

CW-2 Cis-1,2 DCE

General Statistics

Total Number of Observations	13	Number of Distinct Observations	12
Number of Detects	10	Number of Non-Detects	3
Number of Distinct Detects	10	Number of Distinct Non-Detects	2
Minimum Detect	0.78	Minimum Non-Detect	0.3
Maximum Detect	6.1	Maximum Non-Detect	0.71
Variance Detects	3.934	Percent Non-Detects	23.08%
Mean Detects	2.761	SD Detects	1.983
Median Detects	2.5	CV Detects	0.718
Skewness Detects	0.68	Kurtosis Detects	-0.82
Mean of Logged Detects	0.749	SD of Logged Detects	0.8

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.877	Shapiro Wilk GOF Test	
1% Shapiro Wilk Critical Value	0.781	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.199	Lilliefors GOF Test	
1% Lilliefors Critical Value	0.304	Detected Data appear Normal at 1% Significance Level	
Detected Data appear Normal at 1% Significance Level			

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.193	KM Standard Error of Mean	0.57
90KM SD	1.949	95% KM (BCA) UCL	3.218
95% KM (t) UCL	3.209	95% KM (Percentile Bootstrap) UCL	3.128
95% KM (z) UCL	3.13	95% KM Bootstrap t UCL	3.48
90% KM Chebyshev UCL	3.902	95% KM Chebyshev UCL	4.677
97.5% KM Chebyshev UCL	5.751	99% KM Chebyshev UCL	7.862

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.46	Anderson-Darling GOF Test	
5% A-D Critical Value	0.735	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.212	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.27	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			

Gamma Statistics on Detected Data Only

k hat (MLE)	2.027	k star (bias corrected MLE)	1.486
Theta hat (MLE)	1.362	Theta star (bias corrected MLE)	1.858
nu hat (MLE)	40.55	nu star (bias corrected)	29.72
Mean (detects)	2.761		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
 For such situations, GROS method may yield incorrect values of UCLs and BTVs
 This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.126
Maximum	6.1	Median	1.1
SD	2.099	CV	0.987
k hat (MLE)	0.51	k star (bias corrected MLE)	0.444
Theta hat (MLE)	4.166	Theta star (bias corrected MLE)	4.791
nu hat (MLE)	13.27	nu star (bias corrected)	11.54
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (11.54, α)	4.925	Adjusted Chi Square Value (11.54, β)	4.326
95% Gamma Approximate UCL	4.981	95% Gamma Adjusted UCL	5.672

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.193	SD (KM)	1.949
Variance (KM)	3.798	SE of Mean (KM)	0.57
k hat (KM)	1.266	k star (KM)	1.025
nu hat (KM)	32.92	nu star (KM)	26.66
theta hat (KM)	1.732	theta star (KM)	2.139
80% gamma percentile (KM)	3.522	90% gamma percentile (KM)	5.019
95% gamma percentile (KM)	6.512	99% gamma percentile (KM)	9.974

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (26.66, α)	15.89	Adjusted Chi Square Value (26.66, β)	14.71
95% KM Approximate Gamma UCL	3.68	95% KM Adjusted Gamma UCL	3.974

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.888	Shapiro Wilk GOF Test	
10% Shapiro Wilk Critical Value	0.869	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.193	Lilliefors GOF Test	
10% Lilliefors Critical Value	0.241	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.199	Mean in Log Scale	0.311
SD in Original Scale	2.023	SD in Log Scale	1.087
95% t UCL (assumes normality of ROS data)	3.199	95% Percentile Bootstrap UCL	3.136
95% BCA Bootstrap UCL	3.231	95% Bootstrap t UCL	3.426
95% H-UCL (Log ROS)	6.322		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.298	KM Geo Mean	1.348
KM SD (logged)	1.058	95% Critical H Value (KM-Log)	2.95
KM Standard Error of Mean (logged)	0.309	95% H-UCL (KM -Log)	5.81
KM SD (logged)	1.058	95% Critical H Value (KM-Log)	2.95
KM Standard Error of Mean (logged)	0.309		

DL/2 Statistics

DL/2 Normal	DL/2 Log-Transformed		
Mean in Original Scale	2.174	Mean in Log Scale	0.205
SD in Original Scale	2.048	SD in Log Scale	1.261
95% t UCL (Assumes normality)	3.187	95% H-Stat UCL	9.114

