

## Output Crap SP3

## UCL Statistics for Uncensored Full Data Sets

User Selected Options  
 Date/Time of Computation ProUCL 5.102/04/2019 15:50:28  
 From File input Crap parco\_SP.xls  
 Full Precision OFF  
 Confidence Coefficient 95%  
 Number of Bootstrap Operations 2000

Antimonio

## General Statistics

Total Number of Observations	23,00	Number of Distinct Observations	23,00
		Number of Missing Observations	0
Minimum	0,215	Mean	0,987
Maximum	4,766	Median	0,500
SD	1,094	Std. Error of Mean	0,228
Coefficient of Variation	1,108	Skewness	2,361

## Normal GOF Test

Shapiro Wilk Test Statistic	0,691	<b>Shapiro Wilk GOF Test</b>
5% Shapiro Wilk Critical Value	0,914	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0,269	<b>Lilliefors GOF Test</b>
5% Lilliefors Critical Value	0,180	Data Not Normal at 5% Significance Level

**Data Not Normal at 5% Significance Level**

## Assuming Normal Distribution

<b>95% Normal UCL</b>		<b>95% UCLs (Adjusted for Skewness)</b>	
95% Student's-t UCL	1,379	95% Adjusted-CLT UCL (Chen-1995)	1,482
		95% Modified-t UCL (Johnson-1978)	1,398

## Gamma GOF Test

A-D Test Statistic	1,098	<b>Anderson-Darling Gamma GOF Test</b>
5% A-D Critical Value	0,762	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0,186	<b>Kolmogorov-Smirnov Gamma GOF Test</b>
5% K-S Critical Value	0,185	Data Not Gamma Distributed at 5% Significance Level

**Data Not Gamma Distributed at 5% Significance Level**

## Gamma Statistics

k hat (MLE)	1,391	k star (bias corrected MLE)	1,238
Theta hat (MLE)	0,710	Theta star (bias corrected MLE)	0,797
nu hat (MLE)	63,98	nu star (bias corrected)	56,97
MLE Mean (bias corrected)	0,987	MLE Sd (bias corrected)	0,887
		Approximate Chi Square Value (0,0500)	40,62
Adjusted Level of Significance	0,0389	Adjusted Chi Square Value	39,62

## Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1,385	95% Adjusted Gamma UCL (use when n<50)	1,420
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## Lognormal GOF Test

Shapiro Wilk Test Statistic	0,933	<b>Shapiro Wilk Lognormal GOF Test</b>
5% Shapiro Wilk Critical Value	0,914	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0,150	<b>Lilliefors Lognormal GOF Test</b>
5% Lilliefors Critical Value	0,180	Data appear Lognormal at 5% Significance Level

**Data appear Lognormal at 5% Significance Level**

## Lognormal Statistics

Minimum of Logged Data	-1,539	Mean of logged Data	-0,414
Maximum of Logged Data	1,562	SD of logged Data	0,853

## Assuming Lognormal Distribution

<b>95% H-UCL</b>	<b>1,457</b>	90% Chebyshev (MVUE) UCL	1,480
95% Chebyshev (MVUE) UCL	1,729	97,5% Chebyshev (MVUE) UCL	2,073
99% Chebyshev (MVUE) UCL	2,750		

## Nonparametric Distribution Free UCL Statistics

**Data appear to follow a Discernible Distribution at 5% Significance Level**

## Nonparametric Distribution Free UCLs

95% CLT UCL	1,362	95% Jackknife UCL	1,379
95% Standard Bootstrap UCL	1,346	95% Bootstrap-t UCL	1,639
95% Hall's Bootstrap UCL	1,862	95% Percentile Bootstrap UCL	1,394
95% BCA Bootstrap UCL	1,465		
90% Chebyshev(Mean, Sd) UCL	1,672	95% Chebyshev(Mean, Sd) UCL	1,982
97,5% Chebyshev(Mean, Sd) UCL	2,412	99% Chebyshev(Mean, Sd) UCL	3,257

## Suggested UCL to Use

**95% H-UCL 1,457**

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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**

**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**

**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**

**Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.**

## Output Crap SP3

Arsenico

General Statistics			
Total Number of Observations	101,0	Number of Distinct Observations	93,00
		Number of Missing Observations	0
Minimum	2,500	Mean	77,38
Maximum	4960	Median	13,16
SD	493,5	Std. Error of Mean	49,10
Coefficient of Variation	6,377	Skewness	9,884
Normal GOF Test			
Shapiro Wilk Test Statistic	0,142	Shapiro Wilk GOF Test	
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0,440	Lilliefors GOF Test	
5% Lilliefors Critical Value	0,0884	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	158,9	95% Adjusted-CLT UCL (Chen-1995)	209,7
		95% Modified-t UCL (Johnson-1978)	166,9
Gamma GOF Test			
A-D Test Statistic	16,99	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0,839	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0,318	Kolmogorov-Smlrnov Gamma GOF Test	
5% K-S Critical Value	0,0954	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0,417	k star (bias corrected MLE)	0,411
Theta hat (MLE)	185,6	Theta star (bias corrected MLE)	188,2
nu hat (MLE)	84,21	nu star (bias corrected)	83,04
MLE Mean (bias corrected)	77,38	MLE Sd (bias corrected)	120,7
		Approximate Chi Square Value (0,0500)	63,04
Adjusted Level of Significance	0,0476	Adjusted Chi Square Value	62,79
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	101,9	95% Adjusted Gamma UCL (use when n<50)	102,3
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0,880	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk P Value	1,736E-11	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0,148	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0,0884	Data Not Lognormal at 5% Significance Level	
Data Not Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	0,916	Mean of logged Data	2,781
Maximum of Logged Data	8,509	SD of logged Data	1,133
Assuming Lognormal Distribution			
95% H-UCL	39,88	90% Chebyshev (MVUE) UCL	43,10
95% Chebyshev (MVUE) UCL	48,89	97,5% Chebyshev (MVUE) UCL	56,92
99% Chebyshev (MVUE) UCL	72,71		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution (0.05)			
Nonparametric Distribution Free UCLs			
95% CLT UCL	158,1	95% Jackknife UCL	158,9
95% Standard Bootstrap UCL	158,6	95% Bootstrap-t UCL	802,4
95% Hall's Bootstrap UCL	527,1	95% Percentile Bootstrap UCL	174,5
95% BCA Bootstrap UCL	233,5		
90% Chebyshev(Mean, Sd) UCL	224,7	95% Chebyshev(Mean, Sd) UCL	291,4
97,5% Chebyshev(Mean, Sd) UCL	384,0	99% Chebyshev(Mean, Sd) UCL	565,9
Suggested UCL to Use			
95% Chebyshev (Mean, Sd) UCL	291,4		

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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

## Output Crap SP3

Cobalto

## General Statistics

Total Number of Observations	24,00	Number of Distinct Observations	24,00
		Number of Missing Observations	0
Minimum	1,464	Mean	6,694
Maximum	12,24	Median	6,258
SD	2,722	Std. Error of Mean	0,556
Coefficient of Variation	0,407	Skewness	0,190

## Normal GOF Test

Shapiro Wilk Test Statistic	0,984	<b>Shapiro Wilk GOF Test</b>
5% Shapiro Wilk Critical Value	0,916	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0,0989	<b>Lilliefors GOF Test</b>
5% Lilliefors Critical Value	0,177	Data appear Normal at 5% Significance Level

**Data appear Normal at 5% Significance Level**

## Assuming Normal Distribution

<b>95% Normal UCL</b>		<b>95% UCLs (Adjusted for Skewness)</b>	
95% Student's-t UCL	7,646	95% Adjusted-CLT UCL (Chen-1995)	7,631
		95% Modified-t UCL (Johnson-1978)	7,650

## Gamma GOF Test

A-D Test Statistic	0,260	<b>Anderson-Darling Gamma GOF Test</b>
5% A-D Critical Value	0,746	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0,0923	<b>Kolmogorov-Smirnov Gamma GOF Test</b>
5% K-S Critical Value	0,178	Detected data appear Gamma Distributed at 5% Significance Level

**Detected data appear Gamma Distributed at 5% Significance Level**

## Gamma Statistics

k hat (MLE)	5,244	k star (bias corrected MLE)	4,617
Theta hat (MLE)	1,276	Theta star (bias corrected MLE)	1,450
nu hat (MLE)	251,7	nu star (bias corrected)	221,6
MLE Mean (bias corrected)	6,694	MLE Sd (bias corrected)	3,115
		Approximate Chi Square Value (0,0500)	188,1
Adjusted Level of Significance	0,0392	Adjusted Chi Square Value	186,0

## Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	7,884	95% Adjusted Gamma UCL (use when n<50)	7,976
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## Lognormal GOF Test

Shapiro Wilk Test Statistic	0,919	<b>Shapiro Wilk Lognormal GOF Test</b>
5% Shapiro Wilk Critical Value	0,916	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0,108	<b>Lilliefors Lognormal GOF Test</b>
5% Lilliefors Critical Value	0,177	Data appear Lognormal at 5% Significance Level

