

Quick Tour



ReliaSoft

Weibull++ 2020 Quick Tour

© 1992-2020 HBM United Kingdom Limited ("HBM UK Ltd"), at Technology Centre, Advanced Manufacturing Park, Brunel Way, Catcliffe, Rotherham S60 5WG. HBM UK Ltd is an affiliate of HBM Prensica Inc. ALL RIGHTS RESERVED.

This license agreement ("License Agreement") sets forth the terms and conditions that govern the distribution and use of the HBM UK Ltd software documentation (the "HBM Software Documentation"), including any and all derivative works. Any unauthorized distribution or use of the HBM Software Documentation is strictly prohibited.

Licensee hereby acknowledges and agrees to the following terms and conditions of this License Agreement for its use of the HBM Software Documentation:

HBM UK Ltd grants the Licensee who accepts and abides by the terms of this License Agreement a non-exclusive, non-transferable, royalty-free, and revocable license to the HBM Software Documentation. Unless otherwise indicated, all HBM Software Documentation are copyrighted and owned by HBM UK Ltd and are the property of HBM UK Ltd. They are licensed to you and for your use only as an individual who has purchased the software ("Licensee"). Notwithstanding this License Agreement, the Licensee shall not have a license to the trademarks, logos, or any other intellectual property of HBM UK Ltd and/or its affiliates or Licensor(s).

Licensee may print a single copy of the HBM Software Documentation for his/her reference. Licensee may reprint the HBM Software Documentation, as needed, if the original printed copy is damaged and/or destroyed.

Except as provided above, no part of the HBM Software Documentation, either text or image, may be used for any purpose other than Licensee's own personal use and reference as a learning aid. Therefore, the reproduction, modification, creation of derivative works, storage in a retrieval system, or retransmission, in any form or by any means, electronic, mechanical or otherwise, for reasons other than Licensee's personal use, is strictly prohibited.

Certain photos and images in the HBM Software Documentation are used under non-transferable licenses obtained by HBM UK Ltd and/or its affiliates and are owned by its Licensor(s) ("Licensor"). Images depicting photos of actual persons are licensed to HBM UK Ltd and/or its affiliates and the signed model releases for these images are on file with the Licensor(s). HBM UK Ltd makes no copyright claims on these images. All ownership and intellectual property rights to the HBM Software Documentation are reserved by either HBM UK Ltd and/or its affiliates or its Licensor(s).

DISCLAIMER: THE HBM SOFTWARE DOCUMENTATION IS PROVIDED "AS IS" WITHOUT WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO: 1) ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT OF INTELLECTUAL PROPERTY; 2) ANY WARRANTY THAT THE HBM COURSE MATERIALS WILL CONFORM TO SPECIFICATIONS; 3) ANY WARRANTY THAT THE WORK WILL BE ERROR FREE OR VIRUS FREE. IN NO EVENT SHALL HBM UK LTD, ITS AFFILIATES, DISTRIBUTORS, CONTRACTORS, AGENTS, AND ITS LICENSOR(S) BE LIABLE FOR ANY DAMAGES, INCLUDING, BUT NOT LIMITED TO, DIRECT, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, ARISING OUT OF, RESULTING FROM, OR IN ANY WAY CONNECTED WITH THE HBM SOFTWARE DOCUMENTATION, WHETHER OR NOT BASED UPON WARRANTY, CONTRACT, TORT, OR OTHERWISE, WHETHER OR NOT LOSS WAS SUSTAINED FROM, OR AROSE OUT OF THE RESULTS OF, OR USE OF, THE HBM SOFTWARE DOCUMENTATION. LICENSEES AGREE TO WAIVE ANY AND ALL CLAIMS AGAINST HBM UK LTD, ITS AFFILIATES, DISTRIBUTORS, CONTRACTORS, AGENTS, AND ITS LICENSOR(S), AND SHALL INDEMNIFY, DEFEND AND HOLD HARMLESS HBM UK LTD, ITS AFFILIATES, DISTRIBUTORS, CONTRACTORS, AGENTS, AND ITS LICENSOR(S) FOR ANY AND ALL LIABILITIES, CLAIMS, DEMANDS, DAMAGES, EXPENSES OR LOSSES THAT MAY ARISE FROM THE LICENSEE'S USE OR DISTRIBUTION OF THE HBM SOFTWARE DOCUMENTATION, INCLUDING ANY LIABILITIES OR DAMAGES FROM DERIVATIVE WORKS OR OTHER PRODUCTS BASED ON, OR RESULTING FROM, THE USE THEREOF.

This License Agreement is subject to change without notice and does not represent any commitment on the part of HBM UK Ltd and/or its affiliates to the Licensee, including any commitment to maintain or update the HBM Software Documentation. The names of companies, products, people, characters, and/or data mentioned in the HBM Software Documentation are not intended to represent any real individual, company, product or event, unless otherwise noted. Any rights not expressly granted herein are reserved for HBM UK Ltd.

TRADEMARKS:

ReliaSoft, Synthesis Platform, Weibull++, ALTA, DOE++, RGA, BlockSim, Lambda Predict, XFMEA, RCM++ and XFRACAS are all trademarks of HBM Prensica Inc.

GlyphWorks, VibeSys, DesignLife and the nCode logos are all trademarks of HBM UK Ltd.

Other product names and services identified in the HBM Software Documentation are trademarks belonging to their respective trademark holders, and are used for illustration purposes. Their use in no way conveys an endorsement or other affiliation with HBM UK Ltd and/or its affiliates.

Quick Tour of Weibull++

Weibull++ offers the most comprehensive toolset available for **reliability life data analysis**, with support for all life data types and all commonly used product lifetime distributions.

Accelerated Life Testing (ALTA) and **Accelerated Life Testing PRO (ALTA PRO)** utilize powerful life-stress relationship models to design and analyze data from **accelerated life tests**.

Reliability Growth (RGA) supports all of the major **reliability growth models** and can analyze data from both developmental testing and fielded repairable systems. It also includes a comprehensive toolset for advanced reliability growth projections, planning and management.

These applications are also packed with tools for related reliability analysis such as degradation data analysis, stress-strength comparison, reliability test design and design of experiments (DOE). In addition, Weibull++ also supports warranty data analysis, non-parametric data analysis and recurrent event data analysis.

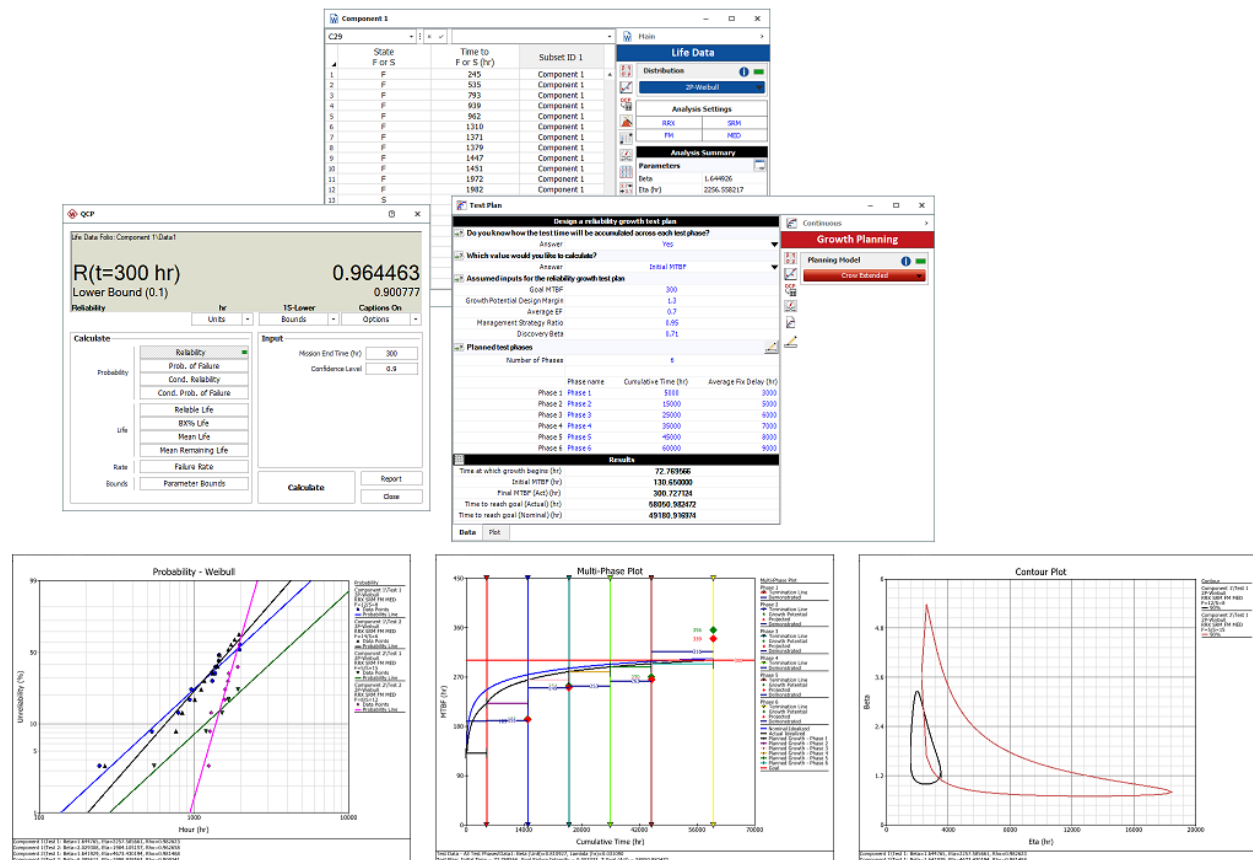
For life data and life-stress data analysis, you can use this application to answer a wide variety of questions such as:

- How many units do you need to test? How much test time? At which stress levels?
- Will the product meet the reliability requirement?
- What is the influence of different failure modes? How does accelerated stress affect life?
- Which design (or supplier) will be more cost-effective over time?
- How many units are likely to be returned under warranty?
- Is there an emerging reliability problem in the field? With a particular supplier? In a particular region?
- When will a crack, wear, etc. degrade to the point of failure?
- What is the typical time to repair? How effective are the repairs?

For growth data analysis, you can use this application to answer a wide variety of questions, such as:

- Will the product meet the MTBF goal? How much test time is required?
- How does the product perform across different test phases? At which phase will the product meet the reliability requirement? What is the initial MTBF?
- How do the test data compare to the reliability growth test plan?
- What failure modes should be fixed and when?
- What is the optimum growth maintenance strategy? When is the best time to schedule maintenance/overhauls?

Quick Tour of Weibull++



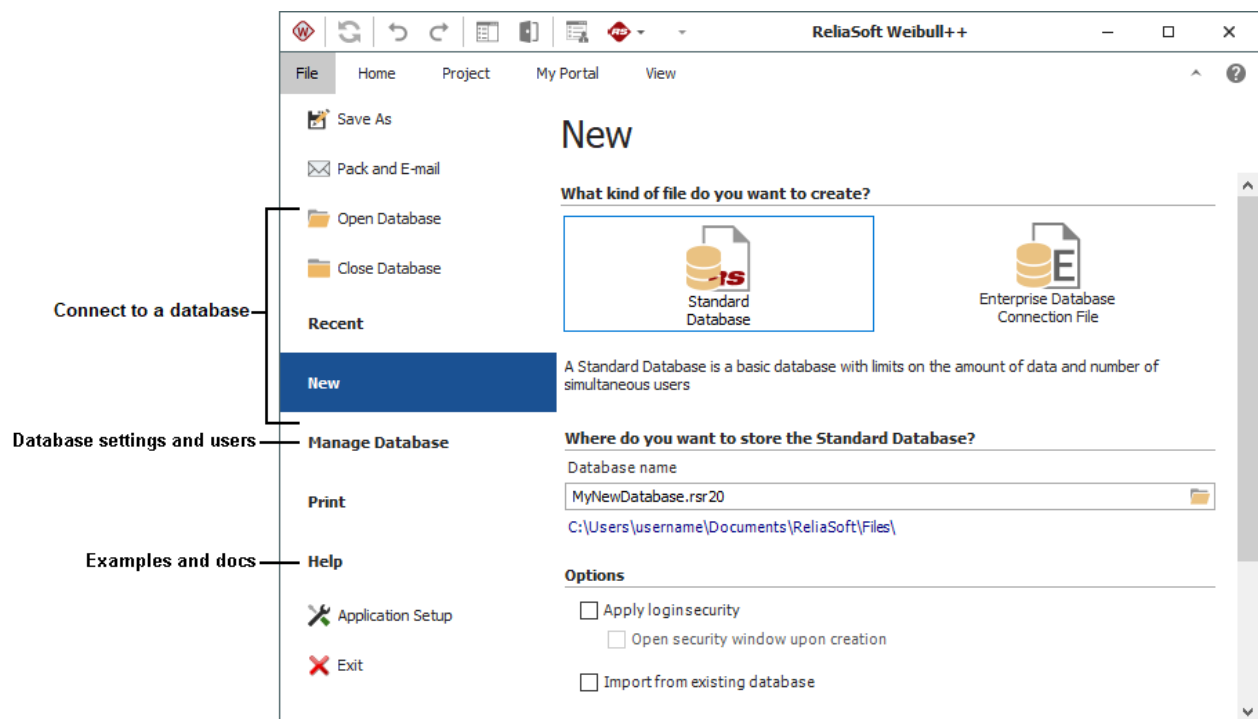
Using Databases and Projects

File Menu

Use commands on the **File** menu (**New**, **Recent** or **Open Database**) to create or open a database).

Each database supports simultaneous access by multiple users. If you have admin permissions, use **File > Manage Database** to control user access and manage configurable settings that apply throughout the database.

Use **File > Help** to access online help and shipped examples.



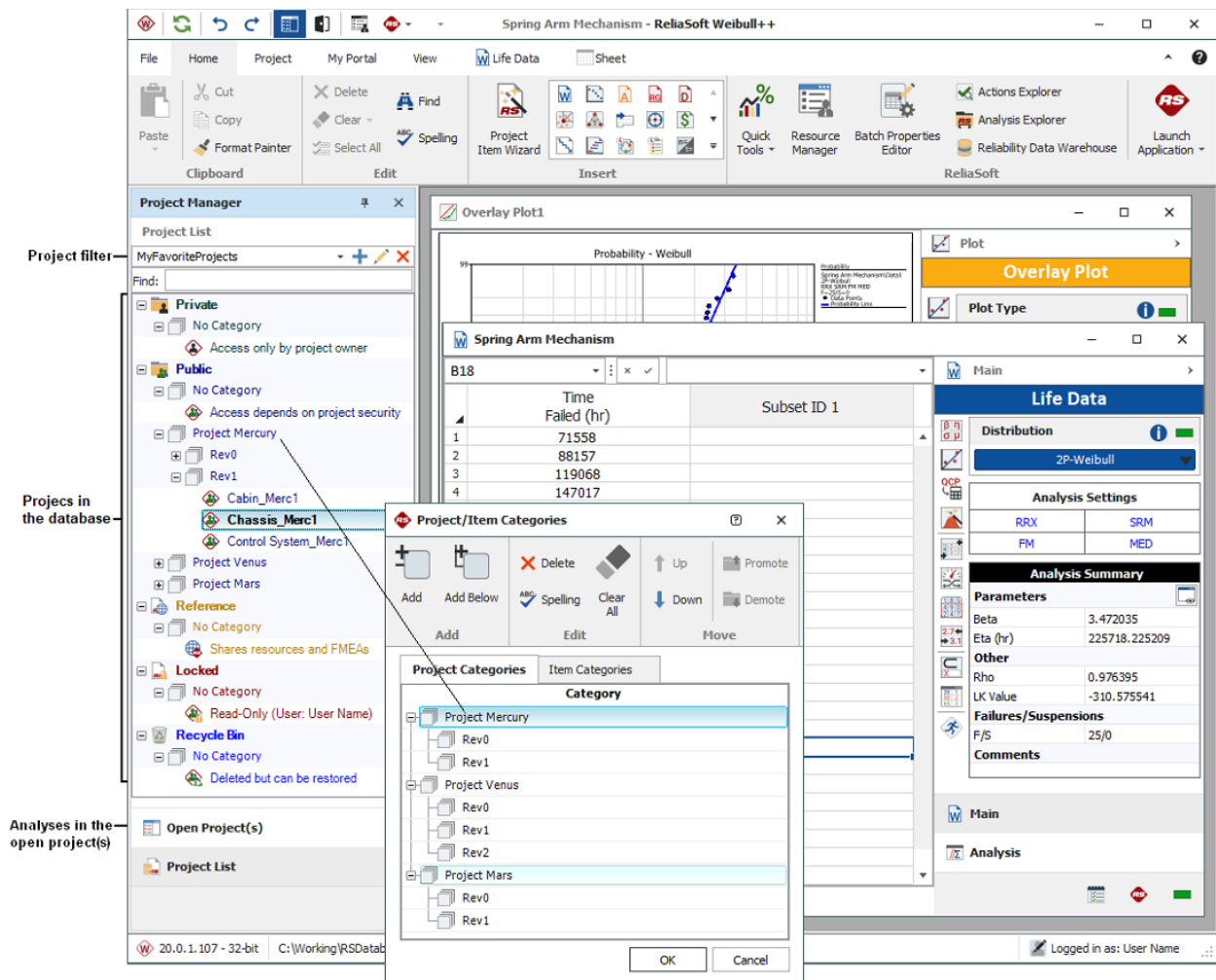
Project List

Each database can contain multiple projects. Use the **project list** to create or open a project.

