000	1000	1000
4.00	936	966	983	992	996	998	999	1000	1000	1000	1000	1000
4.50	833	895	938	965	982	991	995	998	999	1000	1000	1000
5.00	669	764	841	897	937	963	980	989	994	997	999	999
6.00	293	393	497	599	693	774	840	891	929	955	973	984
7.00	74	118	176	248	330	421	514	604	688	762	824	874
8.00	11	21	37	60	94	139	195	262	338	419	503	586
9.00	1	2	5	9	16	27	44	69	101	144	195	256
10.00	0	0	0	1	2	3	6	11	19	30	46	69
11.00	0	0	0	0	0	0	1	1	2	4	7	12
12.00	0	0	0	0	0	0	0	0	0	0	1	1
13.00	0	0	0	0	0	0	0	0	0	0	0	0
14.00	0	0	0	0	0	0	0	0	0	0	0	0
15.00	0	0	0	0	0	0	0	0	0	0	0	0
16.00	0	0	0	0	0	0	0	0	0	0	0	0
17.00	0	0	0	0	0	0	0	0	0	0	0	0
18.00	0	0	0	0	0	0	0	0	0	0	0	0
19.00	0	0	0	0	0	0	0	0	0	0	0	0
20.00	0	0	0	0	0	0	0	0	0	0	0	0
21.00	0	0	0	0	0	0	0	0	0	0	0	0
22.00	0	0	0	0	0	0	0	0	0	0	0	0
23.00	0	0	0	0	0	0	0	0	0	0	0	0
24.00	0	0	0	0	0	0	0	0	0	0	0	0
25.00	0	0	0	0	0	0	0	0	0	0	0	0
30.00	0	0	0	0	0	0	0	0	0	0	0	0
35.00	0	0	0	0	0	0	0	0	0	0	0	0
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Table A3.24- Probability Tables For A Shape Parameter of 1.50(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	24	25	26	27	28	29	30	31	32	33	34	35
5.00	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
6.00	991	995	997	999	999	1000	1000	1000	1000	1000	1000	1000
7.00	913	942	962	976	985	991	995	997	998	999	1000	1000
8.00	664	734	796	847	889	921	946	964	976	985	991	994
9.00	324	398	474	551	625	693	755	809	855	892	921	944
10.00	99	136	182	236	296	363	432	503	573	641	703	760
11.00	19	29	44	63	89	121	161	207	260	318	381	446
12.00	2	4	7	11	17	26	38	54	75	102	135	174
13.00	0	3	1	1	2	3	6	9	14	21	31	44
14.00	0	0	0	0	0	0	1	1	2	3	5	7
15.00	0	0	0	0	0	0	0	0	0	0	0	1
16.00	0	0	0	0	0	0	0	0	0	0	0	0
17.00	0	0	0	0	0	0	0	0	0	0	0	0
18.00	0	0	0	0	0	0	0	0	0	0	0	0
19.00	0	0	0	0	0	0	0	0	0	0	0	0
20.00	0	0	0	0	0	0	0	0	0	0	0	0
21.00	0	0	0	0	0	0	0	0	0	0	0	0
22.00	0	0	0	0	0	0	0	0	0	0	0	0
23.00	0	0	0	0	0	0	0	0	0	0	0	0
24.00	0	0	0	0	0	0	0	0	0	0	0	0
25.00	0	0	0	0	0	0	0	0	0	0	0	0
30.00	0	0	0	0	0	0	0	0	0	0	0	0
35.00	0	0	0	0	0	0	0	0	0	0	0	0
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	36	37	38	39	40	41	42	43	44	45	46	47
8.00	997	998	999	999	1000	1000	1000	1000	1000	1000	1000	1000
9.00	961	974	983	989	993	996	997	998	999	999	1000	1000
10.00	809	852	887	916	938	956	969	979	986	990	994	996
11.00	512	577	640	699	752	799	841	876	905	928	947	962
12.00	219	269	324	383	444	506	567	627	683	734	781	822
13.00	60	82	108	140	177	219	266	318	373	430	488	546
14.00	11	16	23	33	46	62	83	107	137	171	210	254
15.00	1	2	3	5	8	12	17	24	33	45	60	79
16.00	0	0	0	1	1	1	2	3	5	8	11	16
17.00	0	0	0	0	0	0	0	0	1	1	1	2
18.00	0	0	0	0	0	0	0	0	0	0	0	0
19.00	0	0	0	0	0	0	0	0	0	0	0	0
20.00	0	0	0	0	0	0	0	0	0	0	0	0
21.00	0	0	0	0	0	0	0	0	0	0	0	0
22.00	0	0	0	0	0	0	0	0	0	0	0	0
23.00	0	0	0	0	0	0	0	0	0	0	0	0
24.00	0	0	0	0	0	0	0	0	0	0	0	0
25.00	0	0	0	0	0	0	0	0	0	0	0	0
30.00	0	0	0	0	0	0	0	0	0	0	0	0
35.00	0	0	0	0	0	0	0	0	0	0	0	0
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Table A3.24- Probability Tables For A Shape Parameter of 1.50(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	48	49	50	51	52	53	54	55	56	57	58	59
10.00	998	998	999	999	1000	1000	1000	1000	1000	1000	1000	1000
11.00	973	981	987	991	994	996	997	998	999	999	1000	1000
12.00	858	889	914	934	951	964	974	981	987	991	994	996
13.00	683	657	708	755	797	834	866	894	917	936	951	964
14.00	302	352	406	460	516	570	623	673	721	764	803	838
15.00	101	128	159	195	235	278	325	374	425	478	530	581
16.00	23	31	42	55	72	92	116	143	175	210	249	292
17.00	3	5	7	10	15	20	28	37	48	63	80	100
18.00	0	1	1	1	2	3	4	6	9	13	17	23
19.00	0	0	0	0	0	0	0	1	1	2	3	4
20.00	0	0	0	0	0	0	0	0	0	0	0	0