**Data appear Lognormal at 5% Significance Level**

## Lognormal Statistics

Minimum of Logged Data	0,381	Mean of logged Data	1,803
Maximum of Logged Data	2,505	SD of logged Data	0,492

## Assuming Lognormal Distribution

95% H-UCL	8,383	90% Chebyshev (MVUE) UCL	8,941
95% Chebyshev (MVUE) UCL	9,906	97,5% Chebyshev (MVUE) UCL	11,25
99% Chebyshev (MVUE) UCL	13,88		

## Nonparametric Distribution Free UCL Statistics

**Data appear to follow a Discernible Distribution at 5% Significance Level**

## Nonparametric Distribution Free UCLs

95% CLT UCL	7,608	95% Jackknife UCL	7,646
95% Standard Bootstrap UCL	7,564	95% Bootstrap-t UCL	7,730
95% Hall's Bootstrap UCL	7,649	95% Percentile Bootstrap UCL	7,572
95% BCA Bootstrap UCL	7,593		
90% Chebyshev(Mean, Sd) UCL	8,361	95% Chebyshev(Mean, Sd) UCL	9,116
97,5% Chebyshev(Mean, Sd) UCL	10,16	99% Chebyshev(Mean, Sd) UCL	12,22

## Suggested UCL to Use

95% Student's-t UCL 7,646

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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

## Output Crap SP3

Mercurio

## General Statistics

Total Number of Observations	92,00	Number of Distinct Observations	84,00
		Number of Missing Observations	0
Minimum	0,100	Mean	12,04
Maximum	221,3	Median	1,615
SD	28,87	Std. Error of Mean	3,010
Coefficient of Variation	2,398	Skewness	4,918

## Normal GOF Test

Shapiro Wilk Test Statistic	0,467
5% Shapiro Wilk P Value	0
Lilliefors Test Statistic	0,340
5% Lilliefors Critical Value	0,0926

## Shapiro Wilk GOF Test

Data Not Normal at 5% Significance Level

## Lilliefors GOF Test

Data Not Normal at 5% Significance Level

**Data Not Normal at 5% Significance Level**

## Assuming Normal Distribution

## 95% Normal UCL

95% Student's-t UCL	17,04
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## 95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	18,64
95% Modified-t UCL (Johnson-1978)	17,30

## Gamma GOF Test

A-D Test Statistic	5,466
5% A-D Critical Value	0,842
K-S Test Statistic	0,202
5% K-S Critical Value	0,0999

## Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

## Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

**Data Not Gamma Distributed at 5% Significance Level**

## Gamma Statistics

k hat (MLE)	0,405	k star (bias corrected MLE)	0,399
Theta hat (MLE)	29,71	Theta star (bias corrected MLE)	30,16
nu hat (MLE)	74,55	nu star (bias corrected)	73,45
MLE Mean (bias corrected)	12,04	MLE Sd (bias corrected)	19,05
		Approximate Chi Square Value (0,0500)	54,72
Adjusted Level of Significance	0,0474	Adjusted Chi Square Value	54,46

## Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	16,16	95% Adjusted Gamma UCL (use when n<50)	16,24
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## Lognormal GOF Test

Shapiro Wilk Test Statistic	0,950
5% Shapiro Wilk P Value	0,00436
Lilliefors Test Statistic	0,0952
5% Lilliefors Critical Value	0,0926

## Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 5% Significance Level

## Lilliefors Lognormal GOF Test

Data Not Lognormal at 5% Significance Level

**Data Not Lognormal at 5% Significance Level**

## Lognormal Statistics

Minimum of Logged Data	-2,303	Mean of logged Data	0,867
Maximum of Logged Data	5,400	SD of logged Data	1,779

## Assuming Lognormal Distribution

95% H-UCL	20,70	90% Chebyshev (MVUE) UCL	20,27
95% Chebyshev (MVUE) UCL	24,42	97,5% Chebyshev (MVUE) UCL	30,18
99% Chebyshev (MVUE) UCL	41,51		

## Nonparametric Distribution Free UCL Statistics

**Data do not follow a Discernible Distribution (0.05)**

## Nonparametric Distribution Free UCLs

95% CLT UCL	16,99	95% Jackknife UCL	17,04
95% Standard Bootstrap UCL	16,92	95% Bootstrap-t UCL	20,42
95% Hall's Bootstrap UCL	36,33	95% Percentile Bootstrap UCL	17,36
95% BCA Bootstrap UCL	19,04		
90% Chebyshev(Mean, Sd) UCL	21,07	95% Chebyshev(Mean, Sd) UCL	25,16
97,5% Chebyshev(Mean, Sd) UCL	30,84	99% Chebyshev(Mean, Sd) UCL	41,99

## Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 25,16

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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

## Output Crap SP3

Piombo

## General Statistics

Total Number of Observations	101,0	Number of Distinct Observations	94,00
		Number of Missing Observations	0
Minimum	3,333	Mean	105,2
Maximum	4067	Median	29,40
SD	423,8	Std. Error of Mean	42,17
Coefficient of Variation	4,029	Skewness	8,501

## Normal GOF Test

Shapiro Wilk Test Statistic	0,231
5% Shapiro Wilk P Value	0
Lilliefors Test Statistic	0,407
5% Lilliefors Critical Value	0,0884

## Shapiro Wilk GOF Test

Data Not Normal at 5% Significance Level

## Lilliefors GOF Test

Data Not Normal at 5% Significance Level

**Data Not Normal at 5% Significance Level**

## Assuming Normal Distribution

## 95% Normal UCL

95% Student's-t UCL	175,2
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## 95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	212,7
95% Modified-t UCL (Johnson-1978)	181,1

## Gamma GOF Test

A-D Test Statistic	10,95
5% A-D Critical Value	0,817
K-S Test Statistic	0,264
5% K-S Critical Value	0,0942

## Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

## Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

**Data Not Gamma Distributed at 5% Significance Level**

## Gamma Statistics

k hat (MLE)	0,519	k star (bias corrected MLE)	0,510
Theta hat (MLE)	202,8	Theta star (bias corrected MLE)	206,3
nu hat (MLE)	104,8	nu star (bias corrected)	103,0
MLE Mean (bias corrected)	105,2	MLE Sd (bias corrected)	147,3
		Approximate Chi Square Value (0,0500)	80,57
Adjusted Level of Significance	0,0476	Adjusted Chi Square Value	80,29

## Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	134,5	95% Adjusted Gamma UCL (use when n<50)	134,9
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## Lognormal GOF Test

Shapiro Wilk Test Statistic	0,934
5% Shapiro Wilk P Value	4,6950E-5
Lilliefors Test Statistic	0,116
5% Lilliefors Critical Value	0,0884

## Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 5% Significance Level

## Lilliefors Lognormal GOF Test

Data Not Lognormal at 5% Significance Level

**Data Not Lognormal at 5% Significance Level**

## Lognormal Statistics

Minimum of Logged Data	1,204	Mean of logged Data	3,438
Maximum of Logged Data	8,311	SD of logged Data	1,205

## Assuming Lognormal Distribution

95% H-UCL	85,86	90% Chebyshev (MVUE) UCL	92,61
95% Chebyshev (MVUE) UCL	105,8	97,5% Chebyshev (MVUE) UCL	124,1
99% Chebyshev (MVUE) UCL	160,0		

## Nonparametric Distribution Free UCL Statistics

**Data do not follow a Discernible Distribution (0.05)**

## Nonparametric Distribution Free UCLs

95% CLT UCL	174,5	95% Jackknife UCL	175,2
95% Standard Bootstrap UCL	174,5	95% Bootstrap-t UCL	353,8
95% Hall's Bootstrap UCL	381,4	95% Percentile Bootstrap UCL	184,8
95% BCA Bootstrap UCL	246,4		
90% Chebyshev(Mean, Sd) UCL	231,7	95% Chebyshev(Mean, Sd) UCL	289,0
97,5% Chebyshev(Mean, Sd) UCL	368,5	99% Chebyshev(Mean, Sd) UCL	524,7

## Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 289,0

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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

## Output Crap SP3

Rame totale

## General Statistics

Total Number of Observations	101,0	Number of Distinct Observations	98,00
		Number of Missing Observations	0
Minimum	3,500	Mean	350,3
Maximum	23216	Median	24,36
SD	2360	Std. Error of Mean	234,8
Coefficient of Variation	6,737	Skewness	9,356

## Normal GOF Test

Shapiro Wilk Test Statistic	0,152
5% Shapiro Wilk P Value	0
Lilliefors Test Statistic	0,464
5% Lilliefors Critical Value	0,0884