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	3.209
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

MW-3 MTBE

User Selected Options

Date/Time of Computation ProUCL 5.2 2/23/2026 4:58:51 PM
 From File WorkSheet.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

General Statistics

Total Number of Observations	13	Number of Distinct Observations	6
Number of Detects	3	Number of Non-Detects	10
Number of Distinct Detects	3	Number of Distinct Non-Detects	3
Minimum Detect	0.19	Minimum Non-Detect	0.2
Maximum Detect	0.26	Maximum Non-Detect	0.59
Variance Detects	0.00123	Percent Non-Detects	76.92%
Mean Detects	0.227	SD Detects	0.0351
Median Detects	0.23	CV Detects	0.155
Skewness Detects	-0.423	Kurtosis Detects	N/A
Mean of Logged Detects	-1.492	SD of Logged Detects	0.158

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.993	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.753	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.204	Lilliefors GOF Test
1% Lilliefors Critical Value	0.429	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level
 Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.202	KM Standard Error of Mean	0.00914
90KM SD	0.0232	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.218	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.217	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.229	95% KM Chebyshev UCL	0.241
97.5% KM Chebyshev UCL	0.259	99% KM Chebyshev UCL	0.292

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.263	Anderson-Darling GOF Test
5% A-D Critical Value	0.634	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.236	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.431	Detected data appear Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	61	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.00372	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	366	nu star (bias corrected)	N/A
Mean (detects)	0.227		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.159	Mean	0.2
Maximum	0.26	Median	0.194
SD	0.0268	CV	0.134
k hat (MLE)	62.44	k star (bias corrected MLE)	48.08
Theta hat (MLE)	0.0032	Theta star (bias corrected MLE)	0.00415
nu hat (MLE)	1624	nu star (bias corrected)	1250
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (N/A, α)	1169	Adjusted Chi Square Value (N/A, β)	1158
95% Gamma Approximate UCL	0.213	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.202	SD (KM)	0.0232
Variance (KM)	5.38E-04	SE of Mean (KM)	0.00914
k hat (KM)	75.5	k star (KM)	58.13
nu hat (KM)	1963	nu star (KM)	1511

theta hat (KM)	0.00267	theta star (KM)	0.00347
80% gamma percentile (KM)	0.223	90% gamma percentile (KM)	0.236
95% gamma percentile (KM)	0.247	99% gamma percentile (KM)	0.268

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (N/A, α)	1422	Adjusted Chi Square Value (N/A, β)	1410
95% KM Approximate Gamma UCL	0.214	95% KM Adjusted Gamma UCL	0.216

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.984	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.789	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.224	Lilliefors GOF Test
10% Lilliefors Critical Value	0.389	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.2	Mean in Log Scale	-1.617
SD in Original Scale	0.0259	SD in Log Scale	0.125
95% t UCL (assumes normality of ROS data)	0.213	95% Percentile Bootstrap UCL	0.212
95% BCA Bootstrap UCL	0.214	95% Bootstrap t UCL	0.217
95% H-UCL (Log ROS)	0.213		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.608	KM Geo Mean	0.2
KM SD (logged)	0.106	95% Critical H Value (KM-Log)	1.766
KM Standard Error of Mean (logged)	0.0417	95% H-UCL (KM -Log)	0.213
KM SD (logged)	0.106	95% Critical H Value (KM-Log)	1.766
KM Standard Error of Mean (logged)	0.0417		

DL/2 Statistics

DL/2 Normal	DL/2 Log-Transformed		
Mean in Original Scale	0.176	Mean in Log Scale	-1.852
SD in Original Scale	0.0868	SD in Log Scale	0.494
95% t UCL (Assumes normality)	0.219	95% H-Stat UCL	0.239

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.218
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician

MW-16S TCE

General Statistics

Total Number of Observations	13	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	5.6	Mean	13.68
Maximum	20	Median	15
SD	4.889	Std. Error of Mean	1.356
Coefficient of Variation	0.357	Skewness	-0.585

Normal GOF Test

Shapiro Wilk Test Statistic	0.904	Shapiro Wilk GOF Test	
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.219	Lilliefors GOF Test	
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	16.09	95% Adjusted-CLT UCL (Chen-1995)	15.67
		95% Modified-t UCL (Johnson-1978)	16.06