If you have a lot of projects:

- Use the **project filter** to limit what's displayed.
- Use the **project category** to group projects within the list.

Quick Tour of Weibull++



Current Project Explorer

Use the **current project explorer** to create or open analyses and reports.

You can open the same project in any ReliaSoft desktop application. Analyses and reports are visible only in the application(s) that can edit them:

- Life data folios are only visible in Weibull++
- Fault trees are only visible in BlockSim
- FMEAs are only visible in XFMEA, RCM++ or RBI
- Etc.

Common features such as **project plans**, **resources** and **project attachments** are visible in all ReliaSoft desktop applications.

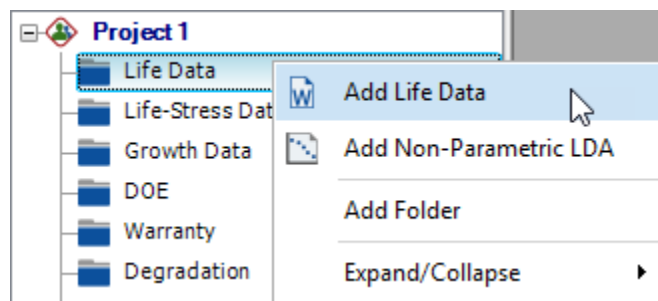
Using Life Data Folios

Weibull++'s life data folio allows you to fit a statistical distribution to failure time data in order to understand the reliability performance of a product over time or to make projections about future behavior. From the analysis, you can obtain reliability information about a product such as probability of failure, reliability, mean life or failure rate.

The basic steps for using a life data folio are:

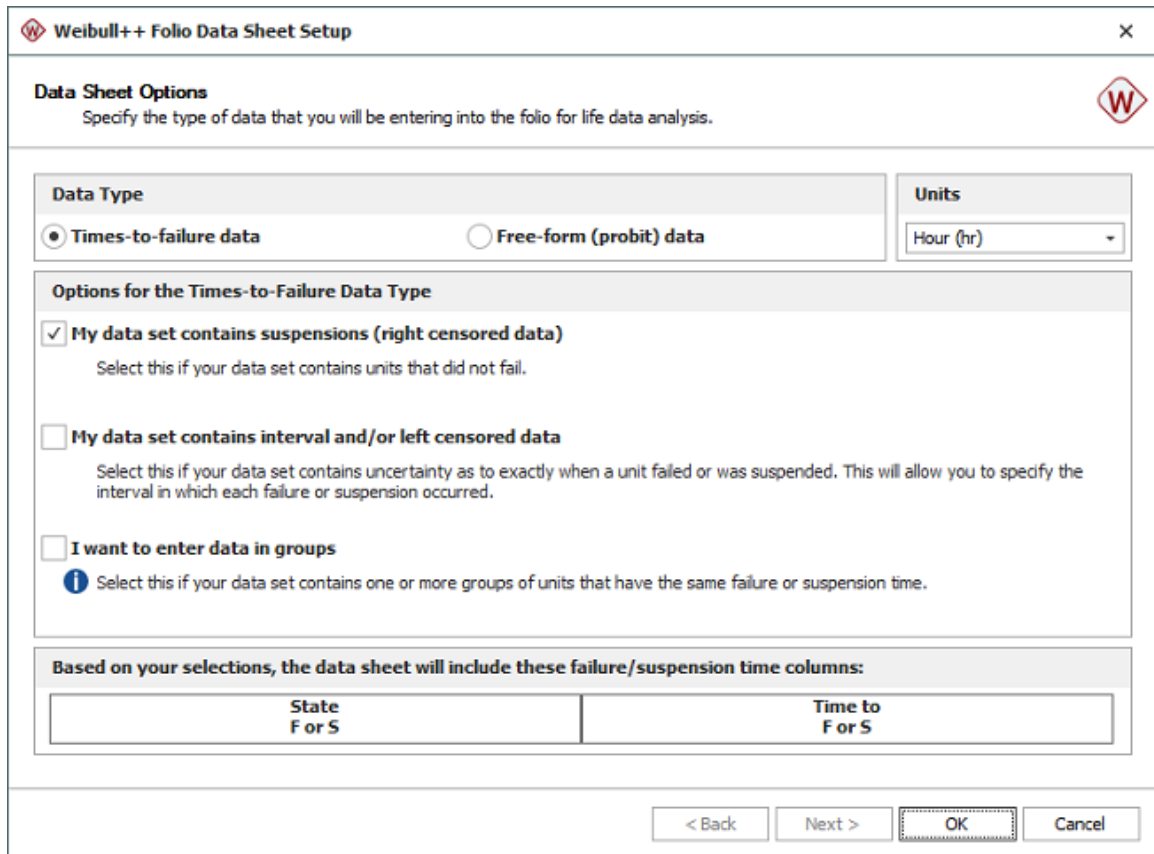
1. [Add life data folio](#)

Right-click the Life Data folder in the current project explorer and choose **Add Life Data**.



Quick Tour of Weibull++

In the setup window, select the desired data type and the units for time/usage values (hours, cycles, etc.).



The image shows the 'Weibull++ Folio Data Sheet Setup' dialog box. It has a title bar with the Weibull++ logo and a close button. The main area is titled 'Data Sheet Options' with a subtitle 'Specify the type of data that you will be entering into the folio for life data analysis.' and a Weibull++ logo in the top right corner. Below this, there are two main sections. The first section, 'Data Type', has two radio buttons: 'Times-to-failure data' (selected) and 'Free-form (probit) data'. To the right of this is a 'Units' section with a dropdown menu currently set to 'Hour (hr)'. The second section, 'Options for the Times-to-Failure Data Type', contains three checkboxes: 'My data set contains suspensions (right censored data)' (checked), 'My data set contains interval and/or left censored data' (unchecked), and 'I want to enter data in groups' (unchecked). Each checkbox has a brief description. Below these options is a summary box titled 'Based on your selections, the data sheet will include these failure/suspension time columns:'. It contains two columns: 'State For S' and 'Time to For S'. At the bottom of the dialog are four buttons: '< Back', 'Next >', 'OK', and 'Cancel'.

Weibull++ Folio Data Sheet Setup

Data Sheet Options
Specify the type of data that you will be entering into the folio for life data analysis.

Data Type


☒ Times-to-failure data ☐ Free-form (probit) data

Units
Hour (hr)

Options for the Times-to-Failure Data Type

☒ **My data set contains suspensions (right censored data)**
Select this if your data set contains units that did not fail.

☐ **My data set contains interval and/or left censored data**
Select this if your data set contains uncertainty as to exactly when a unit failed or was suspended. This will allow you to specify the interval in which each failure or suspension occurred.

☐ **I want to enter data in groups**
 Select this if your data set contains one or more groups of units that have the same failure or suspension time.

Based on your selections, the data sheet will include these failure/suspension time columns:

State For S	Time to For S
-------------	---------------

< Back Next > OK Cancel

2. [Enter data](#)

Enter the data and use the control panel to specify the life distribution and analysis settings.

The screenshot shows the Weibull++ software interface. The main window is titled "Folio1" and contains a data table with the following columns: "State F or S", "Time to F or S (hr)", and "Subset ID 1". The data is as follows:


	State F or S	Time to F or S (hr)	Subset ID 1
1	F	16	prototype unit
2	F	34	prototype unit
3	F	53	prototype unit
4	F	75	prototype unit
5	F	93	prototype unit
6	F	120	prototype unit
7	S	120	prototype unit
8	S	120	prototype unit
9	S	120	prototype unit
10	S	120	prototype unit
11			
12			
13			
14			

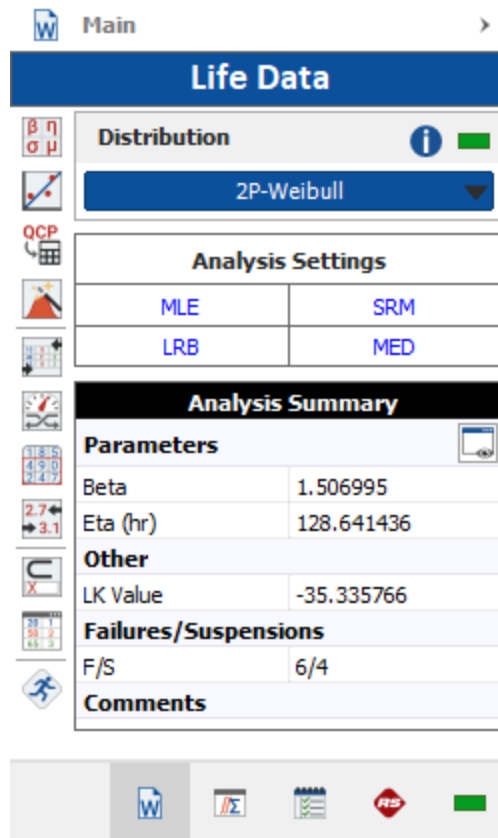
Below the table is a "Data1" tab. To the right of the table is a "Main" control panel. The "Main" panel has a "Life Data" section with a "Distribution" dropdown set to "2P-Weibull". Below this is an "Analysis Settings" section with four buttons: "MLE", "SRM", "LRB", and "MED". At the bottom of the "Main" panel is an "Analysis" section. The bottom of the window shows a status bar with icons for "AAAA", "RS", and a red flag.

3. [Analyze data](#)



Click the **Calculate** icon on the control panel.



The Analysis Summary area displays the parameters of the distribution. Click the **Detailed Summary** icon  to view more information.



Life Data


Distribution  

2P-Weibull

Analysis Settings

MLE	SRM
LRB	MED

Analysis Summary

Parameters 

Beta	1.506995
Eta (hr)	128.641436





Other

LK Value	-35.335766
----------	------------

Failures/Suspensions

F/S	6/4
-----	-----

Comments

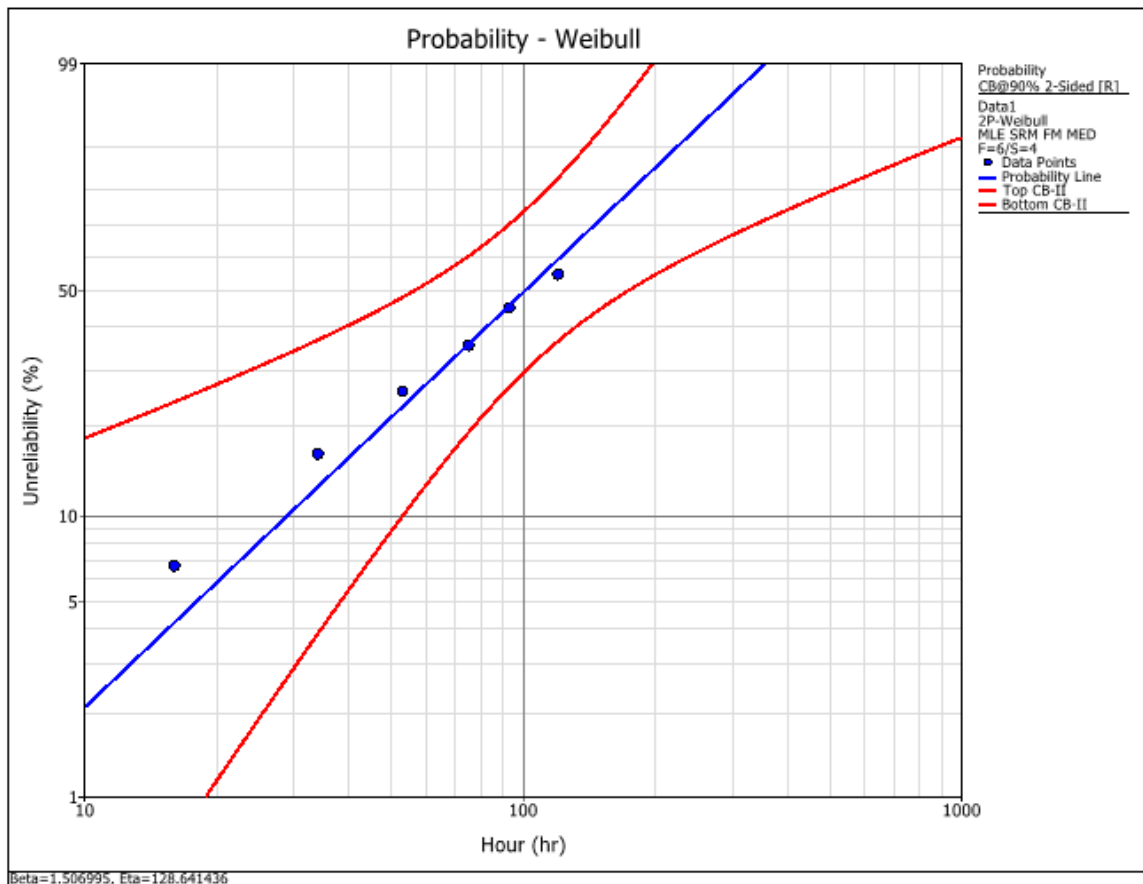
W    

4. [View plots](#)

Click the **Plot** icon on the control panel to open the plot sheet.



To show the confidence bounds, click the **Confidence Bounds** link on the plot's control panel, and then set the desired type of bounds and confidence level.



5. Calculate metrics

Click the **QCP** icon on the control panel to open the Quick Calculation Pad.



The following example shows the estimates for the reliability and the lower one-sided 90% confidence bound.