## Shapiro Wilk GOF Test

Data Not Normal at 5% Significance Level

## Lilliefors GOF Test

Data Not Normal at 5% Significance Level

**Data Not Normal at 5% Significance Level**

## Assuming Normal Distribution

## 95% Normal UCL

95% Student's-t UCL	740,2
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## 95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	970,2
95% Modified-t UCL (Johnson-1978)	776,6

## Gamma GOF Test

A-D Test Statistic	22,67
5% A-D Critical Value	0,871
K-S Test Statistic	0,376
5% K-S Critical Value	0,0969

## Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

## Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

**Data Not Gamma Distributed at 5% Significance Level**

## Gamma Statistics

k hat (MLE)	0,293	k star (bias corrected MLE)	0,291
Theta hat (MLE)	1194	Theta star (bias corrected MLE)	1203
nu hat (MLE)	59,25	nu star (bias corrected)	58,83
MLE Mean (bias corrected)	350,3	MLE Sd (bias corrected)	649,1
		Approximate Chi Square Value (0,0500)	42,19
Adjusted Level of Significance	0,0476	Adjusted Chi Square Value	41,99

## Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	488,4	95% Adjusted Gamma UCL (use when n<50)	490,8
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## Lognormal GOF Test

Shapiro Wilk Test Statistic	0,804
5% Shapiro Wilk P Value	0
Lilliefors Test Statistic	0,210
5% Lilliefors Critical Value	0,0884

## Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 5% Significance Level

## Lilliefors Lognormal GOF Test

Data Not Lognormal at 5% Significance Level

**Data Not Lognormal at 5% Significance Level**

## Lognormal Statistics

Minimum of Logged Data	1,253	Mean of logged Data	3,499
Maximum of Logged Data	10,05	SD of logged Data	1,313

## Assuming Lognormal Distribution

95% H-UCL	108,9	90% Chebyshev (MVUE) UCL	116,9
95% Chebyshev (MVUE) UCL	134,8	97,5% Chebyshev (MVUE) UCL	159,8
99% Chebyshev (MVUE) UCL	208,9		

## Nonparametric Distribution Free UCL Statistics

**Data do not follow a Discernible Distribution (0.05)**

## Nonparametric Distribution Free UCLs

95% CLT UCL	736,6	95% Jackknife UCL	740,2
95% Standard Bootstrap UCL	726,6	95% Bootstrap-t UCL	3583
95% Hall's Bootstrap UCL	3187	95% Percentile Bootstrap UCL	793,6
95% BCA Bootstrap UCL	1247		
90% Chebyshev(Mean, Sd) UCL	1055	95% Chebyshev(Mean, Sd) UCL	1374
97,5% Chebyshev(Mean, Sd) UCL	1817	99% Chebyshev(Mean, Sd) UCL	2687

## Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 1374

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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

## Output Crap SP3

Selenio

General Statistics			
Total Number of Observations	29,00	Number of Distinct Observations	29,00
		Number of Missing Observations	0
Minimum	0,123	Mean	1,201
Maximum	4,960	Median	0,477
SD	1,511	Std. Error of Mean	0,281
Coefficient of Variation	1,258	Skewness	1,425
Normal GOF Test			
Shapiro Wilk Test Statistic	0,710	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0,926	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0,323	Lilliefors GOF Test	
5% Lilliefors Critical Value	0,161	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	1,679	95% Adjusted-CLT UCL (Chen-1995)	1,742
		95% Modified-t UCL (Johnson-1978)	1,691
Gamma GOF Test			
A-D Test Statistic	1,817	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0,782	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0,247	Kolmogorov-Smlrnov Gamma GOF Test	
5% K-S Critical Value	0,169	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0,805	k star (bias corrected MLE)	0,745
Theta hat (MLE)	1,493	Theta star (bias corrected MLE)	1,613
nu hat (MLE)	46,68	nu star (bias corrected)	43,18
MLE Mean (bias corrected)	1,201	MLE Sd (bias corrected)	1,392
		Approximate Chi Square Value (0,0500)	29,11
Adjusted Level of Significance	0,0407	Adjusted Chi Square Value	28,42
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=>50))	1,782	95% Adjusted Gamma UCL (use when n<50)	1,825
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0,890	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0,926	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0,172	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0,161	Data Not Lognormal at 5% Significance Level	
Data Not Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-2,092	Mean of logged Data	-0,554
Maximum of Logged Data	1,601	SD of logged Data	1,219
Assuming Lognormal Distribution			
95% H-UCL	2,276	90% Chebyshev (MVUE) UCL	2,100
95% Chebyshev (MVUE) UCL	2,526	97,5% Chebyshev (MVUE) UCL	3,118
99% Chebyshev (MVUE) UCL	4,280		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution (0.05)			
Nonparametric Distribution Free UCLs			
95% CLT UCL	1,663	95% Jackknife UCL	1,679
95% Standard Bootstrap UCL	1,650	95% Bootstrap-t UCL	1,763
95% Hall's Bootstrap UCL	1,692	95% Percentile Bootstrap UCL	1,686
95% BCA Bootstrap UCL	1,716		
90% Chebyshev(Mean, Sd) UCL	2,043	95% Chebyshev(Mean, Sd) UCL	2,425
97,5% Chebyshev(Mean, Sd) UCL	2,954	99% Chebyshev(Mean, Sd) UCL	3,994
Suggested UCL to Use			
95% Chebyshev (Mean, Sd) UCL	2,425		

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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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



## Output Crap SP3

Stagno

General Statistics			
Total Number of Observations	86,00	Number of Distinct Observations	61,00
		Number of Missing Observations	0
Minimum	0,100	Mean	3,017
Maximum	33,37	Median	1,500
SD	4,918	Std. Error of Mean	0,530
Coefficient of Variation	1,630	Skewness	4,006
Normal GOF Test			
Shapiro Wilk Test Statistic	0,544	Shapiro Wilk GOF Test	
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0,292	Lilliefors GOF Test	
5% Lilliefors Critical Value	0,0957	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	3,899	95% Adjusted-CLT UCL (Chen-1995)	4,135
		95% Modified-t UCL (Johnson-1978)	3,938
Gamma GOF Test			
A-D Test Statistic	2,789	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0,789	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0,182	Kolmogorov-Smlrnov Gamma GOF Test	
5% K-S Critical Value	0,0998	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0,853	k star (bias corrected MLE)	0,831
Theta hat (MLE)	3,536	Theta star (bias corrected MLE)	3,630
nu hat (MLE)	146,8	nu star (bias corrected)	143,0
MLE Mean (bias corrected)	3,017	MLE Sd (bias corrected)	3,310
		Approximate Chi Square Value (0,0500)	116,3
Adjusted Level of Significance	0,0472	Adjusted Chi Square Value	115,9
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	3,708	95% Adjusted Gamma UCL (use when n<50)	3,721
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0,970	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk P Value	0,179	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0,122	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0,0957	Data Not Lognormal at 5% Significance Level	
Data appear Approximate Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-2,303	Mean of logged Data	0,415
Maximum of Logged Data	3,508	SD of logged Data	1,161
Assuming Lognormal Distribution			
95% H-UCL	4,019	90% Chebyshev (MVUE) UCL	4,312
95% Chebyshev (MVUE) UCL	4,937	97,5% Chebyshev (MVUE) UCL	5,804
99% Chebyshev (MVUE) UCL	7,507		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	3,890	95% Jackknife UCL	3,899
95% Standard Bootstrap UCL	3,906	95% Bootstrap-t UCL	4,397
95% Hall's Bootstrap UCL	4,349	95% Percentile Bootstrap UCL	3,982
95% BCA Bootstrap UCL	4,132		
90% Chebyshev(Mean, Sd) UCL	4,609	95% Chebyshev(Mean, Sd) UCL	5,329
97,5% Chebyshev(Mean, Sd) UCL	6,329	99% Chebyshev(Mean, Sd) UCL	8,294
Suggested UCL to Use			
95% H-UCL	4,019		

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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**