Gamma GOF Test

A-D Test Statistic	0.8	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.735	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.267	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.237	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			

Gamma Statistics

k hat (MLE)	6.724	k star (bias corrected MLE)	5.224
Theta hat (MLE)	2.034	Theta star (bias corrected MLE)	2.618
nu hat (MLE)	174.8	nu star (bias corrected)	135.8
MLE Mean (bias corrected)	13.68	MLE Sd (bias corrected)	5.984
		Approximate Chi Square Value (0.05)	109.9
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	106.6

Assuming Gamma Distribution

95% Approximate Gamma UCL	16.9	95% Adjusted Gamma UCL	17.43
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Lognormal GOF Test

Shapiro Wilk Test Statistic	0.848	Shapiro Wilk Lognormal GOF Test	
10% Shapiro Wilk Critical Value	0.889	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.283	Lilliefors Lognormal GOF Test	
10% Lilliefors Critical Value	0.215	Data Not Lognormal at 10% Significance Level	
Data Not Lognormal at 10% Significance Level			

Lognormal Statistics

Minimum of Logged Data	1.723	Mean of logged Data	2.54
Maximum of Logged Data	2.996	SD of logged Data	0.434

Assuming Lognormal Distribution

95% H-UCL	17.98	90% Chebyshev (MVUE) UCL	18.91
95% Chebyshev (MVUE) UCL	21.21	97.5% Chebyshev (MVUE) UCL	24.41
99% Chebyshev (MVUE) UCL	30.7		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	15.91	95% BCA Bootstrap UCL	15.53
95% Standard Bootstrap UCL	15.84	95% Bootstrap-t UCL	15.87
95% Hall's Bootstrap UCL	15.59	95% Percentile Bootstrap UCL	15.75
90% Chebyshev(Mean, Sd) UCL	17.74	95% Chebyshev(Mean, Sd) UCL	19.59
97.5% Chebyshev(Mean, Sd) UCL	22.14	99% Chebyshev(Mean, Sd) UCL	27.17

Suggested UCL to Use

95% Student's-t UCL

16.09

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

MW-20M TCE

General Statistics

Total Number of Observations	13	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	0.85	Mean	15.69
Maximum	32	Median	18
SD	9.099	Std. Error of Mean	2.524
Coefficient of Variation	0.58	Skewness	-0.256

Normal GOF Test

Shapiro Wilk Test Statistic	0.946	Shapiro Wilk GOF Test	
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.153	Lilliefors GOF Test	
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	20.19	95% Adjusted-CLT UCL (Chen-1995)	19.65
		95% Modified-t UCL (Johnson-1978)	20.16

Gamma GOF Test

A-D Test Statistic	1.063	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.749	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.287	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.241	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			

Gamma Statistics

k hat (MLE)	1.572	k star (bias corrected MLE)	1.261
Theta hat (MLE)	9.978	Theta star (bias corrected MLE)	12.44
nu hat (MLE)	40.88	nu star (bias corrected)	32.78
MLE Mean (bias corrected)	15.69	MLE Sd (bias corrected)	13.97
		Approximate Chi Square Value (0.05)	20.69
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	19.33

Assuming Gamma Distribution

95% Approximate Gamma UCL	24.85	95% Adjusted Gamma UCL	26.6
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Lognormal GOF Test

Shapiro Wilk Test Statistic	0.762	Shapiro Wilk Lognormal GOF Test	
10% Shapiro Wilk Critical Value	0.889	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.327	Lilliefors Lognormal GOF Test	
10% Lilliefors Critical Value	0.215	Data Not Lognormal at 10% Significance Level	
Data Not Lognormal at 10% Significance Level			

Lognormal Statistics

Minimum of Logged Data	-0.163	Mean of logged Data	2.402
Maximum of Logged Data	3.466	SD of logged Data	1.117

Assuming Lognormal Distribution

95% H-UCL	55.15	90% Chebyshev (MVUE) UCL	38.67
95% Chebyshev (MVUE) UCL	47.48	97.5% Chebyshev (MVUE) UCL	59.7
99% Chebyshev (MVUE) UCL	83.72		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	19.84	95% BCA Bootstrap UCL	19.65
95% Standard Bootstrap UCL	19.81	95% Bootstrap-t UCL	20.02
95% Hall's Bootstrap UCL	19.95	95% Percentile Bootstrap UCL	19.69
90% Chebyshev(Mean, Sd) UCL	23.26	95% Chebyshev(Mean, Sd) UCL	26.69
97.5% Chebyshev(Mean, Sd) UCL	31.45	99% Chebyshev(Mean, Sd) UCL	40.8