Life Data Folio: Folio1\Data1

R(t=60 hr) **0.728448**
Lower Bound (0.1) **0.543195**

Reliability hr 1S-Lower Captions On
Units Bounds Options

Calculate

Probability	Reliability <input checked="" type="checkbox"/>
	Prob. of Failure
	Cond. Reliability
	Cond. Prob. of Failure
Life	Reliable Life
	BX% Life
	Mean Life
	Mean Remaining Life
Rate	Failure Rate
Bounds	Parameter Bounds

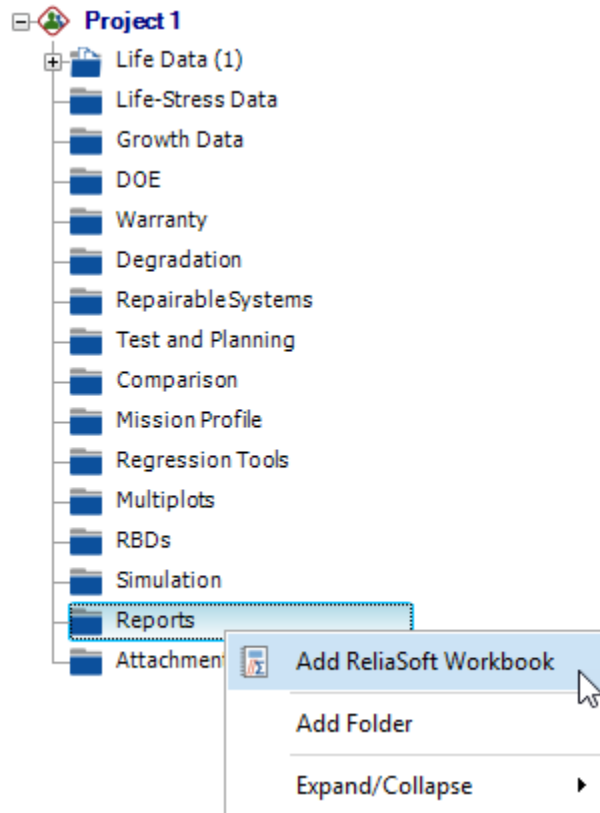
Input

Mission End Time (hr) 60
Confidence Level 0.9

Calculate **Report** **Close**

6. Create report

Right-click the Reports folder in the current project explorer and choose **Add ReliaSoft Workbook**.



Quick Tour of Weibull++

In the ReliaSoft Workbook wizard, select the folio as the default data source. If desired, you can also select a standard or user-defined report template (e.g., the "Weibull Summary Style 1 Template" is shown below).

The screenshot shows the ReliaSoft Workbook application window titled 'Workbook1'. The ribbon at the top includes tabs for Home, Document, Page Layout, Formulas, Data, Review, and View. The left sidebar shows 'Modules' with 'C42' selected, and 'Word Processing' is active. The main area displays a report template titled 'Basic Report Sample'.

Basic Report Sample				
Analysis Settings				
Distribution	Weibull 2P			
Method Used:	MLE			
Confidence Limits:	Lower	5.00%	Upper	95.00%
Method for CL:	Likelihood Ratio		2-Sided	90.00%
Estimates and Confidence Bounds for Distribution Parameters				
	Parameter	Estimate	Lower Limit	Upper Limit
	Beta	1.506994639	0.758399828	2.607276213
	Eta	128.6414361	84.69230273	257.5742323
Selected Metrics				
	Parameter	Estimate	Lower Limit	Upper Limit
	Mean	116.0654733	74.6168519	220.866107
	Median	100.8688464	61.78887984	181.1700023
	B10	28.89727771	7.191877701	55.99633019

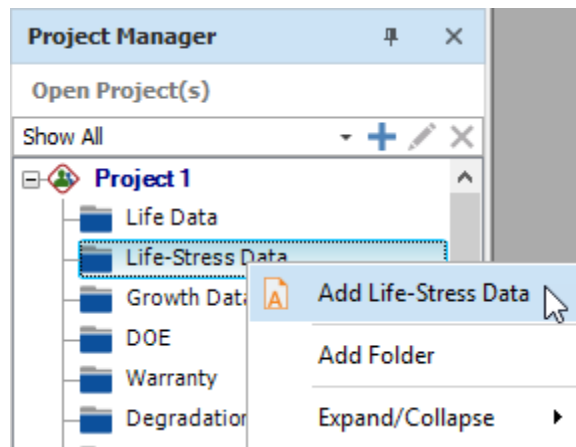
Using Life-Stress Data Folios

Weibull++'s life-stress data folio allows you to perform quantitative accelerated life testing data analysis. In this analysis, you extrapolate a product's failure behavior at normal conditions from life data obtained at accelerated stress levels. Since products fail more quickly at accelerated stress levels, the analysis allows you to obtain reliability information about a product (e.g., mean life, probability of failure at a specific time, etc.) in a shorter time.

The basic steps for using a life-stress data folio are:

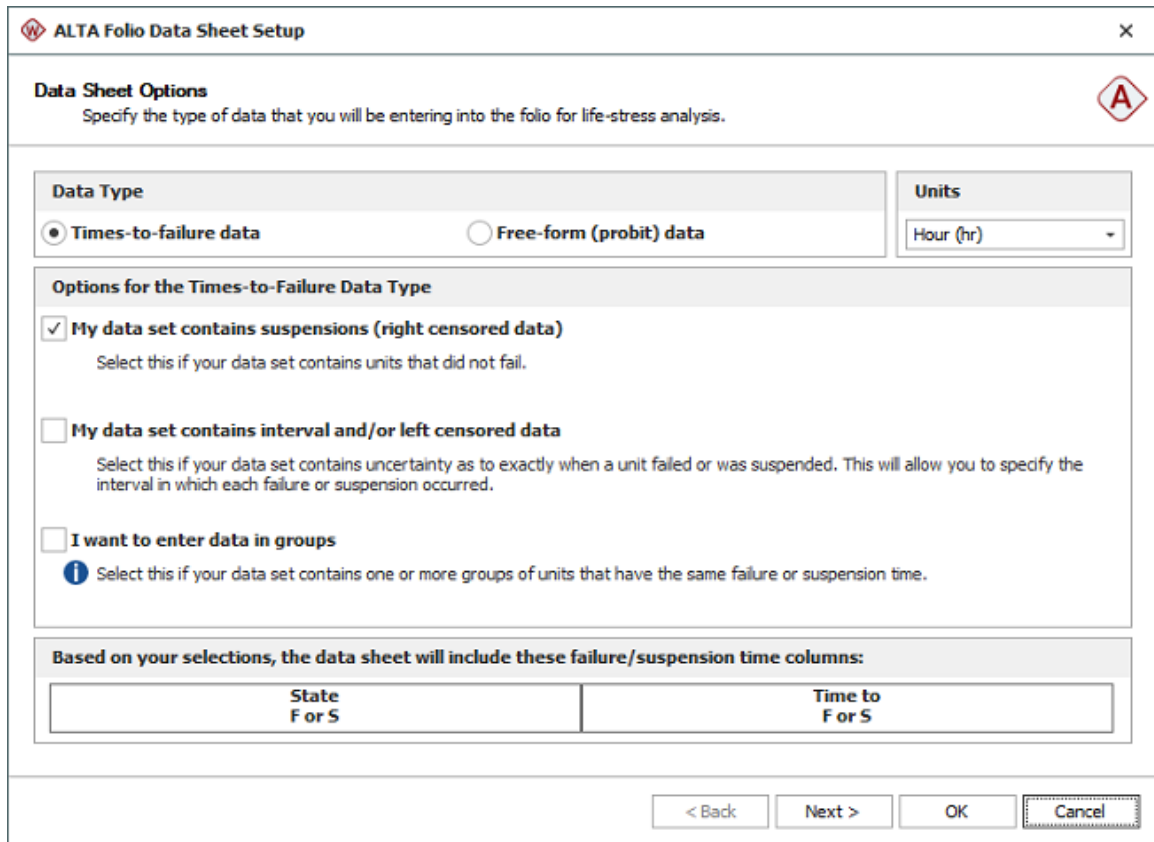
1. [Add life-stress data folio](#)

Right-click the Life-Stress Data folder in the current project explorer and choose **Add Life-Stress Data**.



Quick Tour of Weibull++

In the setup window, select the desired censoring type and units for time/usage values (hours, cycles, etc.).



The image shows the 'ALTA Folio Data Sheet Setup' dialog box. It has a title bar with the ALTA logo and a close button. The main area is titled 'Data Sheet Options' with a subtitle 'Specify the type of data that you will be entering into the folio for life-stress analysis.' and a red 'A' icon. There are two main sections: 'Data Type' and 'Units'. The 'Data Type' section has two radio buttons: 'Times-to-failure data' (selected) and 'Free-form (probit) data'. The 'Units' section has a dropdown menu set to 'Hour (hr)'. Below these is a section titled 'Options for the Times-to-Failure Data Type' with three checkboxes: 'My data set contains suspensions (right censored data)' (checked), 'My data set contains interval and/or left censored data' (unchecked), and 'I want to enter data in groups' (unchecked). Each checkbox has a descriptive text below it. At the bottom of this section is an information icon and a note: 'Select this if your data set contains one or more groups of units that have the same failure or suspension time.' Below this is a section titled 'Based on your selections, the data sheet will include these failure/suspension time columns:' which contains a table with two columns: 'State F or S' and 'Time to F or S'. At the very bottom are four buttons: '< Back', 'Next >', 'OK', and 'Cancel'.

ALTA Folio Data Sheet Setup

Data Sheet Options
Specify the type of data that you will be entering into the folio for life-stress analysis.

Data Type


☒ Times-to-failure data ☐ Free-form (probit) data

Units
Hour (hr)

Options for the Times-to-Failure Data Type

☒ **My data set contains suspensions (right censored data)**
Select this if your data set contains units that did not fail.

☐ **My data set contains interval and/or left censored data**
Select this if your data set contains uncertainty as to exactly when a unit failed or was suspended. This will allow you to specify the interval in which each failure or suspension occurred.

☐ **I want to enter data in groups**
 Select this if your data set contains one or more groups of units that have the same failure or suspension time.


Based on your selections, the data sheet will include these failure/suspension time columns:

State F or S	Time to F or S
-----------------	-------------------

< Back Next > OK Cancel

In the next page, define the stress type(s) to use in the analysis and the use stress level.

ALTA Folio Data Sheet Setup ×

Select Stress Columns 

Define the stress columns that will appear in the data sheet, and specify the use stress level(s). The following table contains some commonly used stress types, but you can change any of the labels (e.g., if your vibration values use meters per second squared instead of hertz, you can change Hz to m/s²).

Define Stress Columns and Use Stress Levels			
	Stress Name	Stress Units	Use Level
<input checked="" type="checkbox"/>	Temperature	K	298
<input type="checkbox"/>	Voltage	V	100
<input type="checkbox"/>	Humidity	RH	50
<input type="checkbox"/>	Vibration	Hz	25
<input type="checkbox"/>	Temperature	R	580
<input type="checkbox"/>	Mechanical	kip	25
<input type="checkbox"/>	<Stress name>	<Stress units>	10
<input type="checkbox"/>	<Stress name>	<Stress units>	10

Based on your selections, the data sheet will also include these stress columns:

Temperature K

Quick Tour of Weibull++

2. [Enter data](#)

Enter the data and use the control panel to specify the life-stress model.


The screenshot displays the Weibull++ software interface. On the left, a data table is visible with columns for State (F or S), Time to F or S (hr), Temperature K, and Subset ID 1. The data is entered for 14 rows. On the right, the 'Life-Stress Data' control panel is shown, featuring a 'Model' dropdown set to 'Arrhenius-Weibull', links for 'Select Stress Columns...', 'Stress Transformation...', and 'Set Use Stress...', and a 'Not Analyzed' status indicator.

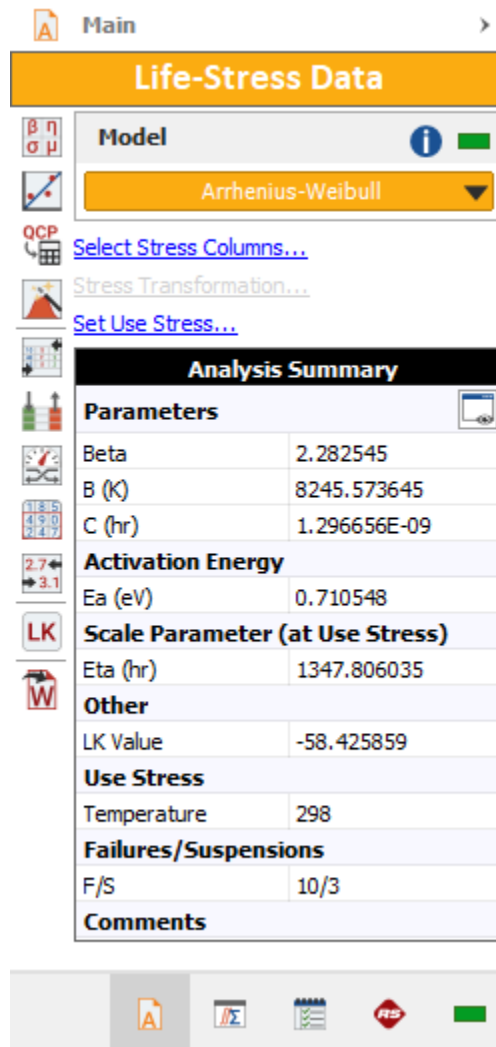
	State F or S	Time to F or S (hr)	Temperature K	Subset ID 1
1	F	105	313	
2	F	170	313	
3	F	224	313	
4	F	278	313	
5	S	350	313	
6	S	350	313	
7	S	350	313	
8	F	38	328	
9	F	62	328	
10	F	82	328	
11	F	103	328	
12	F	128	328	
13	F	165	328	
14				

3. [Analyze data](#)



Click the **Calculate** icon on the control panel.



The Analysis Summary area displays the parameters of the distribution. Click the **Detailed Summary** icon  to view more information.



Life-Stress Data


Model  






Arrhenius-Weibull

[Select Stress Columns...](#)

[Stress Transformation...](#)

[Set Use Stress...](#)

Analysis Summary	
Parameters 	
Beta	2.282545
B (K)	8245.573645
C (hr)	1.296656E-09
Activation Energy	
Ea (eV)	0.710548
Scale Parameter (at Use Stress)	
Eta (hr)	1347.806035
Other	
LK Value	-58.425859
Use Stress	
Temperature	298
Failures/Suspensions	
F/S	10/3
Comments	

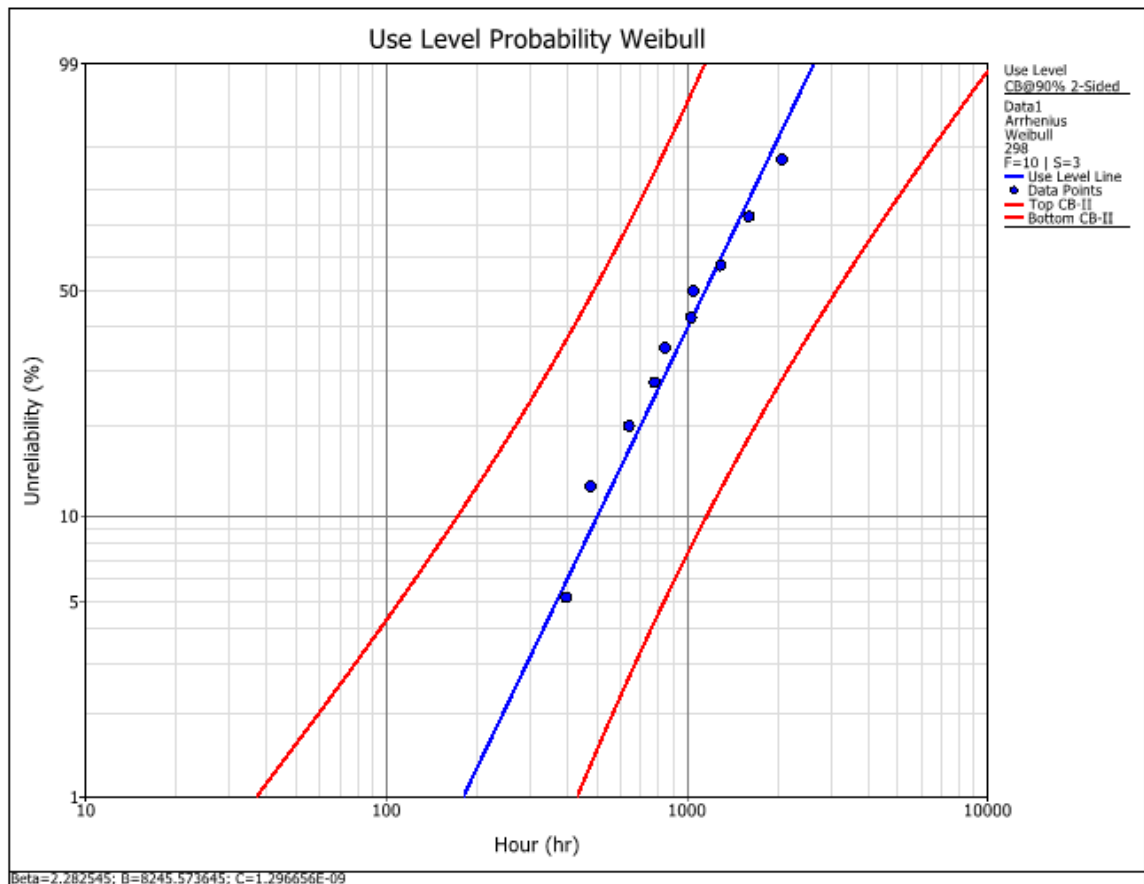
4. [View plots](#)

Click the **Plot** icon on the control panel to open the plot sheet.