**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**

**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

## Output Crap SP3

Tallio

General Statistics			
Total Number of Observations	20,00	Number of Distinct Observations	19,00
		Number of Missing Observations	0
Minimum	0,0972	Mean	0,249
Maximum	0,799	Median	0,189
SD	0,172	Std. Error of Mean	0,0384
Coefficient of Variation	0,690	Skewness	1,955
Normal GOF Test			
Shapiro Wilk Test Statistic	0,794	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0,905	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0,225	Lilliefors GOF Test	
5% Lilliefors Critical Value	0,192	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0,315	95% Adjusted-CLT UCL (Chen-1995)	0,330
		95% Modified-t UCL (Johnson-1978)	0,318
Gamma GOF Test			
A-D Test Statistic	0,579	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0,748	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0,185	Kolmogorov-Smlrnov Gamma GOF Test	
5% K-S Critical Value	0,195	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	2,994	k star (bias corrected MLE)	2,578
Theta hat (MLE)	0,0831	Theta star (bias corrected MLE)	0,0965
nu hat (MLE)	119,7	nu star (bias corrected)	103,1
MLE Mean (bias corrected)	0,249	MLE Sd (bias corrected)	0,155
		Approximate Chi Square Value (0,0500)	80,68
Adjusted Level of Significance	0,0380	Adjusted Chi Square Value	79,12
Assuming Gamma Distribution			
ate Gamma UCL (use when n>=50)	0,318	95% Adjusted Gamma UCL (use when n<50)	0,324
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0,944	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0,905	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0,149	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0,192	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-2,331	Mean of logged Data	-1,568
Maximum of Logged Data	-0,224	SD of logged Data	0,585
Assuming Lognormal Distribution			
95% H-UCL	0,328	90% Chebyshev (MVUE) UCL	0,346
95% Chebyshev (MVUE) UCL	0,392	97,5% Chebyshev (MVUE) UCL	0,455
99% Chebyshev (MVUE) UCL	0,579		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0,312	95% Jackknife UCL	0,315
95% Standard Bootstrap UCL	0,310	95% Bootstrap-t UCL	0,348
95% Hall's Bootstrap UCL	0,368	95% Percentile Bootstrap UCL	0,314
95% BCA Bootstrap UCL	0,327		
90% Chebyshev(Mean, Sd) UCL	0,364	95% Chebyshev(Mean, Sd) UCL	0,416
97,5% Chebyshev(Mean, Sd) UCL	0,488	99% Chebyshev(Mean, Sd) UCL	0,630
Suggested UCL to Use			
95% Adjusted Gamma UCL	0,324		

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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

## Output Crap SP3

Zinco

## General Statistics

Total Number of Observations	42,00	Number of Distinct Observations	42,00
		Number of Missing Observations	0
Minimum	14,53	Mean	82,63
Maximum	644,8	Median	62,67
SD	105,9	Std. Error of Mean	16,34
Coefficient of Variation	1,282	Skewness	4,548

## Normal GOF Test

Shapiro Wilk Test Statistic	0,408
5% Shapiro Wilk Critical Value	0,942
Lilliefors Test Statistic	0,402
5% Lilliefors Critical Value	0,135

## Shapiro Wilk GOF Test

Data Not Normal at 5% Significance Level

## Lilliefors GOF Test

Data Not Normal at 5% Significance Level

**Data Not Normal at 5% Significance Level**

## Assuming Normal Distribution

## 95% Normal UCL

95% Student's-t UCL	110,1
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## 95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	121,8
95% Modified-t UCL (Johnson-1978)	112,0

## Gamma GOF Test

A-D Test Statistic	3,997
5% A-D Critical Value	0,761
K-S Test Statistic	0,288
5% K-S Critical Value	0,138

## Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

## Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

**Data Not Gamma Distributed at 5% Significance Level**

## Gamma Statistics

k hat (MLE)	1,896	k star (bias corrected MLE)	1,777
Theta hat (MLE)	43,57	Theta star (bias corrected MLE)	46,50
nu hat (MLE)	159,3	nu star (bias corrected)	149,2
MLE Mean (bias corrected)	82,63	MLE Sd (bias corrected)	61,99
		Approximate Chi Square Value (0,0500)	122,0
Adjusted Level of Significance	0,0443	Adjusted Chi Square Value	121,1

## Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	101,1	95% Adjusted Gamma UCL (use when n<50)	101,8
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## Lognormal GOF Test

Shapiro Wilk Test Statistic	0,820
5% Shapiro Wilk Critical Value	0,942
Lilliefors Test Statistic	0,212
5% Lilliefors Critical Value	0,135

## Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 5% Significance Level

## Lilliefors Lognormal GOF Test

Data Not Lognormal at 5% Significance Level

**Data Not Lognormal at 5% Significance Level**

## Lognormal Statistics

Minimum of Logged Data	2,676	Mean of logged Data	4,128
Maximum of Logged Data	6,469	SD of logged Data	0,645

## Assuming Lognormal Distribution

95% H-UCL	93,59	90% Chebyshev (MVUE) UCL	100,4
95% Chebyshev (MVUE) UCL	111,5	97,5% Chebyshev (MVUE) UCL	126,9
99% Chebyshev (MVUE) UCL	157,1		

## Nonparametric Distribution Free UCL Statistics

**Data do not follow a Discernible Distribution (0.05)**

## Nonparametric Distribution Free UCLs

95% CLT UCL	109,5	95% Jackknife UCL	110,1
95% Standard Bootstrap UCL	110,0	95% Bootstrap-t UCL	202,4
95% Hall's Bootstrap UCL	269,7	95% Percentile Bootstrap UCL	112,7
95% BCA Bootstrap UCL	126,2		
90% Chebyshev(Mean, Sd) UCL	131,7	95% Chebyshev(Mean, Sd) UCL	153,9
97,5% Chebyshev(Mean, Sd) UCL	184,7	99% Chebyshev(Mean, Sd) UCL	245,2

## Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 153,9

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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

## Output Crap SP3

Idrocarburi C &gt; 12

General Statistics			
Total Number of Observations	35,00	Number of Distinct Observations	34,00
		Number of Missing Observations	0
Minimum	7,222	Mean	137,8
Maximum	963,4	Median	44,07
SD	231,9	Std. Error of Mean	39,19
Coefficient of Variation	1,683	Skewness	2,863
Normal GOF Test			
Shapiro Wilk Test Statistic	0,568	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0,934	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0,319	Lilliefors GOF Test	
5% Lilliefors Critical Value	0,148	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	204,1	95% Adjusted-CLT UCL (Chen-1995)	222,5
		95% Modified-t UCL (Johnson-1978)	207,2
Gamma GOF Test			
A-D Test Statistic	1,752	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0,794	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0,166	Kolmogorov-Smlrnov Gamma GOF Test	
5% K-S Critical Value	0,155	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0,689	k star (bias corrected MLE)	0,649
Theta hat (MLE)	200,0	Theta star (bias corrected MLE)	212,3
nu hat (MLE)	48,23	nu star (bias corrected)	45,43
MLE Mean (bias corrected)	137,8	MLE Sd (bias corrected)	171,1
		Approximate Chi Square Value (0,0500)	30,97
Adjusted Level of Significance	0,0425	Adjusted Chi Square Value	30,40
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	202,2	95% Adjusted Gamma UCL (use when n<50)	205,9
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0,947	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0,934	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0,109	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0,148	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	1,977	Mean of logged Data	4,047
Maximum of Logged Data	6,870	SD of logged Data	1,275
Assuming Lognormal Distribution			
95% H-UCL	238,4	90% Chebyshev (MVUE) UCL	222,3
95% Chebyshev (MVUE) UCL	266,8	97,5% Chebyshev (MVUE) UCL	328,7
99% Chebyshev (MVUE) UCL	450,2		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	202,3	95% Jackknife UCL	204,1
95% Standard Bootstrap UCL	202,4	95% Bootstrap-t UCL	260,7
95% Hall's Bootstrap UCL	291,9	95% Percentile Bootstrap UCL	206,1
95% BCA Bootstrap UCL	219,9		
90% Chebyshev(Mean, Sd) UCL	255,4	95% Chebyshev(Mean, Sd) UCL	308,6
97,5% Chebyshev(Mean, Sd) UCL	382,6	99% Chebyshev(Mean, Sd) UCL	527,8
Suggested UCL to Use			
95% H-UCL	238,4		

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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**

**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**

**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

## Output Crap SP3

PCB totali

General Statistics			
Total Number of Observations	72,00	Number of Distinct Observations	66,00
		Number of Missing Observations	0
Minimum	0,00300	Mean	30,75
Maximum	758,7	Median	1,054
SD	104,8	Std. Error of Mean	12,35
Coefficient of Variation	3,408	Skewness	5,428
Normal GOF Test			
Shapiro Wilk Test Statistic	0,343	Shapiro Wilk GOF Test	
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0,393	Lilliefors GOF Test	
5% Lilliefors Critical Value	0,104	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	51,34	95% Adjusted-CLT UCL (Chen-1995)	59,51
		95% Modified-t UCL (Johnson-1978)	52,65
Gamma GOF Test			
A-D Test Statistic	6,105	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0,892	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0,224	Kolmogorov-Smlrnov Gamma GOF Test	
5% K-S Critical Value	0,116	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0,246	k star (bias corrected MLE)	0,245
Theta hat (MLE)	125,1	Theta star (bias corrected MLE)	125,6
nu hat (MLE)	35,39	nu star (bias corrected)	35,25
MLE Mean (bias corrected)	30,75	MLE Sd (bias corrected)	62,16
		Approximate Chi Square Value (0,0500)	22,66
Adjusted Level of Significance	0,0467	Adjusted Chi Square Value	22,46
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	47,83	95% Adjusted Gamma UCL (use when n<50)	48,27
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0,960	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk P Value	0,0627	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0,116	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0,104	Data Not Lognormal at 5% Significance Level	
Data appear Approximate Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-5,809	Mean of logged Data	0,528
Maximum of Logged Data	6,632	SD of logged Data	2,437
Assuming Lognormal Distribution			
95% H-UCL	104,4	90% Chebyshev (MVUE) UCL	68,81
95% Chebyshev (MVUE) UCL	87,08	97,5% Chebyshev (MVUE) UCL	112,4
99% Chebyshev (MVUE) UCL	162,2		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	51,07	95% Jackknife UCL	51,34
95% Standard Bootstrap UCL	51,21	95% Bootstrap-t UCL	78,36
95% Hall's Bootstrap UCL	109,5	95% Percentile Bootstrap UCL	52,26
95% BCA Bootstrap UCL	63,60		
90% Chebyshev(Mean, Sd) UCL	67,80	95% Chebyshev(Mean, Sd) UCL	84,59
97,5% Chebyshev(Mean, Sd) UCL	107,9	99% Chebyshev(Mean, Sd) UCL	153,6
Suggested UCL to Use			
95% H-UCL	104,4		