Suggested UCL to Use

95% Student's-t UCL

20.19

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

MW-20M Cis-1,2 DCE

General Statistics

Total Number of Observations	13	Number of Distinct Observations	8
Number of Detects	3	Number of Non-Detects	10
Number of Distinct Detects	3	Number of Distinct Non-Detects	5
Minimum Detect	0.31	Minimum Non-Detect	0.24
Maximum Detect	0.81	Maximum Non-Detect	1.4
Variance Detects	0.0721	Percent Non-Detects	76.92%
Mean Detects	0.503	SD Detects	0.269
Median Detects	0.39	CV Detects	0.534
Skewness Detects	1.561	Kurtosis Detects	N/A
Mean of Logged Detects	-0.775	SD of Logged Detects	0.502

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.866	Shapiro Wilk GOF Test	
1% Shapiro Wilk Critical Value	0.753	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.33	Lilliefors GOF Test	
1% Lilliefors Critical Value	0.429	Detected Data appear Normal at 1% Significance Level	
Detected Data appear Normal at 1% Significance Level			
Note GOF tests may be unreliable for small sample sizes			

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.308	KM Standard Error of Mean	0.0561
90KM SD	0.158	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.408	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.4	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.476	95% KM Chebyshev UCL	0.552
97.5% KM Chebyshev UCL	0.658	99% KM Chebyshev UCL	0.866

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.389	Anderson-Darling GOF Test	
5% A-D Critical Value	0.637	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.34	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.433	Detected data appear Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			

Gamma Statistics on Detected Data Only

k hat (MLE)	5.843	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0861	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	35.06	nu star (bias corrected)	N/A
Mean (detects)	0.503		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.124
Maximum	0.81	Median	0.01
SD	0.243	CV	1.958
k hat (MLE)	0.403	k star (bias corrected MLE)	0.361
Theta hat (MLE)	0.308	Theta star (bias corrected MLE)	0.343
nu hat (MLE)	10.47	nu star (bias corrected)	9.387
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (9.39, α)	3.562	Adjusted Chi Square Value (9.39, β)	3.069
95% Gamma Approximate UCL	0.326	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.308	SD (KM)	0.158
Variance (KM)	0.025	SE of Mean (KM)	0.0561

k hat (KM)	3.785	k star (KM)	2.963
nu hat (KM)	98.41	nu star (KM)	77.04
theta hat (KM)	0.0813	theta star (KM)	0.104
80% gamma percentile (KM)	0.439	90% gamma percentile (KM)	0.547
95% gamma percentile (KM)	0.648	99% gamma percentile (KM)	0.866

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (77.04, α)	57.82	Adjusted Chi Square Value (77.04, β)	55.45
95% KM Approximate Gamma UCL	0.41	95% KM Adjusted Gamma UCL	0.427

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.917	Shapiro Wilk GOF Test	
10% Shapiro Wilk Critical Value	0.789	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.297	Lilliefors GOF Test	
10% Lilliefors Critical Value	0.389	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Note GOF tests may be unreliable for small sample sizes			

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.193	Mean in Log Scale	-2.012
SD in Original Scale	0.211	SD in Log Scale	0.83
95% t UCL (assumes normality of ROS data)	0.297	95% Percentile Bootstrap UCL	0.301
95% BCA Bootstrap UCL	0.343	95% Bootstrap t UCL	0.446
95% H-UCL (Log ROS)	0.349		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.258	KM Geo Mean	0.284
KM SD (logged)	0.35	95% Critical H Value (KM-Log)	1.954
KM Standard Error of Mean (logged)	0.125	95% H-UCL (KM -Log)	0.368
KM SD (logged)	0.35	95% Critical H Value (KM-Log)	1.954
KM Standard Error of Mean (logged)	0.125		

DL/2 Statistics

DL/2 Normal	DL/2 Log-Transformed		
Mean in Original Scale	0.282	Mean in Log Scale	-1.507
SD in Original Scale	0.231	SD in Log Scale	0.682
95% t UCL (Assumes normality)	0.396	95% H-Stat UCL	0.443