Quick Tour of Weibull++

To show the confidence bounds, click the **Confidence Bounds** link on the plot's control panel, and then set the desired type of bounds and confidence level.



5. Calculate metrics

Click the **QCP** icon on the control panel to open the Quick Calculation Pad.



The following example shows the estimates for reliability and the lower one-sided 90% confidence bound.

Life-Stress Data Folio: Folio1\Data1

R(t=300 hr) **0.968113**
Lower Bound (0.1) **0.842874**

Reliability hr 1S-Lower Captions On
Units Bounds Options

Calculate		Input	
Probability	Reliability <input checked="" type="checkbox"/>	Stress	298
	Prob. of Failure	Mission End Time (hr)	300
	Cond. Reliability	Confidence Level	0.9
	Cond. Prob. of Failure		
Life	Reliable Life		
	BX% Life		
	Mean Life		
	Mean Remaining Life		
Rate	Failure Rate		
Acceleration	Acceleration Factor		
Bounds	Parameter Bounds		

Calculate Report Close

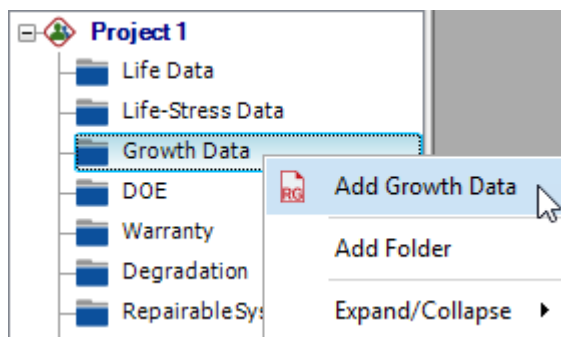
Using Growth Data Folios

Weibull++'s growth data folio supports traditional reliability growth analysis, repairable systems analysis and reliability growth projections. The data type you select determines the type of analysis you can perform.

The basic steps for using a growth data folio are:

1. [Add growth data folio](#)

Right-click the Growth Data folder in the current project explorer and choose **Add Growth Data**.



In the setup window, select the desired data type. Then click **Next** to set the units for values (hours, cycles, etc.) and other preferences.

Project Item Wizard [X]

Data Sheet Options
Select the data type for the folio.

All Data Types

- Developmental
 - Times-to-Failure Data**
 - Discrete Data
 - Multi-Phase Data
 - Reliability Data
- Fielded

Times-to-Failure Data

- Failure Times
- Grouped Failure Times
- Multiple Systems - Known Operating Times
- Multiple Systems - Concurrent Operating Times
- Multiple Systems - Dates
- Multiple Systems with Event Codes

The 'Failure Times' data type is used for situations where the exact failure times have been recorded. This data type can be used to analyze the data from a single system or for the combined times from multiple systems (e.g., if 3 identical systems are tested and 1 fails at 10 hours, the recorded failure time is 30 hours). If you will assume that all fixes are applied during the observed test time, you can use the Crow-AMSAA (NHPP) or Duane models for analysis. If you want to account for different fix strategies used for different failure modes, choose the Crow Extended model. The extended model requires you to identify and classify the failure mode responsible for each failure (A = no fix, BC = fixed during test or BD = delayed fix), and also specify the 'effectiveness factor' for each delayed fix.

[Learn More](#)

< Back Next > OK Cancel

Quick Tour of Weibull++

2. Enter data

Enter the data and use the control panel to specify the growth model and analysis settings.

The screenshot displays the Weibull++ software interface. The main window is titled "Folio1" and contains a data table with 20 rows and 2 columns: "Time to Event (hr)" and "Comments". The data is as follows:

	Time to Event (hr)	Comments
1	0.7	
2	3.7	
3	13.2	
4	17.6	
5	54.5	
6	99.2	
7	112.2	
8	120.9	
9	151	
10	163	
11	174.5	
12	191.6	
13	282.8	
14	355.2	
15	486.3	
16	490.5	
17	513.3	
18	558.4	
19	678.1	
20	688	

A red box highlights the last row with the text: "Note: Complete data set is not shown." The control panel on the right is titled "Growth Data" and includes the following settings:


- Model:** Crow-AMSAA (NHPP)
- Calculation Options:** Standard (selected), Change of Slope
- Developmental Failure Times:** MLE, Crow, No Gap, Cumulative
- Failure Terminated:** ...


The bottom of the control panel shows the "Main" and "Analysis" tabs, with the "Main" tab selected.

3. Analyze data

Click the **Calculate** icon on the control panel.



The Analysis Summary area displays the parameters of the growth model. Click the **Detailed Summary** icon  to view more information.

Results	
Parameters 	
Beta	0.489752
Lambda (hr)	0.761544
Growth Rate	0.510248
DMTBF (hr)	166.221749
DFI	0.006016
Statistical Tests	
Significance Level	0.1
CVM	Passed
Other	
Termination Time (hr): 3256.300000	

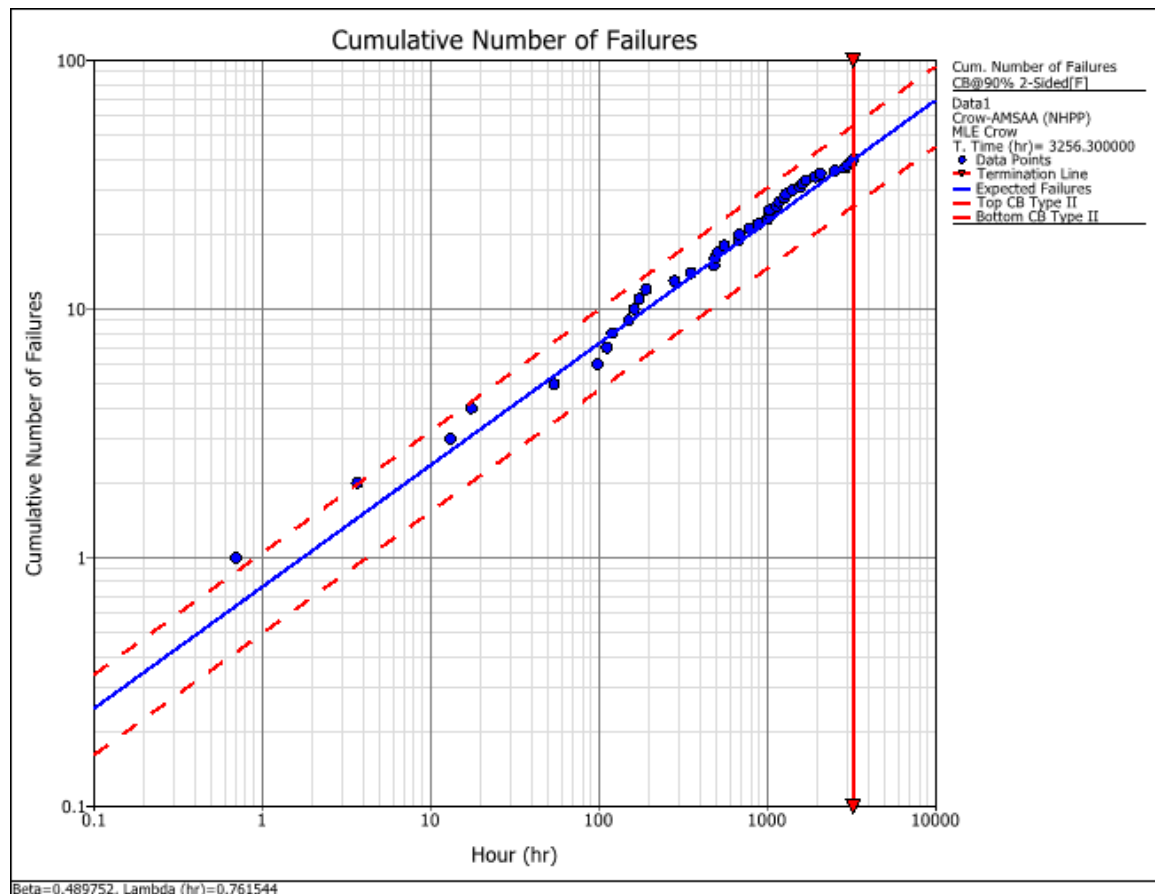
4. [View plots](#)

Click the **Plot** icon on the control panel to open the plot sheet.



Quick Tour of Weibull++

To show the confidence bounds, right-click the plot, choose **Show Confidence Bounds**, and then set the desired type of bounds and confidence level.



5. Calculate metrics

Click the **QCP** icon on the control panel to open the Quick Calculation Pad.



The following example shows the instantaneous MTBF with the lower one-sided 90% confidence bound.

QCP

Folio1\Data1

IMTBF(t=32... **166.221749 hr**
Lower Bound (0.1) **131.212225 hr**

Instantaneous MTBF **hr** **1S-Lower** **Captions On**

Units Bounds Options

Calculate

Cumulative MTBF Failure Intensity
 Instantaneous MTBF Failure Intensity

Time (hr) Time Given:
 Failures Number of Failures
 Bounds Parameter Bounds

Input

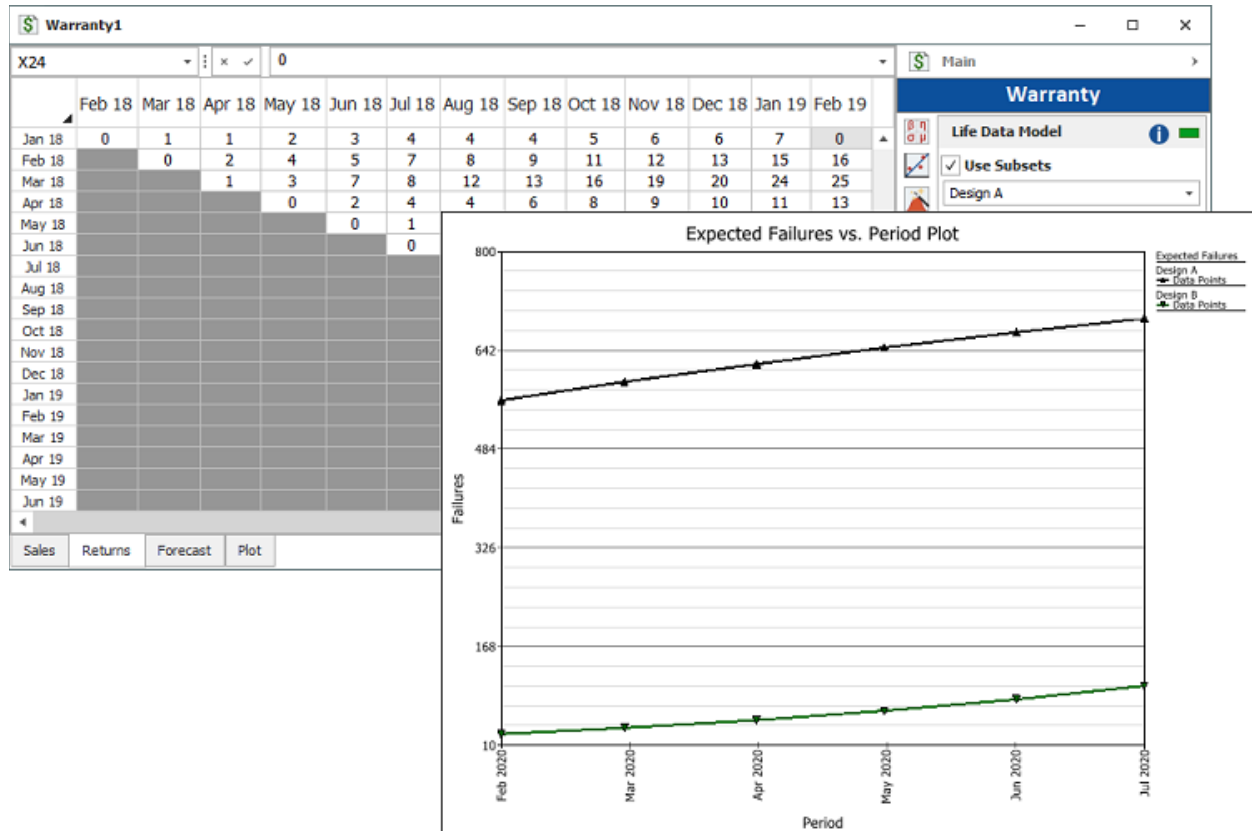
Time (hr) 3256.3
 Confidence Level 0.9

Calculate Report Close

More Analyses and Tools

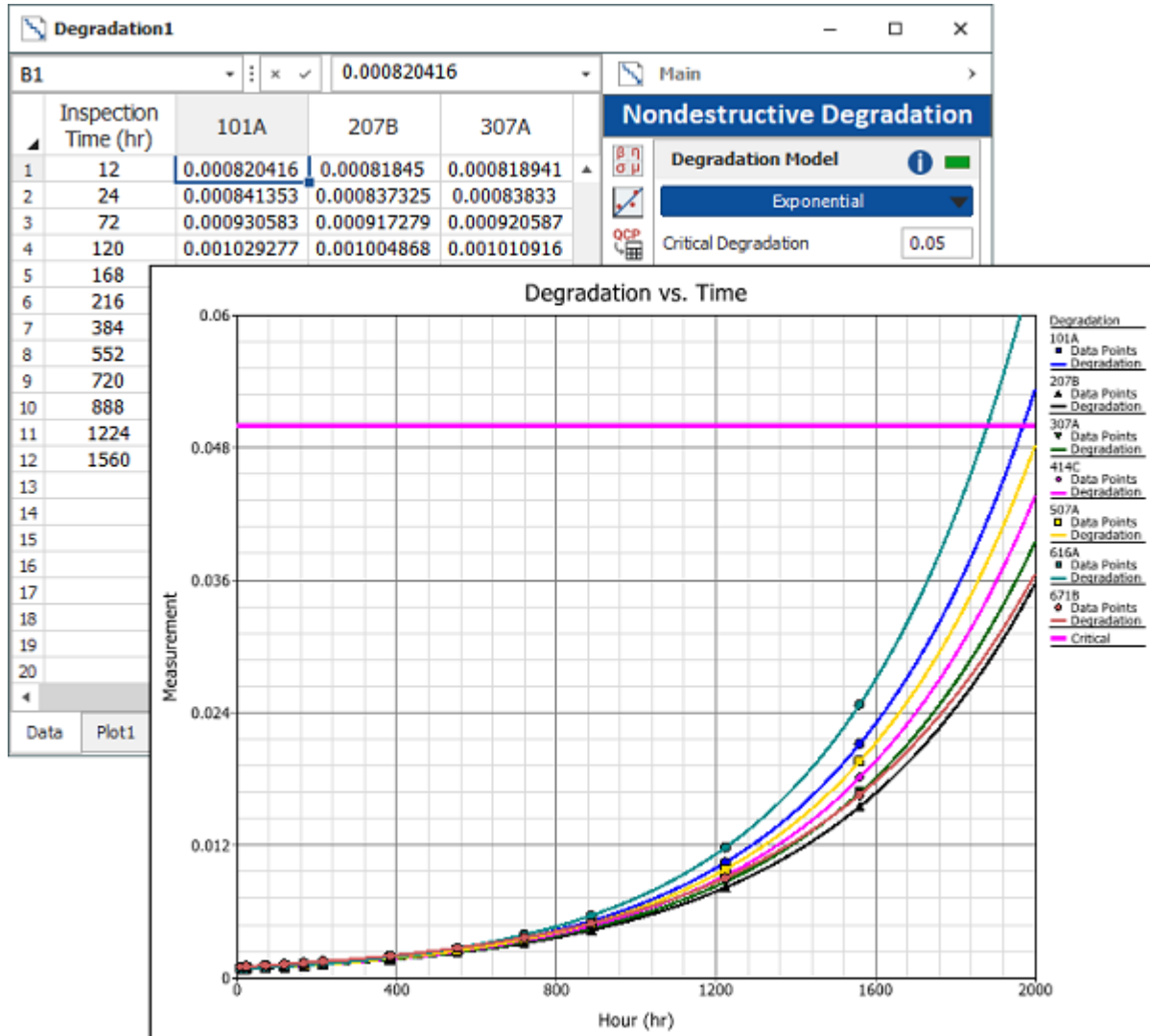
Warranty Data Analysis

For life data analysis, the Warranty folio offers a choice of 4 data entry formats that use sales and returns data to predict future returns under warranty: Nevada, Times-to-Failure, Dates of Failure and Usage.