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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**

**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**

**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.



## Output Crap SP3

PCN

General Statistics			
Total Number of Observations	43,00	Number of Distinct Observations	38,00
		Number of Missing Observations	0
Minimum	0	Mean	19,97
Maximum	331,0	Median	2,300
SD	60,15	Std. Error of Mean	9,172
Coefficient of Variation	3,011	Skewness	4,401
Normal GOF Test			
Shapiro Wilk Test Statistic	0,370	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0,943	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0,370	Lilliefors GOF Test	
5% Lilliefors Critical Value	0,134	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	35,40	95% Adjusted-CLT UCL (Chen-1995)	41,64
		95% Modified-t UCL (Johnson-1978)	36,43
Gamma Statistics Not Available			
Lognormal Statistics Not Available			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution (0.05)			
Nonparametric Distribution Free UCLs			
95% CLT UCL	35,06	95% Jackknife UCL	35,40
95% Standard Bootstrap UCL	34,99	95% Bootstrap-t UCL	83,36
95% Hall's Bootstrap UCL	98,39	95% Percentile Bootstrap UCL	35,91
95% BCA Bootstrap UCL	44,70		
90% Chebyshev (Mean, Sd) UCL	47,49	95% Chebyshev (Mean, Sd) UCL	59,95
97,5% Chebyshev (Mean, Sd) UCL	77,25	99% Chebyshev (Mean, Sd) UCL	111,2
Suggested UCL to Use			
95% Chebyshev (Mean, Sd) UCL	59,95		

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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

PCT

General Statistics			
Total Number of Observations	31,00	Number of Distinct Observations	27,00
		Number of Missing Observations	0
Minimum	0,0571	Mean	3,507
Maximum	23,80	Median	1,100
SD	6,059	Std. Error of Mean	1,088
Coefficient of Variation	1,728	Skewness	2,632
Normal GOF Test			
Shapiro Wilk Test Statistic	0,597	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0,929	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0,295	Lilliefors GOF Test	
5% Lilliefors Critical Value	0,156	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	5,353	95% Adjusted-CLT UCL (Chen-1995)	5,846
		95% Modified-t UCL (Johnson-1978)	5,439
Gamma GOF Test			
A-D Test Statistic	1,036	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0,810	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0,164	Kolmogorov-Smlrnov Gamma GOF Test	
5% K-S Critical Value	0,167	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0,501	k star (bias corrected MLE)	0,474
Theta hat (MLE)	7,000	Theta star (bias corrected MLE)	7,399
nu hat (MLE)	31,06	nu star (bias corrected)	29,38
MLE Mean (bias corrected)	3,507	MLE Sd (bias corrected)	5,093

## Output Crap SP3

Adjusted Level of Significance	0,0413	Approximate Chi Square Value (0,0500)	18,01
		Adjusted Chi Square Value	17,51

**Assuming Gamma Distribution**

95% Approximate Gamma UCL (use when n>=50)	5,721	95% Adjusted Gamma UCL (use when n<50)	5,883
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**Lognormal GOF Test**

Shapiro Wilk Test Statistic	0,958	<b>Shapiro Wilk Lognormal GOF Test</b>	
5% Shapiro Wilk Critical Value	0,929	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0,0833	<b>Lilliefors Lognormal GOF Test</b>	
5% Lilliefors Critical Value	0,156	Data appear Lognormal at 5% Significance Level	

**Data appear Lognormal at 5% Significance Level****Lognormal Statistics**

Minimum of Logged Data	-2,863	Mean of logged Data	-0,0131
Maximum of Logged Data	3,170	SD of logged Data	1,706

**Assuming Lognormal Distribution**

95% H-UCL	12,10	90% Chebyshev (MVUE) UCL	8,404
95% Chebyshev (MVUE) UCL	10,48	97,5% Chebyshev (MVUE) UCL	13,37
99% Chebyshev (MVUE) UCL	19,03		

**Nonparametric Distribution Free UCL Statistics****Data appear to follow a Discernible Distribution at 5% Significance Level****Nonparametric Distribution Free UCLs**

95% CLT UCL	5,296	95% Jackknife UCL	5,353
95% Standard Bootstrap UCL	5,259	95% Bootstrap-t UCL	7,110
95% Hall's Bootstrap UCL	8,903	95% Percentile Bootstrap UCL	5,402
95% BCA Bootstrap UCL	5,956		
90% Chebyshev(Mean, Sd) UCL	6,771	95% Chebyshev(Mean, Sd) UCL	8,250
97,5% Chebyshev(Mean, Sd) UCL	10,30	99% Chebyshev(Mean, Sd) UCL	14,33

**Suggested UCL to Use**

95% Adjusted Gamma UCL	5,883
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When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

## Output Crap SP3

beta HCH

## General Statistics

Total Number of Observations	14,00	Number of Distinct Observations	14,00
		Number of Missing Observations	0
Minimum	0,0100	Mean	0,943
Maximum	11,72	Median	0,102
SD	3,104	Std. Error of Mean	0,829
Coefficient of Variation	3,291	Skewness	3,736

## Normal GOF Test

Shapiro Wilk Test Statistic	0,322
5% Shapiro Wilk Critical Value	0,874
Lilliefors Test Statistic	0,515
5% Lilliefors Critical Value	0,226

## Shapiro Wilk GOF Test

Data Not Normal at 5% Significance Level

## Lilliefors GOF Test

Data Not Normal at 5% Significance Level

**Data Not Normal at 5% Significance Level**

## Assuming Normal Distribution

## 95% Normal UCL

95% Student's-t UCL	2,412
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## 95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	3,192
95% Modified-t UCL (Johnson-1978)	2,550

## Gamma GOF Test

A-D Test Statistic	2,298
5% A-D Critical Value	0,830
K-S Test Statistic	0,413
5% K-S Critical Value	0,248

## Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

## Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

**Data Not Gamma Distributed at 5% Significance Level**

## Gamma Statistics

k hat (MLE)	0,309	k star (bias corrected MLE)	0,291
Theta hat (MLE)	3,049	Theta star (bias corrected MLE)	3,245
nu hat (MLE)	8,660	nu star (bias corrected)	8,138
MLE Mean (bias corrected)	0,943	MLE Sd (bias corrected)	1,749
		Approximate Chi Square Value (0,0500)	2,815
Adjusted Level of Significance	0,0312	Adjusted Chi Square Value	2,416

## Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2,726	95% Adjusted Gamma UCL (use when n<50)	3,176
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## Lognormal GOF Test

Shapiro Wilk Test Statistic	0,880
5% Shapiro Wilk Critical Value	0,874
Lilliefors Test Statistic	0,219
5% Lilliefors Critical Value	0,226

## Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 5% Significance Level

## Lilliefors Lognormal GOF Test

Data appear Lognormal at 5% Significance Level

**Data appear Lognormal at 5% Significance Level**

## Lognormal Statistics

Minimum of Logged Data	-4,605	Mean of logged Data	-2,277
Maximum of Logged Data	2,461	SD of logged Data	1,745

## Assuming Lognormal Distribution

95% H-UCL	3,537	90% Chebyshev (MVUE) UCL	0,978
95% Chebyshev (MVUE) UCL	1,249	97,5% Chebyshev (MVUE) UCL	1,626
99% Chebyshev (MVUE) UCL	2,367		

## Nonparametric Distribution Free UCL Statistics

**Data appear to follow a Discernible Distribution at 5% Significance Level**

## Nonparametric Distribution Free UCLs

95% CLT UCL	2,307	95% Jackknife UCL	2,412
95% Standard Bootstrap UCL	2,259	95% Bootstrap-t UCL	34,24
95% Hall's Bootstrap UCL	15,09	95% Percentile Bootstrap UCL	2,591
95% BCA Bootstrap UCL	3,430		
90% Chebyshev(Mean, Sd) UCL	3,431	95% Chebyshev(Mean, Sd) UCL	4,559
97,5% Chebyshev(Mean, Sd) UCL	6,123	99% Chebyshev(Mean, Sd) UCL	9,196

## Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	9,196
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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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

## Output Crap SP3

DDD, DDT, DDE

General Statistics			
Total Number of Observations	26,00	Number of Distinct Observations	25,00
		Number of Missing Observations	0
Minimum	0,00516	Mean	2,324
Maximum	20,23	Median	0,184
SD	4,780	Std. Error of Mean	0,937
Coefficient of Variation	2,057	Skewness	2,776
Normal GOF Test			
Shapiro Wilk Test Statistic	0,559	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0,920	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0,333	Lilliefors GOF Test	
5% Lilliefors Critical Value	0,170	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	3,925	95% Adjusted-CLT UCL (Chen-1995)	4,411
		95% Modified-t UCL (Johnson-1978)	4,010
Gamma GOF Test			
A-D Test Statistic	1,183	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0,847	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0,190	Kolmogorov-Smlrnov Gamma GOF Test	
5% K-S Critical Value	0,185	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0,321	k star (bias corrected MLE)	0,309
Theta hat (MLE)	7,243	Theta star (bias corrected MLE)	7,509
nu hat (MLE)	16,68	nu star (bias corrected)	16,09
MLE Mean (bias corrected)	2,324	MLE Sd (bias corrected)	4,177
		Approximate Chi Square Value (0,0500)	8,026
Adjusted Level of Significance	0,0398	Adjusted Chi Square Value	7,651
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	4,658	95% Adjusted Gamma UCL (use when n<50)	4,887
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0,966	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0,920	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0,0955	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0,170	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-5,267	Mean of logged Data	-1,283
Maximum of Logged Data	3,007	SD of logged Data	2,333
Assuming Lognormal Distribution			
95% H-UCL	35,32	90% Chebyshev (MVUE) UCL	8,686
95% Chebyshev (MVUE) UCL	11,22	97,5% Chebyshev (MVUE) UCL	14,75
99% Chebyshev (MVUE) UCL	21,66		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	3,866	95% Jackknife UCL	3,925
95% Standard Bootstrap UCL	3,879	95% Bootstrap-t UCL	5,521
95% Hall's Bootstrap UCL	5,419	95% Percentile Bootstrap UCL	3,923
95% BCA Bootstrap UCL	4,358		
90% Chebyshev(Mean, Sd) UCL	5,136	95% Chebyshev(Mean, Sd) UCL	6,410
97,5% Chebyshev(Mean, Sd) UCL	8,178	99% Chebyshev(Mean, Sd) UCL	11,65
Suggested UCL to Use			
97.5% Chebyshev (Mean, Sd) UCL	8,178		

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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

## Output Crap SP3

## Benzo(a)antracene

## General Statistics

Total Number of Observations	23,00	Number of Distinct Observations	23,00
		Number of Missing Observations	0
Minimum	0,0398	Mean	1,024
Maximum	8,110	Median	0,288
SD	1,778	Std. Error of Mean	0,371
Coefficient of Variation	1,736	Skewness	3,230

## Normal GOF Test

Shapiro Wilk Test Statistic	0,574
5% Shapiro Wilk Critical Value	0,914
Lilliefors Test Statistic	0,290
5% Lilliefors Critical Value	0,180

## Shapiro Wilk GOF Test

Data Not Normal at 5% Significance Level

## Lilliefors GOF Test

Data Not Normal at 5% Significance Level

**Data Not Normal at 5% Significance Level**

## Assuming Normal Distribution

## 95% Normal UCL

95% Student's-t UCL 1,661

## 95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 1,901

95% Modified-t UCL (Johnson-1978) 1,702

## Gamma GOF Test

A-D Test Statistic	0,921
5% A-D Critical Value	0,793
K-S Test Statistic	0,171
5% K-S Critical Value	0,190

## Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

## Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

**Detected data follow Appr. Gamma Distribution at 5% Significance Level**

## Gamma Statistics

k hat (MLE)	0,629	k star (bias corrected MLE)	0,576
Theta hat (MLE)	1,629	Theta star (bias corrected MLE)	1,779
nu hat (MLE)	28,92	nu star (bias corrected)	26,48
MLE Mean (bias corrected)	1,024	MLE Sd (bias corrected)	1,350
		Approximate Chi Square Value (0,0500)	15,75
Adjusted Level of Significance	0,0389	Adjusted Chi Square Value	15,15

## Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n&gt;=50) 1,722

95% Adjusted Gamma UCL (use when n&lt;50) 1,790

## Lognormal GOF Test

Shapiro Wilk Test Statistic	0,966
5% Shapiro Wilk Critical Value	0,914
Lilliefors Test Statistic	0,118
5% Lilliefors Critical Value	0,180

## Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 5% Significance Level

## Lilliefors Lognormal GOF Test

Data appear Lognormal at 5% Significance Level

**Data appear Lognormal at 5% Significance Level**

## Lognormal Statistics

Minimum of Logged Data	-3,223	Mean of logged Data	-0,952
Maximum of Logged Data	2,093	SD of logged Data	1,405

## Assuming Lognormal Distribution

95% H-UCL	2,625	90% Chebyshev (MVUE) UCL	1,975
95% Chebyshev (MVUE) UCL	2,436	97,5% Chebyshev (MVUE) UCL	3,075
99% Chebyshev (MVUE) UCL	4,329		

## Nonparametric Distribution Free UCL Statistics

**Data appear to follow a Discernible Distribution at 5% Significance Level**

## Nonparametric Distribution Free UCLs

95% CLT UCL	1,634	95% Jackknife UCL	1,661
95% Standard Bootstrap UCL	1,613	95% Bootstrap-t UCL	2,453
95% Hall's Bootstrap UCL	3,892	95% Percentile Bootstrap UCL	1,685
95% BCA Bootstrap UCL	1,898		
90% Chebyshev(Mean, Sd) UCL	2,136	95% Chebyshev(Mean, Sd) UCL	2,640
97,5% Chebyshev(Mean, Sd) UCL	3,340	99% Chebyshev(Mean, Sd) UCL	4,713

## Suggested UCL to Use

95% Adjusted Gamma UCL 1,790

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

## Output Crap SP3

## Benzo(a)pirene

General Statistics			
Total Number of Observations	21,00	Number of Distinct Observations	21,00
		Number of Missing Observations	0
Minimum	0,0498	Mean	1,118
Maximum	7,400	Median	0,423
SD	1,681	Std. Error of Mean	0,367
Coefficient of Variation	1,504	Skewness	2,890
Normal GOF Test			
Shapiro Wilk Test Statistic	0,642	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0,908	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0,263	Lilliefors GOF Test	
5% Lilliefors Critical Value	0,188	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	1,751	95% Adjusted-CLT UCL (Chen-1995)	1,969
		95% Modified-t UCL (Johnson-1978)	1,789
Gamma GOF Test			
A-D Test Statistic	0,587	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0,789	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0,177	Kolmogorov-Smlrnov Gamma GOF Test	
5% K-S Critical Value	0,198	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0,685	k star (bias corrected MLE)	0,619
Theta hat (MLE)	1,632	Theta star (bias corrected MLE)	1,807
nu hat (MLE)	28,77	nu star (bias corrected)	25,99
MLE Mean (bias corrected)	1,118	MLE Sd (bias corrected)	1,421
		Approximate Chi Square Value (0,0500)	15,37
Adjusted Level of Significance	0,0383	Adjusted Chi Square Value	14,74
Assuming Gamma Distribution			
ate Gamma UCL (use when n>=50)	1,890	95% Adjusted Gamma UCL (use when n<50)	1,971
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0,964	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0,908	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0,127	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0,188	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-3,000	Mean of logged Data	-0,774
Maximum of Logged Data	2,001	SD of logged Data	1,411
Assuming Lognormal Distribution			
95% H-UCL	3,396	90% Chebyshev (MVUE) UCL	2,412
95% Chebyshev (MVUE) UCL	2,984	97,5% Chebyshev (MVUE) UCL	3,779
99% Chebyshev (MVUE) UCL	5,340		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	1,722	95% Jackknife UCL	1,751
95% Standard Bootstrap UCL	1,686	95% Bootstrap-t UCL	2,293
95% Hall's Bootstrap UCL	4,064	95% Percentile Bootstrap UCL	1,775
95% BCA Bootstrap UCL	1,992		
90% Chebyshev(Mean, Sd) UCL	2,219	95% Chebyshev(Mean, Sd) UCL	2,717
97,5% Chebyshev(Mean, Sd) UCL	3,409	99% Chebyshev(Mean, Sd) UCL	4,769
Suggested UCL to Use			
95% Adjusted Gamma UCL	1,971		

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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