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.408
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

MW-143S PCE

General Statistics

Total Number of Observations	13	Number of Distinct Observations	11
Number of Detects	12	Number of Non-Detects	1
Number of Distinct Detects	10	Number of Distinct Non-Detects	1
Minimum Detect	0.51	Minimum Non-Detect	0.15
Maximum Detect	1.1	Maximum Non-Detect	0.15
Variance Detects	0.0435	Percent Non-Detects	7.69%
Mean Detects	0.747	SD Detects	0.209
Median Detects	0.77	CV Detects	0.279
Skewness Detects	0.56	Kurtosis Detects	-0.646
Mean of Logged Detects	-0.327	SD of Logged Detects	0.275

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.884	Shapiro Wilk GOF Test	
1% Shapiro Wilk Critical Value	0.805	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.19	Lilliefors GOF Test	
1% Lilliefors Critical Value	0.281	Detected Data appear Normal at 1% Significance Level	
Detected Data appear Normal at 1% Significance Level			

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.701	KM Standard Error of Mean	0.0722
90KM SD	0.249	95% KM (BCA) UCL	0.812
95% KM (t) UCL	0.829	95% KM (Percentile Bootstrap) UCL	0.815
95% KM (z) UCL	0.819	95% KM Bootstrap t UCL	0.82
90% KM Chebyshev UCL	0.917	95% KM Chebyshev UCL	1.015
97.5% KM Chebyshev UCL	1.152	99% KM Chebyshev UCL	1.419

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.527	Anderson-Darling GOF Test	
5% A-D Critical Value	0.731	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.197	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.245	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			

Gamma Statistics on Detected Data Only

k hat (MLE)	14.45	k star (bias corrected MLE)	10.89
Theta hat (MLE)	0.0517	Theta star (bias corrected MLE)	0.0686
nu hat (MLE)	346.8	nu star (bias corrected)	261.4
Mean (detects)	0.747		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
 For such situations, GROS method may yield incorrect values of UCLs and BTVs
 This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.318	Mean	0.714
Maximum	1.1	Median	0.76
SD	0.232	CV	0.326
k hat (MLE)	9.632	k star (bias corrected MLE)	7.46
Theta hat (MLE)	0.0741	Theta star (bias corrected MLE)	0.0957
nu hat (MLE)	250.4	nu star (bias corrected)	194
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (193.96, β)	162.7	Adjusted Chi Square Value (193.96, β)	158.7
95% Gamma Approximate UCL	0.851	95% Gamma Adjusted UCL	0.872

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.701	SD (KM)	0.249
Variance (KM)	0.0621	SE of Mean (KM)	0.0722
k hat (KM)	7.91	k star (KM)	6.136
nu hat (KM)	205.7	nu star (KM)	159.5
theta hat (KM)	0.0886	theta star (KM)	0.114
80% gamma percentile (KM)	0.921	90% gamma percentile (KM)	1.079
95% gamma percentile (KM)	1.221	99% gamma percentile (KM)	1.52

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (159.53, α)	131.3	Adjusted Chi Square Value (159.53, β)	127.7
95% KM Approximate Gamma UCL	0.851	95% KM Adjusted Gamma UCL	0.876

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.9	Shapiro Wilk GOF Test	
10% Shapiro Wilk Critical Value	0.883	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.183	Lilliefors GOF Test	
10% Lilliefors Critical Value	0.223	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.718	Mean in Log Scale	-0.378
SD in Original Scale	0.225	SD in Log Scale	0.322
95% t UCL (assumes normality of ROS data)	0.829	95% Percentile Bootstrap UCL	0.819
95% BCA Bootstrap UCL	0.821	95% Bootstrap t UCL	0.841
95% H-UCL (Log ROS)	0.863		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.448	KM Geo Mean	0.639
KM SD (logged)	0.489	95% Critical H Value (KM-Log)	2.099
KM Standard Error of Mean (logged)	0.142	95% H-UCL (KM -Log)	0.969
KM SD (logged)	0.489	95% Critical H Value (KM-Log)	2.099
KM Standard Error of Mean (logged)	0.142		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.695	Mean in Log Scale	-0.501
SD in Original Scale	0.273	SD in Log Scale	0.681
95% t UCL (Assumes normality)	0.83	95% H-Stat UCL	1.211

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.829
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.