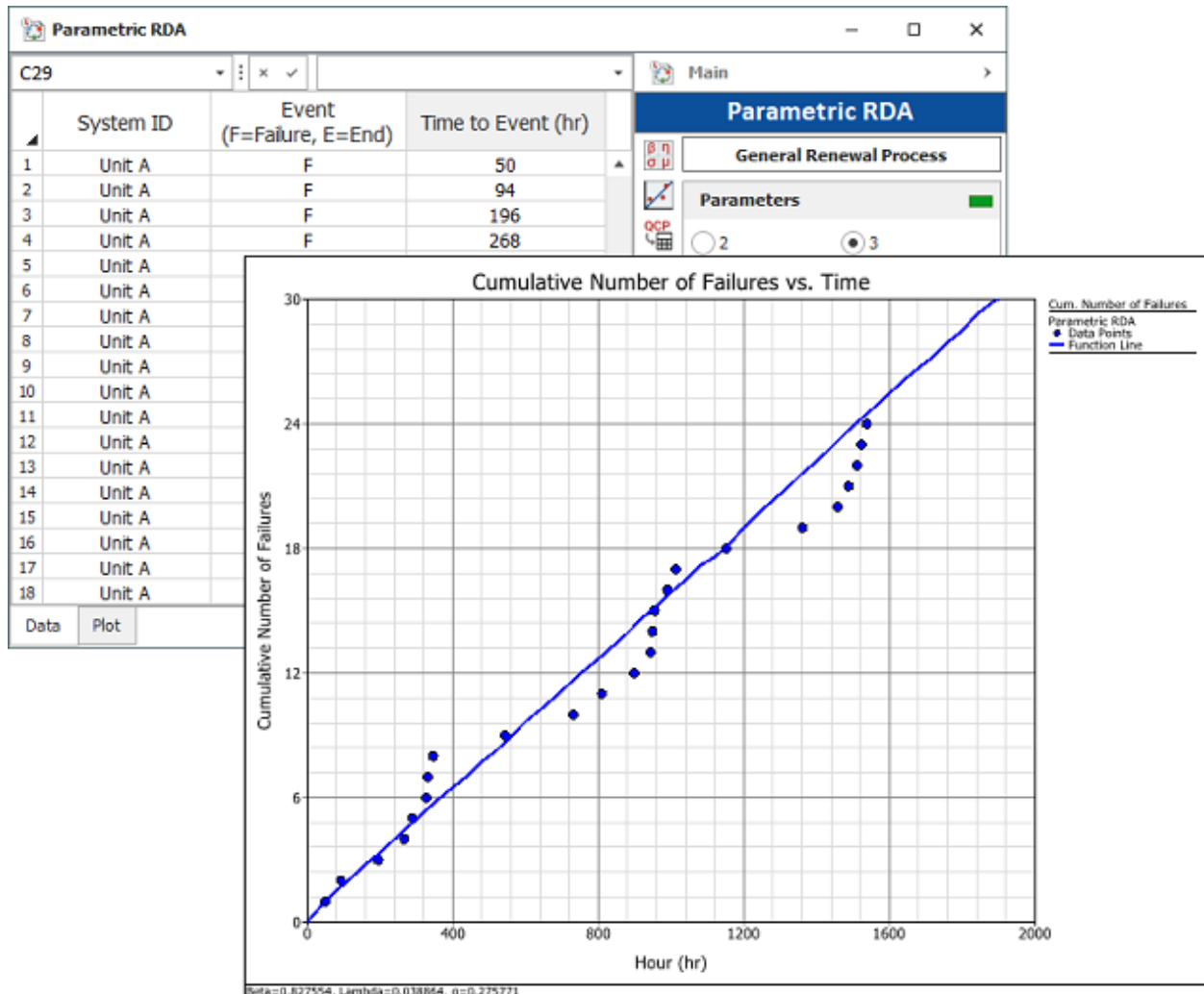
Degradation

For life data and life-stress analyses, the Degradation folio extrapolates expected failure times based on how a performance measure (e.g., crack propagation, tread depth, vibration) has degraded over time.



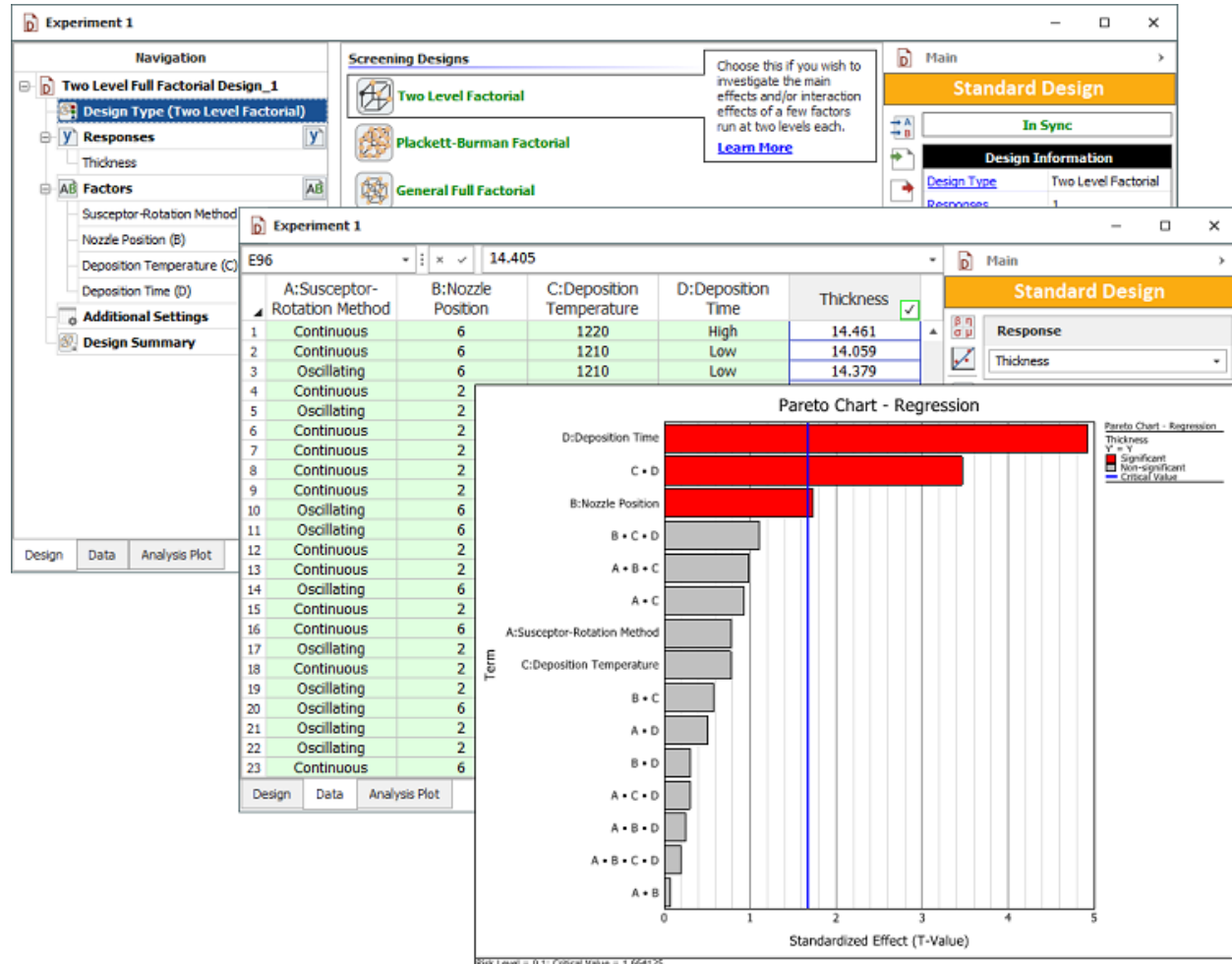
Recurrent Event Data Analysis

For life data analysis, the non-parametric RDA folio uses the Mean Cumulative Function to plot the average number of recurring failures over a given period of time. The parametric RDA folio uses the General Renewal Process (GRP) model, which considers the effectiveness of repairs, to model the cumulative number of failures over time.



Design of Experiments

A set of Design folios provide techniques for DOE analyses such as identifying key factors that affect performance (standard design), minimizing a system's sensitivity to noise (robust design) and determining the best proportion of components in a mixture (mixture design).

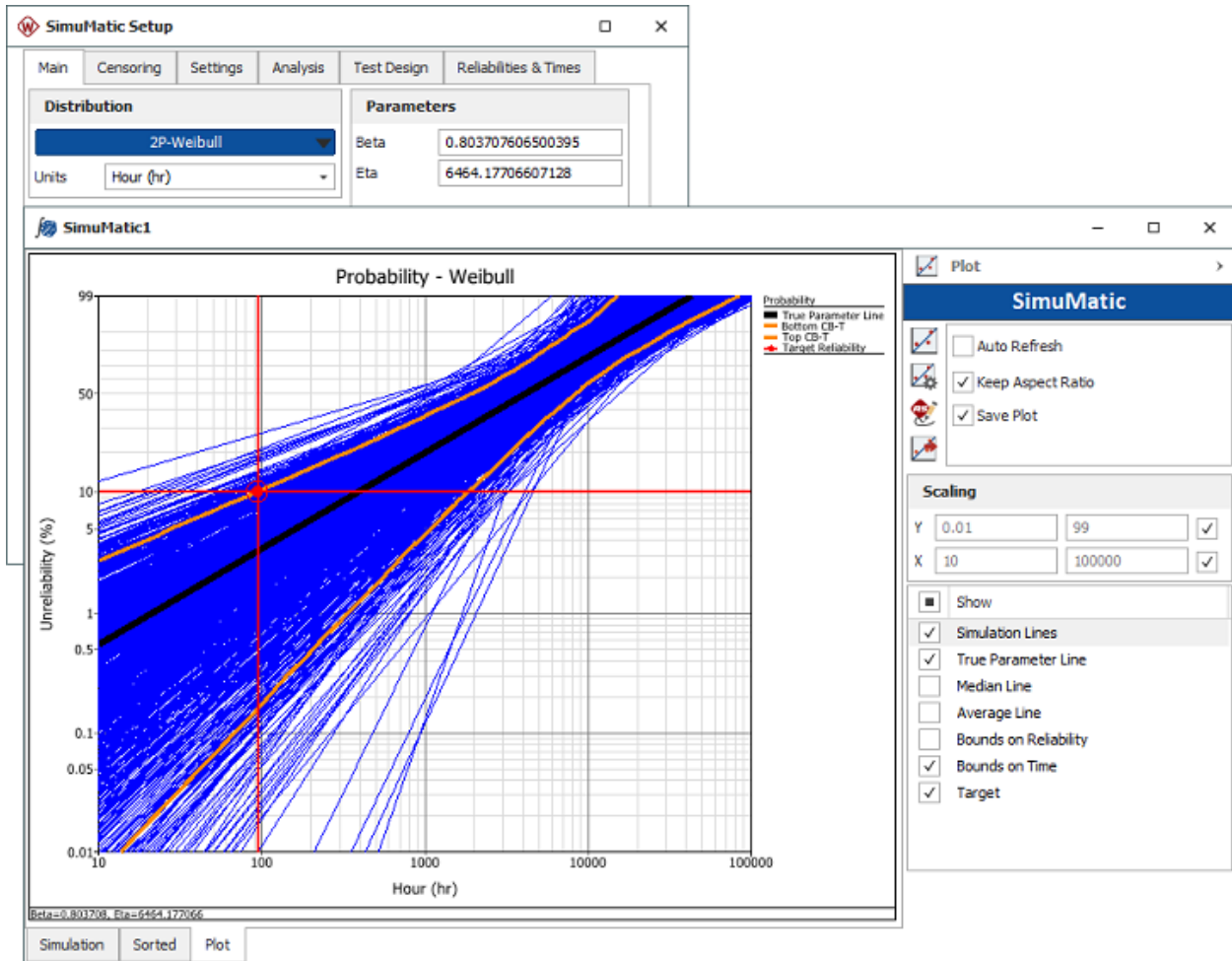


Monte Carlo Data Generation and SimuMatic

For life data and life-stress data analyses, the Monte Carlo utility generates a data set based on a specified probability distribution. SimuMatic performs analyses on a large number of simulated data sets, based on a specified probability distribution. For growth data analysis, the Monte Carlo utility generates a data set based on the Crow-AMSAA model, with specified beta and lambda parameters while SimuMatic performs analyses on a large number of simulated data sets, based on the Crow-AMSAA model.

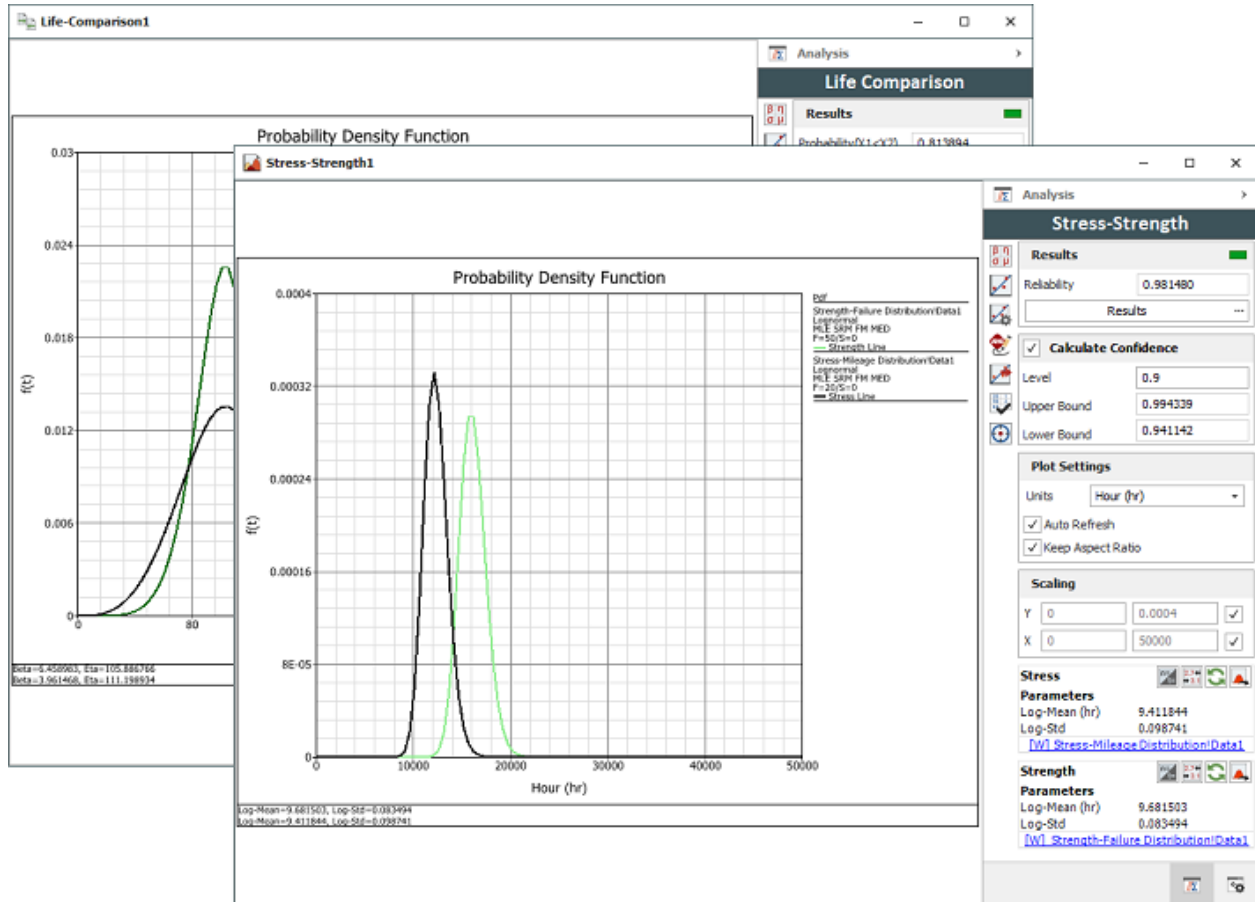
Quick Tour of Weibull++

The life data versions look like this:



Comparison Folios

The Life Comparison folio determines the probability that the life of one population will be greater or less than that of the second. The Stress-Strength analysis folio determines the probability of failure based on the probability of stress exceeding strength.