## Output Crap SP3

## Benzo(b)fluorantene

General Statistics			
Total Number of Observations	25,00	Number of Distinct Observations	25,00
		Number of Missing Observations	0
Minimum	0,0263	Mean	1,293
Maximum	8,110	Median	0,248
SD	1,896	Std. Error of Mean	0,379
Coefficient of Variation	1,466	Skewness	2,293
Normal GOF Test			
Shapiro Wilk Test Statistic	0,696	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0,918	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0,269	Lilliefors GOF Test	
5% Lilliefors Critical Value	0,173	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	1,942	95% Adjusted-CLT UCL (Chen-1995)	2,103
		95% Modified-t UCL (Johnson-1978)	1,971
Gamma GOF Test			
A-D Test Statistic	0,820	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0,800	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0,216	Kolmogorov-Smlrnov Gamma GOF Test	
5% K-S Critical Value	0,184	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0,573	k star (bias corrected MLE)	0,531
Theta hat (MLE)	2,255	Theta star (bias corrected MLE)	2,434
nu hat (MLE)	28,67	nu star (bias corrected)	26,57
MLE Mean (bias corrected)	1,293	MLE Sd (bias corrected)	1,774
		Approximate Chi Square Value (0,0500)	15,82
Adjusted Level of Significance	0,0395	Adjusted Chi Square Value	15,25
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	2,173	95% Adjusted Gamma UCL (use when n<50)	2,253
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0,953	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0,918	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0,156	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0,173	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-3,638	Mean of logged Data	-0,827
Maximum of Logged Data	2,093	SD of logged Data	1,622
Assuming Lognormal Distribution			
95% H-UCL	4,985	90% Chebyshev (MVUE) UCL	3,246
95% Chebyshev (MVUE) UCL	4,053	97,5% Chebyshev (MVUE) UCL	5,174
99% Chebyshev (MVUE) UCL	7,376		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	1,917	95% Jackknife UCL	1,942
95% Standard Bootstrap UCL	1,889	95% Bootstrap-t UCL	2,317
95% Hall's Bootstrap UCL	2,480	95% Percentile Bootstrap UCL	1,956
95% BCA Bootstrap UCL	2,083		
90% Chebyshev(Mean, Sd) UCL	2,431	95% Chebyshev(Mean, Sd) UCL	2,946
97,5% Chebyshev(Mean, Sd) UCL	3,661	99% Chebyshev(Mean, Sd) UCL	5,066
Suggested UCL to Use			
95% Chebyshev (Mean, Sd) UCL	2,946		

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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

## Output Crap SP3

## Benzo(k)fluorantene

General Statistics			
Total Number of Observations	21,00	Number of Distinct Observations	21,00
		Number of Missing Observations	0
Minimum	0,0263	Mean	0,917
Maximum	6,157	Median	0,403
SD	1,386	Std. Error of Mean	0,302
Coefficient of Variation	1,511	Skewness	2,965
Normal GOF Test			
Shapiro Wilk Test Statistic	0,637	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0,908	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0,260	Lilliefors GOF Test	
5% Lilliefors Critical Value	0,188	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	1,439	95% Adjusted-CLT UCL (Chen-1995)	1,624
		95% Modified-t UCL (Johnson-1978)	1,472
Gamma GOF Test			
A-D Test Statistic	0,406	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0,792	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0,148	Kolmogorov-Smlrnov Gamma GOF Test	
5% K-S Critical Value	0,198	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0,651	k star (bias corrected MLE)	0,590
Theta hat (MLE)	1,408	Theta star (bias corrected MLE)	1,555
nu hat (MLE)	27,36	nu star (bias corrected)	24,78
MLE Mean (bias corrected)	0,917	MLE Sd (bias corrected)	1,194
		Approximate Chi Square Value (0,0500)	14,44
Adjusted Level of Significance	0,0383	Adjusted Chi Square Value	13,84
Assuming Gamma Distribution			
ate Gamma UCL (use when n>=50)	1,574	95% Adjusted Gamma UCL (use when n<50)	1,643
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0,972	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0,908	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0,104	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0,188	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-3,638	Mean of logged Data	-1,024
Maximum of Logged Data	1,818	SD of logged Data	1,510
Assuming Lognormal Distribution			
95% H-UCL	3,451	90% Chebyshev (MVUE) UCL	2,221
95% Chebyshev (MVUE) UCL	2,768	97,5% Chebyshev (MVUE) UCL	3,528
99% Chebyshev (MVUE) UCL	5,019		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	1,415	95% Jackknife UCL	1,439
95% Standard Bootstrap UCL	1,405	95% Bootstrap-t UCL	1,966
95% Hall's Bootstrap UCL	3,360	95% Percentile Bootstrap UCL	1,445
95% BCA Bootstrap UCL	1,681		
90% Chebyshev(Mean, Sd) UCL	1,825	95% Chebyshev(Mean, Sd) UCL	2,236
97,5% Chebyshev(Mean, Sd) UCL	2,806	99% Chebyshev(Mean, Sd) UCL	3,927
Suggested UCL to Use			
95% Adjusted Gamma UCL	1,643		

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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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



## Output Crap SP3

Benzo(g,h,i)perilene

## General Statistics

Total Number of Observations	21,00	Number of Distinct Observations	21,00
		Number of Missing Observations	0
Minimum	0,0448	Mean	1,069
Maximum	5,760	Median	0,389
SD	1,624	Std. Error of Mean	0,354
Coefficient of Variation	1,519	Skewness	2,333

## Normal GOF Test

Shapiro Wilk Test Statistic	0,637
5% Shapiro Wilk Critical Value	0,908
Lilliefors Test Statistic	0,264
5% Lilliefors Critical Value	0,188

## Shapiro Wilk GOF Test

Data Not Normal at 5% Significance Level

## Lilliefors GOF Test

Data Not Normal at 5% Significance Level

**Data Not Normal at 5% Significance Level**

## Assuming Normal Distribution

## 95% Normal UCL

95% Student's-t UCL	1,680
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## 95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	1,844
95% Modified-t UCL (Johnson-1978)	1,710

## Gamma GOF Test

A-D Test Statistic	0,666
5% A-D Critical Value	0,793
K-S Test Statistic	0,170
5% K-S Critical Value	0,199

## Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

## Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

**Detected data appear Gamma Distributed at 5% Significance Level**

## Gamma Statistics

k hat (MLE)	0,635	k star (bias corrected MLE)	0,576
Theta hat (MLE)	1,683	Theta star (bias corrected MLE)	1,855
nu hat (MLE)	26,67	nu star (bias corrected)	24,19
MLE Mean (bias corrected)	1,069	MLE Sd (bias corrected)	1,408
		Approximate Chi Square Value (0,0500)	14,00
Adjusted Level of Significance	0,0383	Adjusted Chi Square Value	13,40

## Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	1,848
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95% Adjusted Gamma UCL (use when n<50)	1,930
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## Lognormal GOF Test

Shapiro Wilk Test Statistic	0,954
5% Shapiro Wilk Critical Value	0,908
Lilliefors Test Statistic	0,115
5% Lilliefors Critical Value	0,188

## Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 5% Significance Level

## Lilliefors Lognormal GOF Test

Data appear Lognormal at 5% Significance Level

**Data appear Lognormal at 5% Significance Level**

## Lognormal Statistics

Minimum of Logged Data	-3,105	Mean of logged Data	-0,898
Maximum of Logged Data	1,751	SD of logged Data	1,481

## Assuming Lognormal Distribution

95% H-UCL	3,618	90% Chebyshev (MVUE) UCL	2,398
95% Chebyshev (MVUE) UCL	2,983	97,5% Chebyshev (MVUE) UCL	3,794
99% Chebyshev (MVUE) UCL	5,389		

## Nonparametric Distribution Free UCL Statistics

**Data appear to follow a Discernible Distribution at 5% Significance Level**

## Nonparametric Distribution Free UCLs

95% CLT UCL	1,652	95% Jackknife UCL	1,680
95% Standard Bootstrap UCL	1,641	95% Bootstrap-t UCL	2,505
95% Hall's Bootstrap UCL	4,572	95% Percentile Bootstrap UCL	1,665
95% BCA Bootstrap UCL	1,879		
90% Chebyshev(Mean, Sd) UCL	2,132	95% Chebyshev(Mean, Sd) UCL	2,613
97,5% Chebyshev(Mean, Sd) UCL	3,282	99% Chebyshev(Mean, Sd) UCL	4,595

## Suggested UCL to Use

95% Adjusted Gamma UCL	1,930
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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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

## Output Crap SP3

Crisene

General Statistics			
Total Number of Observations	25,00	Number of Distinct Observations	25,00
		Number of Missing Observations	0
Minimum	0,0368	Mean	1,050
Maximum	8,643	Median	0,287
SD	1,858	Std. Error of Mean	0,372
Coefficient of Variation	1,769	Skewness	3,211

Normal GOF Test		Shapiro Wilk GOF Test	
Shapiro Wilk Test Statistic	0,576		
5% Shapiro Wilk Critical Value	0,918	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0,293	Lilliefors GOF Test	
5% Lilliefors Critical Value	0,173	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	1,686	95% Adjusted-CLT UCL (Chen-1995)	1,917
		95% Modified-t UCL (Johnson-1978)	1,726