21.00	0	0	0	0	0	0	0	0	0	0	0	0
22.00	0	0	0	0	0	0	0	0	0	0	0	0
23.00	0	0	0	0	0	0	0	0	0	0	0	0
24.00	0	0	0	0	0	0	0	0	0	0	0	0
25.00	0	0	0	0	0	0	0	0	0	0	0	0
30.00	0	0	0	0	0	0	0	0	0	0	0	0
35.00	0	0	0	0	0	0	0	0	0	0	0	0
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	60	61	62	63	64	65	66	67	68	69	70	71
12.00	997	998	999	999	1000	1000	1000	1000	1000	1000	1000	1000
13.00	973	980	986	990	993	995	997	998	999	999	999	1000
14.00	868	894	916	934	949	961	971	978	984	988	992	994
15.00	631	679	723	764	802	835	864	890	911	930	945	957
16.00	337	385	434	483	533	582	630	675	718	758	794	827
17.00	124	152	183	218	256	296	340	385	432	480	527	574
18.00	31	41	53	67	84	105	128	155	185	218	254	293
19.00	5	7	10	14	19	25	33	43	54	69	85	105
20.00	1	1	1	2	3	4	6	8	11	15	20	26
21.00	0	0	0	0	0	0	1	1	2	2	3	4
22.00	0	0	0	0	0	0	0	0	0	0	0	1
23.00	0	0	0	0	0	0	0	0	0	0	0	0
24.00	0	0	0	0	0	0	0	0	0	0	0	0
25.00	0	0	0	0	0	0	0	0	0	0	0	0
30.00	0	0	0	0	0	0	0	0	0	0	0	0
35.00	0	0	0	0	0	0	0	0	0	0	0	0
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Table A3.24- Probability Tables For A Shape Parameter of 1.50(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	72	73	74	75	76	77	78	79	80	81	82	83
14.00	996	997	998	999	999	999	1000	1000	1000	1000	1000	1000
15.00	967	975	981	986	990	993	995	996	997	998	999	999
16.00	856	881	903	922	938	951	962	970	977	983	987	991
17.00	620	664	706	745	780	813	842	868	891	911	928	942
18.00	335	378	423	468	514	559	603	646	687	726	762	795
19.00	127	153	181	212	247	284	323	364	406	449	493	537
20.00	33	43	54	67	83	101	122	146	173	202	234	268
21.00	6	8	11	15	19	25	32	41	51	64	78	95
22.00	1	1	2	2	3	4	6	8	11	14	18	23
23.00	0	0	0	0	0	1	1	1	2	2	3	4
24.00	0	0	0	0	0	0	0	0	0	0	0	0
25.00	0	0	0	0	0	0	0	0	0	0	0	0
30.00	0	0	0	0	0	0	0	0	0	0	0	0
35.00	0	0	0	0	0	0	0	0	0	0	0	0
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	84	85	86	87	88	89	90	91	92	93	94	95
15.00	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
16.00	993	995	996	997	998	999	999	999	1000	1000	1000	1000
17.00	954	964	972	978	983	987	991	993	995	996	997	998
18.00	825	852	876	897	915	931	944	955	964	972	978	983
19.00	580	622	663	701	737	771	802	830	856	879	898	916
20.00	305	344	384	425	467	509	551	593	633	671	708	742
21.00	114	136	160	188	217	249	283	319	357	396	436	477
22.00	30	38	47	58	71	87	104	124	146	170	197	227
23.00	5	7	10	13	16	21	27	34	42	52	63	77
24.00	1	1	1	2	3	4	5	6	8	11	14	18
25.00	0	0	0	0	0	0	1	1	1	2	2	3
30.00	0	0	0	0	0	0	0	0	0	0	0	0
35.00	0	0	0	0	0	0	0	0	0	0	0	0
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Table A3.24- Probability Tables For A Shape Parameter of 1.50(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	96	97	98	99	100	101	102	103	104	105	106	107
17.00	999	999	999	1000	1000	1000	1000	1000	1000	1000	1000	1000
18.00	987	990	993	995	996	997	998	998	999	999	999	1000
19.00	931	944	955	964	971	977	982	986	989	992	994	995
20.00	775	804	831	856	878	897	914	929	942	952	961	969
21.00	518	558	598	636	673	708	742	773	802	828	852	874
22.00	258	292	327	364	402	440	479	519	558	596	633	669
23.00	92	110	130	151	176	202	231	262	294	328	364	400
24.00	23	29	36	45	55	66	80	95	112	132	153	177
25.00	4	5	7	9	12	15	20	25	31	38	46	56
30.00	0	0	0	0	0	0	0	0	0	0	0	0
35.00	0	0	0	0	0	0	0	0	0	0	0	0
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	108	109	110	111	112	113	114	115	116	117	118	119
19.00	997	998	998	999	999	999	1000	1000	1000	1000	1000	1000
20.00	975	981	985	988	991	993	995	996	997	998	998	999
21.00	893	910	925	937	949	958	966	973	978	983	986	989
22.00	704	736	767	795	821	845	867	886	903	918	932	943
23.00	438	476	514	552	589	625	660	694	726	756	784	810