Test Design

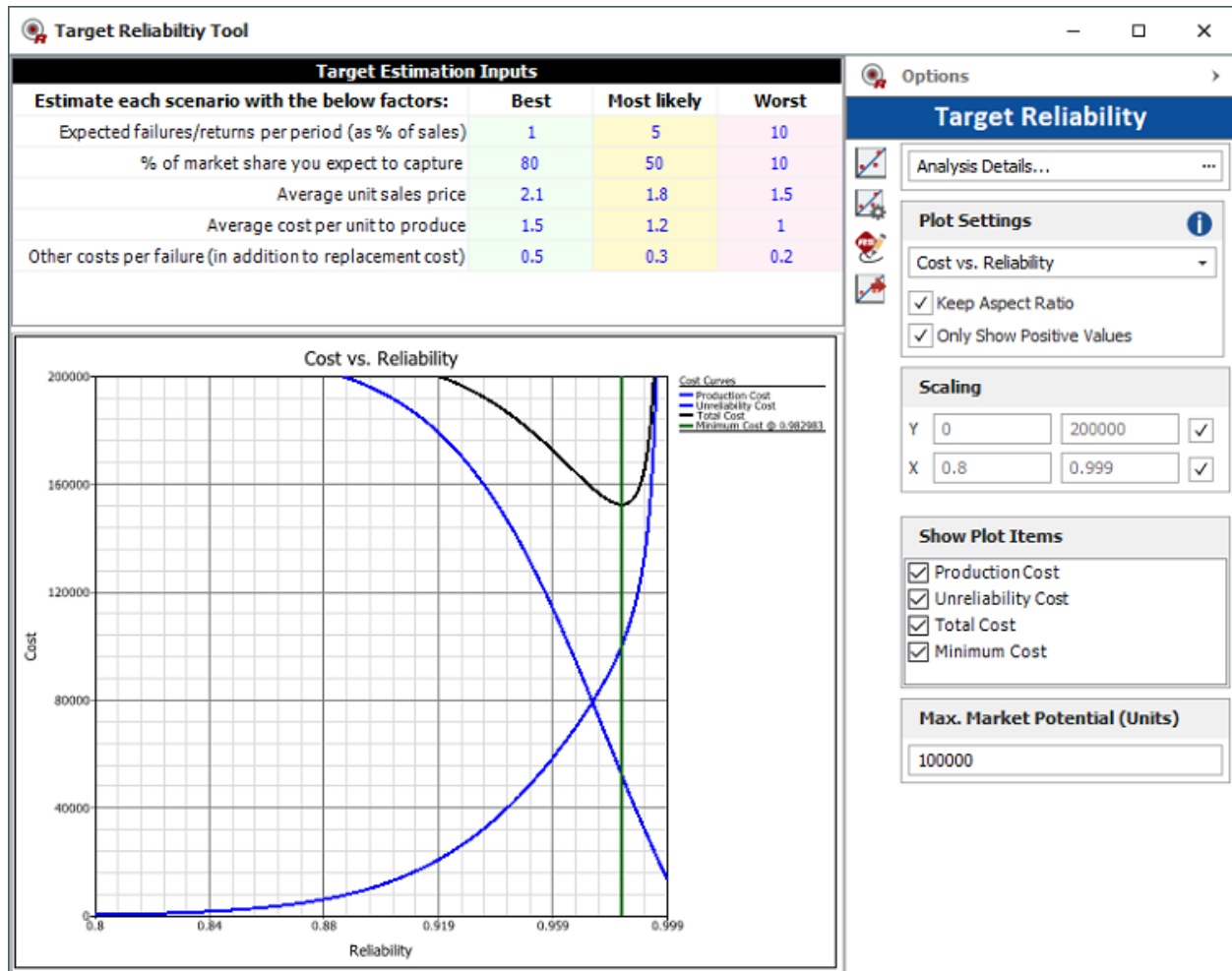
For life data analysis, Weibull++ offers a choice of tools to assist with reliability test design: Reliability Demonstration Test (Parametric Binomial, Non-Parametric Binomial, Exponential Chi-Squared or Non-Parametric Bayesian), Expected Failure Times Plot and Difference Detection Matrix. For growth data analysis, the Test Design folio uses the non-homogeneous Poisson process (NHPP) to design a demonstration test for repairable systems by solving for either the test time required per system or the number of systems that must be tested.

The screenshot displays the Weibull++ Test Design interface with several overlapping windows:

- Test Design Folio1**: A window showing a table of test results. The table has columns for Design 1 Mean Life (300, 600, 900, 1200, 1500, 1800, 2100, 2400, 2700, 3000) and rows for Design 2 Mean Life (300, 600, 900, 1200, 1500, 1800, 2100, 2400). The cells contain 0 or 1, representing test outcomes.
- Expected Failure Times**: A window showing a plot of Units vs. Time.
- Parametric Binomial**: A window for designing a reliability demonstration test. It includes fields for Metric (Reliability value at a specific time), Demonstrate this reliability (%) (90), With this confidence level (%) (90), At this time (hr) (100), Distribution (2P-Weibull), and With this Beta (2). It also has a Results section for Sample size and a Notes section.
- Test Design Assistant**: A window with a "Select Test Design" section. It lists three options: Reliability Demonstration Test Design, Expected Failure Times Plot, and Difference Detection Matrix. A description for the first option is provided: "Explore different reliability demonstration test design options. Use the tool to determine the number of units and/or test time required to demonstrate a specified target reliability."
- Test Design**: A window showing the Test Design Method (Parametric Binomial) and Input fields (Units: Hour (hr), Acceleration Factor: 1). It also includes a Plot Setup section with Sample Size (5), Two-Sided Confidence (%) (90), Acceleration Factor (1), and Actual Failures. The Expected Failure Model is set to WB2 (2, 500). Plot Options include Keep Aspect Ratio and Auto Refresh. X-Axis Scaling is set to Linear, and Scaling is set to Y (0 to 6) and X (0 to 1200).

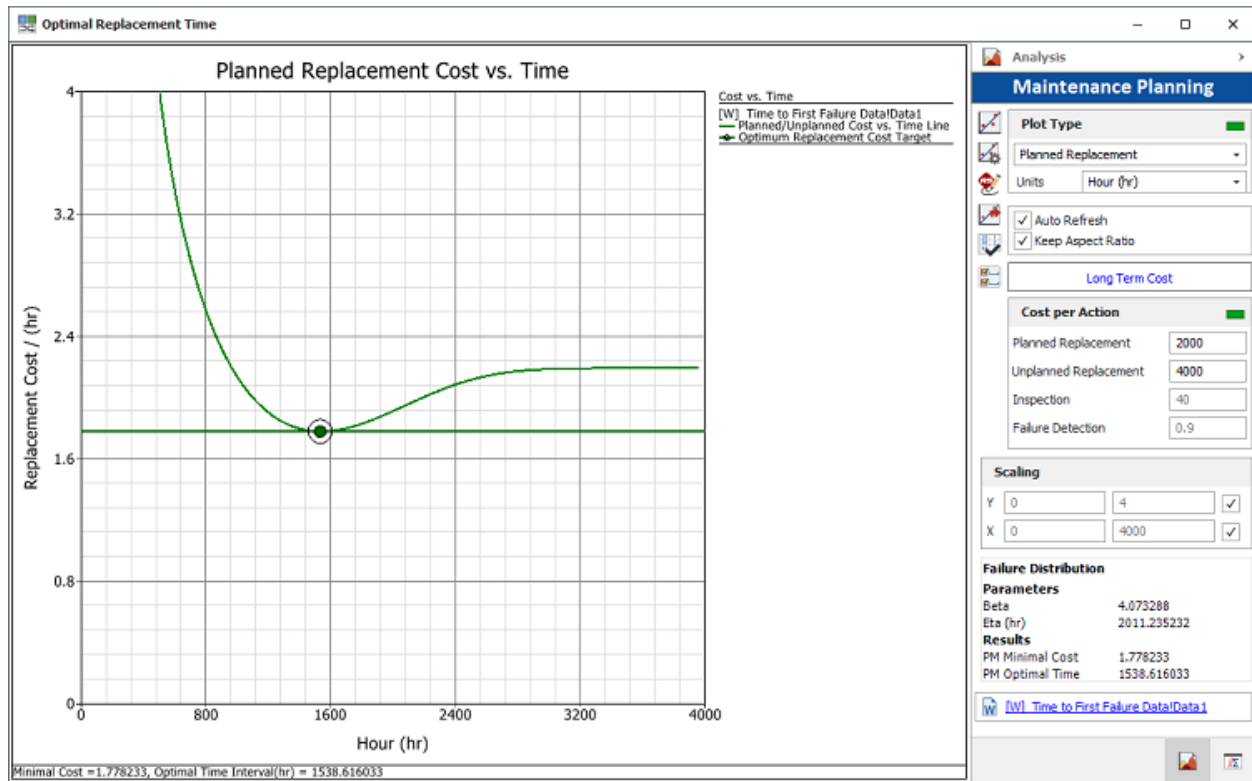
Target Reliability Planner

For life data analysis, the Target Reliability folio finds the optimum cost and reliability of a product, given estimates for various factors involved in the product's production and sale.



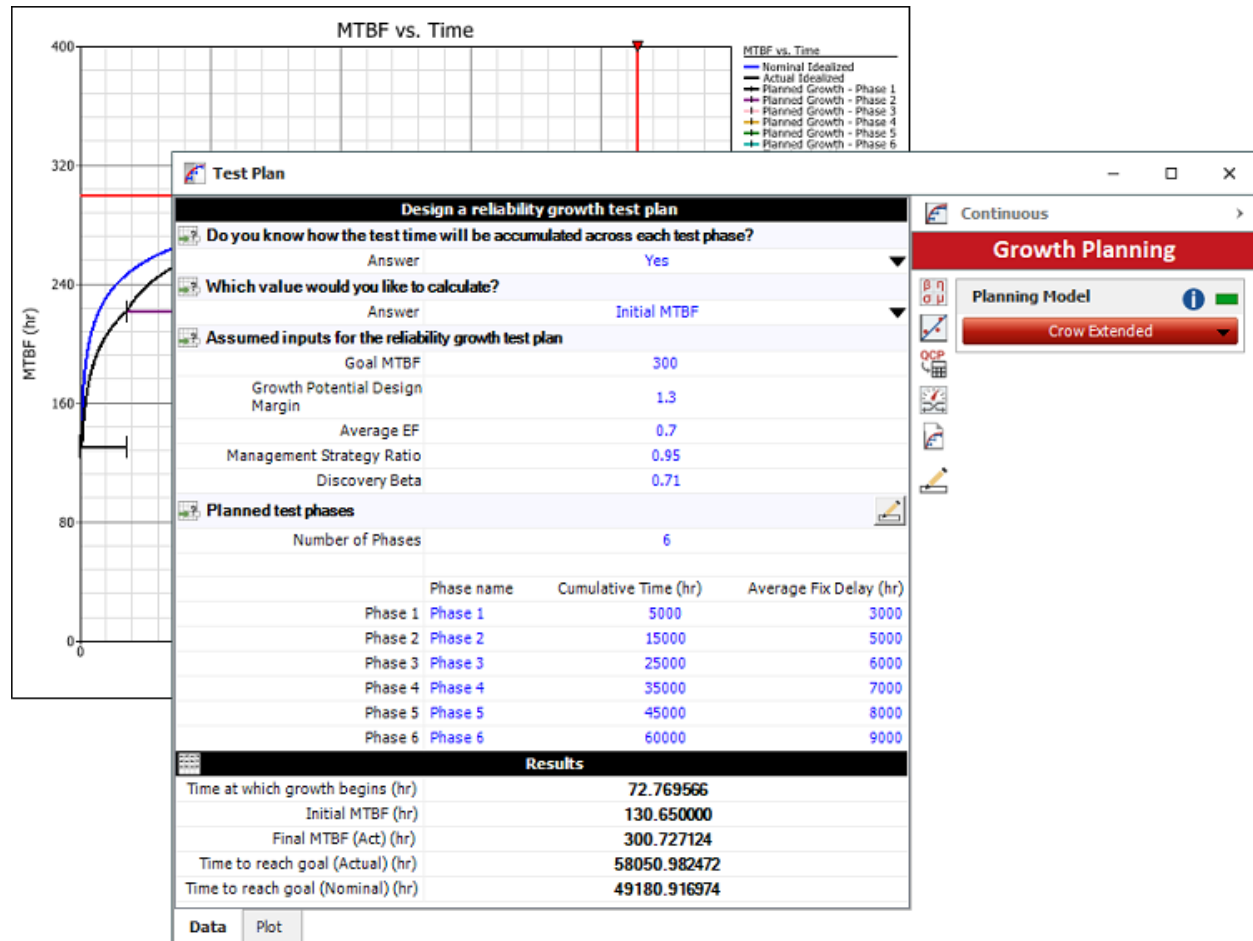
Maintenance Planning

For life data analysis, the Maintenance Planning folio uses the optimum replacement age model to determine the most cost-effective time to replace aged components.



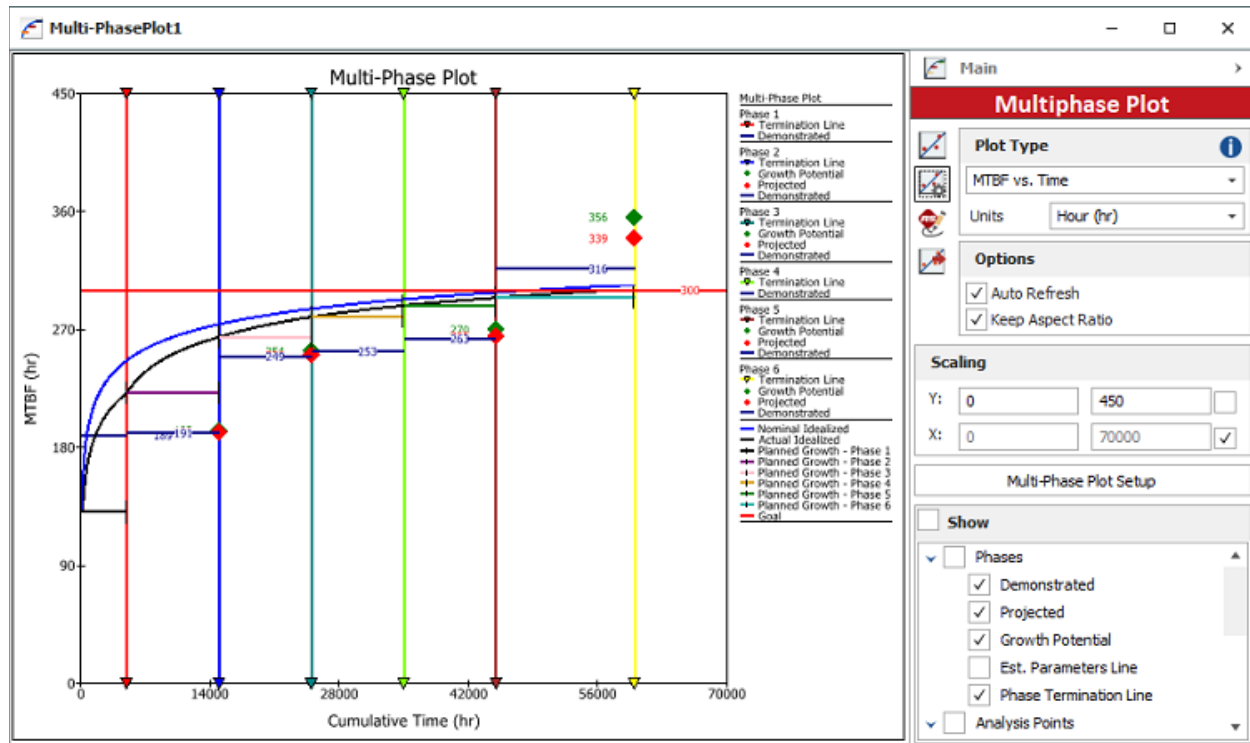
Growth Planning

For growth data analysis, the Growth Planning folio helps you to create a multi-phase reliability growth testing program that is designed to achieve a specific MTBF or reliability goal.



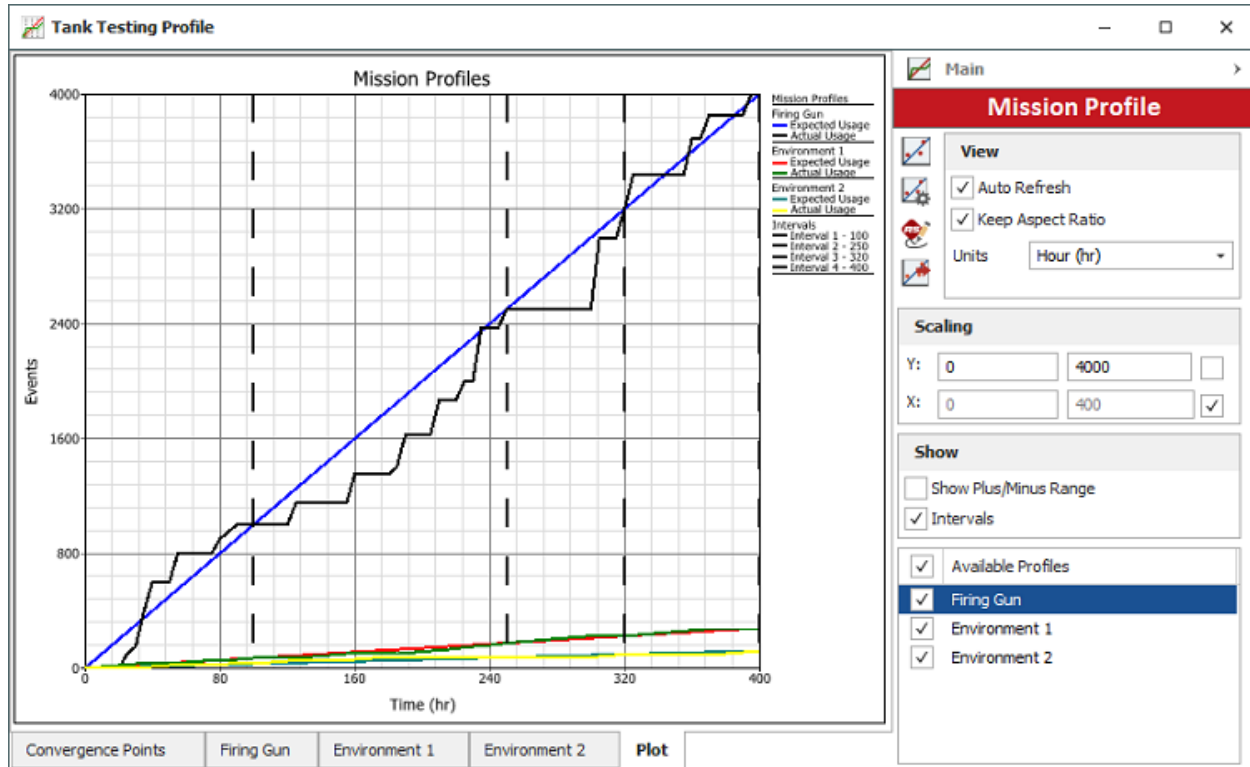
Multi-Phase plot

For growth data analysis, the Multi-Phase plot displays actual test results (e.g., demonstrated, projected and growth potential MTBF or failure intensity) across multiple analysis points and/or test phases. It can be linked to a growth planning folio to compare actual test results against the test plan.



Mission Profiles

For growth data analysis, Mission profiles help to create a balanced operational test plan and track the actual testing against the plan to make sure the data will be suitable for reliability growth analysis.



End User Licence Agreement

Click Wrap Agreement at time of product installation

BY INSTALLING THIS SOFTWARE OR BY CLICKING THE “I ACCEPT” BUTTON AND ACCEPTING THIS LICENCE IN ACCORDANCE WITH RECITAL C (LICENCE ACCEPTANCE PROCEDURE) YOU AGREE TO THE TERMS OF THIS LICENCE WHICH WILL BIND YOU, THE COMPANY ON WHOSE BEHALF YOU ARE ENTERING INTO THIS LICENCE AGREEMENT, AND ITS EMPLOYEES, AS APPLICABLE.

THIS LICENCE AGREEMENT IS A LEGAL AGREEMENT BETWEEN HBM UNITED KINGDOM LTD A COMPANY INCORPORATED IN UNITED KINGDOM WHOSE REGISTERED NUMBER IS 1589921 AND WHOSE REGISTERED OFFICE IS AT TECHNOLOGY CENTRE, ADVANCED MANUFACTURING PARK, BRUNEL WAY, CATCLIFFE, ROTHERHAM S60 5WG (THE ‘LICENSOR’) AND THE END USER LICENSEE OR ITS REPRESENTATIVE/AGENT AUTHORISED TO BIND THE END USER LICENSEE (‘YOU’).

PLEASE READ THIS CAREFULLY BEFORE USING THE SOFTWARE PRODUCTS

A: BACKGROUND

THIS LICENCE AGREEMENT SHALL BE BETWEEN YOU AND THE LICENSOR REGARDLESS OF WHETHER YOU HAVE PURCHASED THE SOFTWARE PRODUCTS DIRECTLY FROM THE LICENSOR OR AN AUTHORISED RESELLER AS SET OUT BELOW.

THE LICENSOR APPOINTS EXPERIENCED PROVIDERS OF SOFTWARE RESALE SERVICES WHO DISTRIBUTE THE SOFTWARE PRODUCTS TO END USERS (‘AUTHORISED RESELLER’). IF YOU HAVE PURCHASED THE SOFTWARE PRODUCTS AND ANY ASSOCIATED SUPPORT AND MAINTENANCE SERVICES FROM AN AUTHORISED RESELLER, SUCH PRODUCTS AND SERVICES WILL BE PROVIDED DIRECTLY TO YOU BY THE RELEVANT AUTHORISED RESELLER AND ALL PAYMENTS SHALL BE MADE TO THE AUTHORISED RESELLER ON THE AUTHORISED RESELLER’S TERMS AND PRICES.

IF YOU HAVE PURCHASED THE SOFTWARE PRODUCT AND SUPPORT AND MAINTENANCE SERVICES DIRECTLY FROM THE LICENSOR, SUCH SUPPORT AND MAINTENANCE SERVICES WILL BE DEALT WITH IN A SEPARATE AGREEMENT BETWEEN YOU AND THE LICENSOR AND ALL PAYMENTS WILL BE MADE TO THE LICENSOR AND GOVERNED BY THE LICENSOR’S TERMS OF SALE.

B: PROPERTY OF LICENSOR

THE LICENSOR, OR, WHERE APPLICABLE, THE RELEVANT MEMBER OF THE LICENSOR’S CORPORATE GROUP, IS THE ENTIRE LEGAL AND BENEFICIAL OWNER OF CERTAIN SOFTWARE PRODUCT(S) (‘THE SOFTWARE PRODUCT’) AS SET OUT IN THE QUOTATION OF INFORMATION, WHICH SHALL ALSO INCLUDE YOUR LICENCE KEY, SENT TO YOU BY EMAIL EITHER BY THE LICENSOR OR, IF YOU HAVE PURCHASED THE SOFTWARE PRODUCTS FROM AN AUTHORISED RESELLER, BY THE AUTHORISED RESELLER (‘QUOTATION’). THE LICENSOR IS WILLING TO GRANT YOU A LICENCE TO USE THE SOFTWARE PRODUCT ONLY IF YOU ACCEPT ALL THE TERMS AND CONDITIONS SET OUT BELOW.

C: LICENCE TO BE GRANTED

THE LICENSOR IS PROPOSING TO GRANT YOU ONE OF THE FOUR FORMS OF LICENCE IN RESPECT OF THE SOFTWARE PRODUCT. DETAILS OF EACH FORM OF LICENCE ARE SET OUT IN CLAUSES 2.1 AND 3 BELOW. THE FORM OF LICENCE THAT IS PROPOSED TO BE GRANTED TO YOU IS SET OUT IN THE QUOTATION. THE QUOTATION FORMS PART OF THE LICENCE AGREEMENT AND BY ACCEPTING THE TERMS OF THE LICENCE YOU ARE ACCEPTING THOSE TERMS IN THE QUOTATION. IF YOU HAVE NOT RECEIVED THE QUOTATION FROM THE EITHER THE LICENSOR OR FROM THE AUTHORISED RESELLER (IF YOU HAVE PURCHASED THE SOFTWARE PRODUCTS FROM AN AUTHORISED RESELLER) AT THE DATE HEREOF OR IF ANY DETAILS WITHIN THE QUOTATION ARE INCORRECT THEN YOU SHOULD FOLLOW THE 'LICENCE REJECTION PROCEDURES' SET OUT AT PARAGRAPH D BELOW AND IMMEDIATELY CONTACT THE LICENSOR OR THE AUTHORISED RESELLER (AS APPLICABLE).

C: LICENCE ACCEPTANCE PROCEDURE

BY CLICKING ON THE ACCEPTANCE BUTTON WHICH FOLLOWS THIS LICENCE AGREEMENT (MARKED 'DO YOU ACCEPT THESE TERMS AND CONDITIONS?'), YOU INDICATE ACCEPTANCE OF THIS LICENCE AGREEMENT AND THE LIMITED WARRANTY AND LIMITATION OF LIABILITY SET OUT IN THIS LICENCE AGREEMENT. SUCH ACCEPTANCE IS ON YOUR OWN BEHALF, IF YOU ARE AN INDIVIDUAL AND ON BEHALF OF ANY CORPORATE ENTITY WHICH EMPLOYS YOU OR WHICH YOU REPRESENT ('CORPORATE LICENSEE') IN ENTERING INTO THIS LICENCE AND YOU WARRANT THAT YOU HAVE THE NECESSARY AUTHORITY TO BIND THE CORPORATE ENTITY IN THIS RESPECT OR THAT THE AUTHORISED REPRESENTATIVES OF THE CORPORATE ENTITY ARE AWARE OF YOUR ACCEPTANCE OF THIS AGREEMENT ON ITS BEHALF. IN THIS LICENCE AGREEMENT, 'YOU' REFERS TO THE LICENSEE, ANY SUCH CORPORATE LICENSEE, OR BOTH, AS A COMMON SENSE INTERPRETATION OF THE RELEVANT SECTION DICTATES.

D: LICENCE REJECTION PROCEDURE

IF YOU DO NOT ACCEPT THESE TERMS AND CONDITIONS, YOU SHOULD CLICK ON THE "I DO NOT ACCEPT" BUTTON, DELETE THE SOFTWARE PRODUCTS FROM YOUR COMPUTER AND PROMPTLY (AND IN ANY EVENT, WITHIN 14 DAYS OF RECEIPT) RETURN TO THE RESELLER (A) ANY MEDIA; AND (B) ANY OTHER ITEMS PROVIDED, THAT ARE PART OF THIS PRODUCT.

E: OTHER AGREEMENTS

IF THE LICENSOR HAS EXPRESSLY AGREED WITH YOU IN WRITING THAT YOUR USE OF THE SOFTWARE PRODUCTS IS GOVERNED BY A PRIOR EXECUTED LICENCE AGREEMENT WITH THE LICENSOR, SUCH AGREEMENT SHALL APPLY INSTEAD OF THE FOLLOWING TERMS AND CONDITIONS TO THE EXTENT THAT THEY CONFLICT.

YOU SHOULD PRINT A COPY OF THIS LICENCE AGREEMENT FOR FUTURE REFERENCE.

LICENCE AGREEMENT

1. Ownership of Software Products and Copies

- 1.1 The Software Products and any printed materials or electronic documentation accompanying the Software Products ('**Documentation**') are copyrighted works of authorship, and are also protected under applicable database laws. The Licensor, or, where applicable, the relevant member of the Licensor's corporate group, retains ownership of the Software Products and all subsequent copies of the Software

Products, regardless of the form in which the copies may exist. This Licence Agreement is not a sale of the original Software Products or any copies.

2. Commercial Licence

2.1 In consideration of you agreeing to abide by the terms of this Licence Agreement and payment of the applicable licence fees either to the Licensor or, if you have purchased the Software Products from an Authorised Reseller, to the Authorised Reseller (as specified in the Quotation), the Licensor hereby grants to you a personal, non-exclusive, and (unless expressly agreed otherwise by the Licensor in accordance with clause 5.1) non-transferable licence to use the Software Products and the Documentation on the terms of this Licence Agreement. The licence shall take one of the following forms, (and shall be set out in the Quotation):

(a) **Annual Licence:**

- (i) Duration – this Licence shall continue for a period of 12 months ('Initial Period') from the date of delivery of the Quotation ("the Delivery Date") and, provided that you have paid all applicable renewal fees, from year to year thereafter unless terminated in accordance with any provision of clause 10 below or any other clause of this Licence Agreement
- (ii) Termination – you must give the Licensor 90 day's written notice prior to the anniversary of the Delivery Date, such notice not to expire before such anniversary date.

(b) **Paid Up Licence:**

- (i) Duration – this Licence shall continue for a period of 25 years from the Delivery Date unless terminated in accordance with any provision of clause 10 below or any other clause of this Licence Agreement.
- (ii) Conversion - this Licence may be converted to a CDS (this may include CRS and CDRS which are specific variations of CDS and collectively known as CDS) Licence, upon application to either the Licensor or the Authorised Reseller (if you have purchased the Software Products from an Authorised Reseller), and payment of an additional fee to the Licensor or the Authorised Reseller,(as applicable) which shall be additional to the fees paid or payable in respect of any maintenance and support services provided by either by the Licensor or the Authorised Reseller (if you have purchased the Software Products from an Authorised Reseller), You may reverse this conversion to the same terms as agreed in the Paid Up Licence at the anniversary of the conversion by giving the Licensor 90 days written notice prior to the anniversary of the Delivery Date, such notice not to expire before the anniversary of the Delivery Date.

(c) **CDS/CRS/CDRS Licence:**

- (i) Access – subject to the terms and conditions of this Licence Agreement, you may access any of the Software Products in the Quotation at any one time and in any combination up to the number of subscriptions granting you access to the Software Products for simultaneous use by you and purchased by you pursuant to this Agreement ('Access Credits'). In the event the number of Access Credits reaches the number of Access Credits duly paid for by you ('Access Limit'), you may add additional Access Credits (or, alternatively, at any time during the Term) which shall be charged in accordance with either the Licensor's prices or the Authorised Reseller's prices (if you have purchased the Software Products from an Authorised Reseller) Such increase in Access Credits shall apply to the following 12 month period, unless you give the Licensor or the Authorised Reseller (as applicable) written notice at least 90 days in advance of the expiry of the Initial Period, that you do not wish to sustain such increase in Access Credits. You may opt to reduce the number of Access Credits with

90 days written notice in advance of the 12 month period following from the anniversary of the Delivery Date, provided that the total number of Access Credits does not fall below the minimum threshold set by the Licensor or the Authorised Reseller (as applicable) or below the initial number of Access Credits calculated at the time of conversion of any Paid Up Licence.