24.00	203	230	260	291	324	358	394	430	467	503	540	576
25.00	67	81	95	112	131	152	174	199	225	254	284	315
30.00	0	0	0	0	0	0	0	0	0	0	0	0
35.00	0	0	0	0	0	0	0	0	0	0	0	0
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	120	121	122	123	124	125	126	127	128	129	130	131
20.00	999	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
21.00	992	994	995	996	997	998	998	999	999	999	1000	1000
22.00	953	963	969	975	980	984	987	990	992	994	995	996
23.00	834	856	876	894	910	924	936	947	956	964	970	976
24.00	612	646	680	711	741	770	796	821	843	864	882	899
25.00	348	382	417	452	486	524	559	594	628	661	693	723
30.00	0	0	0	0	1	1	1	1	2	2	3	4
35.00	0	0	0	0	0	0	0	0	0	0	0	0
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Table A3.24- Probability Tables For A Shape Parameter of 1.50(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	132	133	134	135	136	137	138	139	140	141	142	143
22.00	997	998	998	999	999	999	1000	1000	1000	1000	1000	1000
23.00	980	984	988	990	992	994	995	996	997	998	998	999
24.00	914	927	938	948	957	964	971	976	981	984	987	990
25.00	751	778	803	827	848	868	885	901	915	928	939	949
30.00	5	7	8	11	13	16	20	24	29	35	42	50
35.00	0	0	0	0	0	0	0	0	0	0	0	0
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	144	145	146	147	148	149	150	151	152	153	154	155
23.00	999	999	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
24.00	992	994	995	996	997	998	998	999	999	999	999	1000
25.00	957	964	970	976	980	984	987	989	992	993	995	996
30.00	59	69	80	93	107	123	140	159	179	200	223	248
35.00	0	0	0	0	0	0	0	0	0	0	0	0
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	156	157	158	159	160	161	162	163	164	165	166	167
25.00	997	998	998	999	999	999	999	1000	1000	1000	1000	1000
30.00	274	301	329	358	387	418	449	480	511	542	573	603
35.00	0	0	0	0	0	1	1	1	1	1	2	2
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	168	169	170	171	172	173	174	175	176	177	178	179
30.00	632	661	689	715	741	765	788	809	829	848	865	881
35.00	3	4	5	6	7	8	10	13	15	18	22	26
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Table A3.24- Probability Tables For A Shape Parameter of 1.50(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	180	181	182	183	184	185	186	187	188	189	190	191
30.00	895	908	920	931	940	949	956	963	968	973	977	981
35.00	30	36	42	49	56	65	75	85	97	110	124	139
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	192	193	194	195	196	197	198	199	200	201	202	203
30.00	984	987	989	991	993	994	995	996	997	998	998	998
35.00	156	173	192	212	233	255	278	303	327	353	380	406
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	204	205	206	207	208	209	210	211	212	213	214	215
30.00	999	999	999	999	1000	1000	1000	1000	1000	1000	1000	1000
35.00	434	461	489	517	544	572	599	625	651	676	700	724
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	216	217	218	219	220	221	222	223	224	225	226	227
35.00	746	768	788	807	825	842	858	873	886	899	910	921
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	228	229	230	231	232	233	234	235	236	237	238	239
35.00	930	939	946	953	959	965	970	974	978	981	984	986
40.00	0	0	0	0	0	0	0	0	0	0	0	0
45.00	0	0	0	0	0	0	0	0	0	0	0	0
50.00	0	0	0	0	0	0	0	0	0	0	0	0

Table A3.24- Probability Tables For A Shape Parameter of 1.50(Continued)

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	240	241	242	243	244	245	246	247	248	249	250	251
35.00	989	990	992	993	994	995	996	997	997	998	998	999

Test Time In Multiples Of Characteristic Life	Cumulative Probability of X or Less Occurrences											
	252	253	254	255	256	257	258	259	260	261	262	263
35.00	999	999	999	999	1000	1000	1000	1000	1000	1000	1000	1000

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