- (ii) Duration - this Licence shall continue for the Initial Period and, provided that you have paid for the applicable Access Credits, from year to year thereafter unless terminated in accordance with any provision of clause 10 below or any other clause of this Licence Agreement;
- (iii) Reporting – in order to serve our customers better, the Licensor needs to be able to understand how its customers use the CDS system. As a condition of your continued access to the system, you are asked to provide to the Licensor on a quarterly basis, the CDS log file. You will be provided with easy-to-follow instructions on how to do this.
- (iv) Termination – you must give the Licensor 90 days written notice in advance of the expiry of the Initial Period of your intention to discontinue the CDS Licence, such notice not to expire before the anniversary of the Delivery Date, and you must have submitted all reports required of you in clause 2.1(c)(iii) above. Failure to provide such notice and reports will mean that the license shall automatically continue on the same terms until terminated in accordance with this clause.

2.2 As an end user licensee of the Software Products, you may, subject to the following conditions and any conditions specified in the Quotation:

- (a) use and copy the Software Products only for use on any computer system that is detailed in the release notes of the respective Software Product and which is licenced, leased and/or controlled by you (the Corporate Licensee) or any member of your corporate group, which expression includes the Corporate Licensee's majority-owned subsidiaries, any parent company having a majority-owned interest in the Corporate Licensee, and such parent's majority-owned subsidiaries;
- (b) load the Software Products into and use it only on computers at the locations specified in the Quotation and which are under your control; and
- (c) copy the Software Products only for back-up and archival purposes and make up to three copies of the Documentation, provided that the original and each copy is kept in your possession and that your installation and use of the Software Products does not exceed any restrictions contained in the Quotation.

3. Demonstration Licence

- 3.1 If the Licensor has provided you with the Software Products free of charge for evaluation purposes, this clause 3 shall apply to your use of the Software Products.
- 3.2 You may use the Software Product on a computer solely for the purposes of evaluating the Software Product.
- 3.3 The Software Product is provided to you free of charge and on an “AS IS” basis, without any technical support or warranty of any kind from us including, without limitation, a warranty of satisfactory quality, fitness for purpose and non-infringement.
- 3.4 This Licence shall continue for a period of 30 days from the Delivery Date unless terminated in accordance with any provision of clause 10 below or any other applicable clause of this Licence Agreement or until such Licence is converted into an Annual Licence, Paid Up Licence or CDS Licence, if earlier.

- 3.5 As part of the Licensor's testing and evaluation of the Software Products, you shall share with the Licensor the input and views received and any reports and analysis produced promptly upon receipt of such feedback.
- 3.6 Clauses 4, 5.1(a), 6.1(b), 6.1(f), 8.1, 8.2, 8.5, 10.1(a) of this Licence Agreement shall not apply to a Demonstration Licence.

4. Delivery and Risk

- 4.1 The Software Products shall consist of one copy of the object code of the Software Products on machine-readable form only, on the disk, dongle or other media on which the Software Product is delivered as described in the Quotation (the "Media"). Risk in the Media shall pass to you on delivery. If any part of the Media shall thereafter be lost, damaged or destroyed, you must contact either the Licensor or the Authorised Reseller from whom you have purchased the Software Products who will arrange for a repair or replacement of such Media at a cost (if any) determined by the Licensor or the Authorised Reseller (as applicable).

5. Licence Restrictions

- 5.1 You may not nor permit others to:
- (a) transfer the Software Products from one location to another, without the express written consent of the Licensor and provided such transfers do not exceed two in any twelve month period. It will be a condition of the grant of any such consent that the Software Products held on hard drives at the current location must be erased and you must enter into a new licence agreement with the Licensor before a Software Products licence key is provided to you. The administration charge (currently US \$1,500) will be payable by you in respect of such transfer.; This charge is only applicable to end user licensees who do not have a support and maintenance services agreement with the Licensor or Authorised Reseller;
 - (b) exceed the number of concurrent users specified in the Quotation, if any;
 - (c) sub-licence, sell, assign, rent, pledge, lease, transfer or otherwise dispose of the Software Products, on a temporary or permanent basis, without the prior written consent of the Licensor,
 - (d) translate, reverse engineer, decompile, disassemble, modify or create derivative works based on the Software Products except as permitted by law;
 - (e) make copies of the Software Products, in whole or part, except for back-up or archival purposes as permitted in this Licence Agreement;
 - (f) use any back-up copy of the Software Products for any purpose other than to replace the original copy in the event that it is destroyed or becomes defective;
 - (g) copy the Documentation (except as provided by this Licence Agreement);
 - (h) adapt, modify, delete or translate the Documentation in any way for any purpose whatsoever;
 - (i) vary, delete or obscure any notices of proprietary rights or any product identification or restrictions on or in the Software Products.

6. Open Source

Notwithstanding the foregoing provisions, You acknowledge that certain components of the Software Product may be covered by so-called open source software licenses ("Open Source Components"), which means any software licenses approved as open source licenses by the Open Source Initiative or any substantially similar licenses, including without limitation any license that, as a condition of distribution of the software licensed under such license, requires that the distributor make the software available in

source code format. To the extent required by the licenses covering Open Source Components, the terms of such licenses will apply to such Open Source Components in lieu of the terms of this Agreement. To the extent the terms of the licenses applicable to Open Source Components prohibit any of the restriction in this License Agreement with respect to such Open Source Components, such restrictions will not apply to such Open Source Components. To the extent the terms of the licenses applicable to Open Source Components require Licensor to make an offer to provide source code or related information in connection with the Software Product, such offer is hereby made. Any request for source code or related information should be directed only to Customer Support, HBM United Kingdom Limited, AMP Technology Centre, Brunel Way, Catcliffe, Rotherham, South Yorkshire, S60 5WG, United Kingdom. You acknowledge receipt of notices for the Open Source Components for the initial delivery of the Software Product.

7. Undertakings

7.1 You undertake:

- (a) to ensure that, prior to use of the Software Products by your employees or agents, all such parties are notified of this Licence and the terms of this Licence Agreement and that any such use as aforesaid is in accordance with the terms of this Licence Agreement;
- (b) to replace the current version of the Software Product with any updated or upgraded version or new release provided by the Licensor or the Authorised Reseller (if applicable) under the terms of this Licence Agreement immediately on receipt of such version or release;
- (c) to use the Software Products only as described in the Documentation and subject to the restrictions as set out in clause 5 (Licence Restrictions above);
- (d) to reproduce and include the Licensor's copyright notice (or such other party's copyright notice as specified on the Software Products) on all and any copies of the Software Products, including any partial copies of the Software Products as permitted to be made under the terms of this Licence Agreement;
- (e) to hold all drawings, specifications, data (including object and source codes), Software Products listings and all other information relating to the Software Products confidential and not at any time, during this Licence or after its expiry, disclose the same, whether directly or indirectly, to any third party without the Licensor's consent and
- (f) to effect and maintain adequate security measures to safeguard the Software Product from access or use by any unauthorised person and indemnify the Licensor for losses flowing from your failure to do so.

8. Intellectual Property Rights

- 8.1 You acknowledge that all intellectual property rights in the Software Product and the Documentation throughout the world belong to the Licensor, that rights in the Software Product are licensed (not sold) to you, and that you have no rights in, or to, the Software Product or the Documentation other than the right to use them in accordance with the terms of this Licence Agreement.
- 8.2 You acknowledge that you have no right to have access to the Software Product in source code form or in unlocked coding or with comments.
- 8.3 The integrity of this Software Product is protected by technical protection measures ("TPM") so that the intellectual property rights, including copyright, in the software of the Licensor are not misappropriated. You must not attempt in any way to remove or circumvent any such TPM, nor to apply, manufacture for sale, hire, import, distribute, sell, nor let, offer, advertise or expose for sale or hire, nor have in your possession for private or commercial purposes, any means whose sole intended purpose is to facilitate the unauthorised removal or circumvention of such TPM.

9. Limited Warranty

- 9.1 Subject to the limitations and exclusions of liability below and providing the Software is used in accordance with the Documentation and on an operating system or computer for which it was designed, the Licensor warrants that (a) the Media on which the Software Products is furnished will be free from material defects under normal use for a period of 90 days from the date of delivery (the “Warranty Period”); and that (b) during the Warranty Period, the Software Product will, when properly used, perform substantially in accordance with the functions described in the Documentation; and (c) that the Documentation correctly describes the operation of the Software Product in all material respects.
- 9.2 If, within the Warranty Period, you notify the Licensor in writing of any defect or fault in the Software Product in consequence of which it fails to perform substantially in accordance with the Documentation, and such defect or fault does not result from you having amended the Software Product or used it in contravention of the terms of this Licence Agreement, the Licensor will, at its sole option, i) repair or replace the Software Product, provided that you make available all information that may be necessary to assist the Licensor in resolving the defect or fault, including sufficient information to enable the Licensor to recreate the defect or fault, or ii) terminate this Licence Agreement immediately by notice in writing to you and the Licensor will refund or if the Software Products have been purchased from an Authorised Reseller will procure that the Authorised Reseller shall refund; any of the fees paid as at the date of termination (less a reasonable sum in respect of your use of the Software Product to the date of termination) on return of the Software Product and all copies thereof. The Licensor’s obligation under this clause 8.2 is subject to your compliance with clause 6.1(b).
- 9.3 You acknowledge that the Software Product has not been developed to meet your individual requirements and that it is therefore your responsibility to ensure that the facilities and functions of the Software Product as described in the Documentation meet your requirements.
- 9.4 You acknowledge that the Software Product may not be free of bugs or errors and you agree that the existence of any minor errors shall not constitute a breach of this Licence Agreement.
- 9.5 The Licensor shall not be liable under the said warranty above if the Software Product fails to operate in accordance with the said warranty as a result of any modification, variation or addition to the Software Products not performed by the Licensor or caused by any abuse, corruption or incorrect use of the Software Products, including use of the Software Products with equipment or other software which is incompatible.
- 9.6 All other conditions, warranties or other terms which might have effect or be implied or incorporated into this Licence Agreement or any collateral contract, whether by statute, common law or otherwise, are hereby excluded, including, without limitation, the implied conditions, warranties or other terms as to satisfactory quality, fitness for purpose or the use of reasonable skill and care.

10. Exclusion of Liability

- 10.1 Nothing in this Licence Agreement shall limit or exclude the liability of either party for death or personal injury resulting from negligence, for fraud or for fraudulent misrepresentation.
- 10.2 Subject to clause 9.1, the Licensor shall have no liability for any losses or damages which may be suffered by you (or any person claiming under or through you), whether the same are suffered directly or indirectly or are immediate or consequential, and whether the same arise in contract, tort (including negligence) or otherwise howsoever, which fall within any of the following:
 - (a) loss of income;
 - (b) loss of business profits or contracts;
 - (c) business interruption;

- (d) loss of the use of money or anticipated savings;
- (e) loss of information;
- (f) loss of opportunity, goodwill or reputation;
- (g) loss of, damage to or corruption of data; or
- (h) any indirect or consequential loss or damage of any kind howsoever arising and whether caused by tort (including negligence), breach of contract or otherwise;

provided that this clause 9.2 shall not prevent claims for loss of or damage to your tangible property that fall within the terms of clause 8 or a claim for a refund of the licence fees paid to the Licensor or the Authorised Reseller (as applicable) for the licence of the Software Products.

- 10.3 Subject to clause 9.1 and clause 9.2, the Licensor's maximum aggregate liability under or in connection with this Licence Agreement, or any collateral contract, whether in contract, tort (including negligence) or otherwise, shall be limited to a sum equal to the fees paid by you to the Licensor or the Authorised Reseller (as applicable) for the licence of the Software Products.
- 10.4 Subject to clause 9.1, clause 9.2 and clause 9.3, the Licensor's liability for infringement of third party intellectual property rights shall be limited to breaches of third party rights subsisting in the UK and USA.
- 10.5 This Licence Agreement sets out the full extent of the Licensor's obligations and liabilities in respect of the supply of the Software and Documentation. In particular, there are no conditions, warranties, representations or other terms, express or implied, that are binding on the Licensor except as specifically stated in this Licence Agreement. Any condition, warranty, representation or other term concerning the supply of the Software and Documentation which might otherwise be implied into, or incorporated in, this Licence Agreement, or any collateral contract, whether by statute, common law or otherwise, is hereby excluded to the fullest extent permitted by law.

11. Term and Termination

- 11.1 This Licence Agreement is effective for the period referred to clause 2.1 or until otherwise terminated in accordance with that clause. The Licensor may terminate this Licence Agreement immediately by written notice to you if:
 - (a) save in respect of a Paid Up Licence, if you purchase the Software Products directly from the Licensor, you fail to pay any renewal or other fees due by you to the Licensor in respect of this Licence Agreement;
 - (b) you fail to comply with any provisions of this Licence Agreement;
 - (c) you commit a material or persistent breach of this Licence Agreement which you fail to remedy (if remediable) within 14 days after the service on you of written notice requiring you to do so; or
 - (d) a petition for a bankruptcy order to be made against you has been presented to the court; or
 - (e) where you, as the Corporate Licensee, become insolvent or unable to pay its (the company's) debts, enters into liquidation, whether voluntary or compulsory (other than for reasons of bona fide amalgamation or reconstruction), passes a resolution for its winding-up, has a receiver or administrator manager, trustee, liquidator or similar officer appointed over the whole or any part of its assets, makes any composition or arrangement with its creditors or takes or suffers any similar action in consequence of its debt, or becomes unable to pay its debts or ceases to trade.
- 11.2 In the event of termination in accordance with clause 10.1 you must immediately pay to the Licensor any sums due to the Licensor under the Licence Agreement and (at the Licensor's sole option) you must return, destroy or delete all copies of the Software Products from all storage media in your control and,

in the case of destruction, certify to us that you have done so.

12. Export

- 12.1 You will comply with all applicable laws, rules, and regulations governing export of goods and information, including the laws of the countries in which the Software Products was created. In particular, you will not export or re-export, directly or indirectly, separately or as a part of a system, the Software Products or other information relating thereto to any country for which an export licence or other approval is required, without first obtaining such licence or other approval.

13. General

- 13.1 You agree that the Licensor shall have the right, after supplying undertakings as to confidentiality, to audit any computer system on which the Software Products are installed in order to verify compliance with this Licence Agreement.
- 13.2 You agree that the Licensor may use your company name in Licensor's customer lists and other promotional materials describing your company as a customer or user of Licensor's software or services, as applicable, unless it receives written notice from you objecting to such use.
- 13.3 This Licence Agreement, its subject matter or its formation (including non-contractual disputes or claims) shall be governed by and construed in accordance with English law and submitted to the non-exclusive jurisdiction of the English courts.
- 13.4 This Licence Agreement constitutes the complete and exclusive statement of the agreement between the Licensor and you with respect to the subject matter of this Licence and supersedes all proposals, representations, understandings and prior agreements, whether oral or written, and all other communications between us relating to that subject matter except for those expressly referred to in this Licence Agreement.
- 13.5 Any clause in this Licence Agreement that is found to be invalid or unenforceable shall be deemed deleted and the remainder of this Licence Agreement shall not be affected by that deletion.
- 13.6 Failure or neglect by either party to exercise any of its rights or remedies under this Licence Agreement will not be construed as a waiver of that party's rights nor in any way affect the validity of the whole or part of this Licence Agreement nor prejudice that party's right to take subsequent action.
- 13.7 This Licence Agreement is personal to you and you may not assign, transfer, sub-contract or otherwise part with this Licence or any right or obligation under it without the Licensor's prior written consent.