Gamma GOF Test		Anderson-Darling Gamma GOF Test	
A-D Test Statistic	0,961		
5% A-D Critical Value	0,799	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0,175	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0,183	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics			
k hat (MLE)	0,587	k star (bias corrected MLE)	0,543
Theta hat (MLE)	1,791	Theta star (bias corrected MLE)	1,935
nu hat (MLE)	29,33	nu star (bias corrected)	27,14
MLE Mean (bias corrected)	1,050	MLE Sd (bias corrected)	1,426
		Approximate Chi Square Value (0,0500)	16,26
Adjusted Level of Significance	0,0395	Adjusted Chi Square Value	15,69

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50)	1,753	95% Adjusted Gamma UCL (use when n<50)	1,817

Lognormal GOF Test		Shapiro Wilk Lognormal GOF Test	
Shapiro Wilk Test Statistic	0,966		
5% Shapiro Wilk Critical Value	0,918	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0,0930	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0,173	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics			
Minimum of Logged Data	-3,302	Mean of logged Data	-1,008
Maximum of Logged Data	2,157	SD of logged Data	1,478

Assuming Lognormal Distribution			
95% H-UCL	2,825	90% Chebyshev (MVUE) UCL	2,096
95% Chebyshev (MVUE) UCL	2,591	97,5% Chebyshev (MVUE) UCL	3,278
99% Chebyshev (MVUE) UCL	4,628		

Nonparametric Distribution Free UCL Statistics  
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs			
95% CLT UCL	1,662	95% Jackknife UCL	1,686
95% Standard Bootstrap UCL	1,649	95% Bootstrap-t UCL	2,485
95% Hall's Bootstrap UCL	3,827	95% Percentile Bootstrap UCL	1,734
95% BCA Bootstrap UCL	1,918		
90% Chebyshev(Mean, Sd) UCL	2,166	95% Chebyshev(Mean, Sd) UCL	2,671
97,5% Chebyshev(Mean, Sd) UCL	3,372	99% Chebyshev(Mean, Sd) UCL	4,749

Suggested UCL to Use  
95% Adjusted Gamma UCL 1,817

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test  
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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.  
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).  
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

## Output Crap SP3

## Dibenzo(a,h)anthracene

## General Statistics

Total Number of Observations	12,00	Number of Distinct Observations	12,00
		Number of Missing Observations	0
Minimum	0,0400	Mean	0,349
Maximum	1,214	Median	0,233
SD	0,366	Std. Error of Mean	0,106
Coefficient of Variation	1,047	Skewness	1,403

## Normal GOF Test

Shapiro Wilk Test Statistic	0,829
5% Shapiro Wilk Critical Value	0,859
Lilliefors Test Statistic	0,199
5% Lilliefors Critical Value	0,243

## Shapiro Wilk GOF Test

Data Not Normal at 5% Significance Level

## Lilliefors GOF Test

Data appear Normal at 5% Significance Level

**Data appear Approximate Normal at 5% Significance Level**

## Assuming Normal Distribution

## 95% Normal UCL

95% Student's-t UCL 0,539

## 95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0,569
95% Modified-t UCL (Johnson-1978)	0,546

## Gamma GOF Test

A-D Test Statistic	0,419
5% A-D Critical Value	0,757
K-S Test Statistic	0,191
5% K-S Critical Value	0,253

## Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

## Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

**Detected data appear Gamma Distributed at 5% Significance Level**

## Gamma Statistics

k hat (MLE)	0,979	k star (bias corrected MLE)	0,790
Theta hat (MLE)	0,357	Theta star (bias corrected MLE)	0,442
nu hat (MLE)	23,50	nu star (bias corrected)	18,96
MLE Mean (bias corrected)	0,349	MLE Sd (bias corrected)	0,393
		Approximate Chi Square Value (0,0500)	10,09
Adjusted Level of Significance	0,0290	Adjusted Chi Square Value	9,116

## Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0,657	95% Adjusted Gamma UCL (use when n<50)	0,727
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## Lognormal GOF Test

Shapiro Wilk Test Statistic	0,914
5% Shapiro Wilk Critical Value	0,859
Lilliefors Test Statistic	0,161
5% Lilliefors Critical Value	0,243

## Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 5% Significance Level

## Lilliefors Lognormal GOF Test

Data appear Lognormal at 5% Significance Level

**Data appear Lognormal at 5% Significance Level**

## Lognormal Statistics

Minimum of Logged Data	-3,218	Mean of logged Data	-1,642
Maximum of Logged Data	0,194	SD of logged Data	1,214

## Assuming Lognormal Distribution

95% H-UCL	1,361	90% Chebyshev (MVUE) UCL	0,788
95% Chebyshev (MVUE) UCL	0,979	97,5% Chebyshev (MVUE) UCL	1,243
99% Chebyshev (MVUE) UCL	1,761		

## Nonparametric Distribution Free UCL Statistics

**Data appear to follow a Discernible Distribution at 5% Significance Level**

## Nonparametric Distribution Free UCLs

95% CLT UCL	0,523	95% Jackknife UCL	0,539
95% Standard Bootstrap UCL	0,514	95% Bootstrap-t UCL	0,626
95% Hall's Bootstrap UCL	0,744	95% Percentile Bootstrap UCL	0,519
95% BCA Bootstrap UCL	0,569		
90% Chebyshev(Mean, Sd) UCL	0,666	95% Chebyshev(Mean, Sd) UCL	0,810
97,5% Chebyshev(Mean, Sd) UCL	1,009	99% Chebyshev(Mean, Sd) UCL	1,400

## Suggested UCL to Use

95% Student's-t UCL 0,539

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

## Output Crap SP3

Indeno(1,2,3-c,d)pirene

## General Statistics

Total Number of Observations	20,00	Number of Distinct Observations	20,00
		Number of Missing Observations	0
Minimum	0,0398	Mean	1,076
Maximum	5,908	Median	0,514
SD	1,510	Std. Error of Mean	0,338
Coefficient of Variation	1,403	Skewness	2,244

## Normal GOF Test

Shapiro Wilk Test Statistic	0,702
5% Shapiro Wilk Critical Value	0,905
Lilliefors Test Statistic	0,246
5% Lilliefors Critical Value	0,192

## Shapiro Wilk GOF Test

Data Not Normal at 5% Significance Level

## Lilliefors GOF Test

Data Not Normal at 5% Significance Level

**Data Not Normal at 5% Significance Level**

## Assuming Normal Distribution

## 95% Normal UCL

95% Student's-t UCL	1,660
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## 95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	1,812
95% Modified-t UCL (Johnson-1978)	1,688

## Gamma GOF Test

A-D Test Statistic	0,427
5% A-D Critical Value	0,787
K-S Test Statistic	0,163
5% K-S Critical Value	0,202

## Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

## Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

**Detected data appear Gamma Distributed at 5% Significance Level**

## Gamma Statistics

k hat (MLE)	0,672	k star (bias corrected MLE)	0,604
Theta hat (MLE)	1,602	Theta star (bias corrected MLE)	1,781
nu hat (MLE)	26,86	nu star (bias corrected)	24,17
MLE Mean (bias corrected)	1,076	MLE Sd (bias corrected)	1,384
		Approximate Chi Square Value (0,0500)	13,98
Adjusted Level of Significance	0,0380	Adjusted Chi Square Value	13,36

## Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	1,860	95% Adjusted Gamma UCL (use when n<50)	1,946
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## Lognormal GOF Test

Shapiro Wilk Test Statistic	0,964
5% Shapiro Wilk Critical Value	0,905
Lilliefors Test Statistic	0,113
5% Lilliefors Critical Value	0,192

## Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 5% Significance Level

## Lilliefors Lognormal GOF Test

Data appear Lognormal at 5% Significance Level

**Data appear Lognormal at 5% Significance Level**

## Lognormal Statistics

Minimum of Logged Data	-3,223	Mean of logged Data	-0,832
Maximum of Logged Data	1,776	SD of logged Data	1,481

## Assuming Lognormal Distribution

95% H-UCL	4,126	90% Chebyshev (MVUE) UCL	2,573
95% Chebyshev (MVUE) UCL	3,205	97,5% Chebyshev (MVUE) UCL	4,082
99% Chebyshev (MVUE) UCL	5,805		

## Nonparametric Distribution Free UCL Statistics

**Data appear to follow a Discernible Distribution at 5% Significance Level**

## Nonparametric Distribution Free UCLs

95% CLT UCL	1,631	95% Jackknife UCL	1,660
95% Standard Bootstrap UCL	1,618	95% Bootstrap-t UCL	2,274
95% Hall's Bootstrap UCL	3,931	95% Percentile Bootstrap UCL	1,666
95% BCA Bootstrap UCL	1,821		
90% Chebyshev(Mean, Sd) UCL	2,089	95% Chebyshev(Mean, Sd) UCL	2,548
97,5% Chebyshev(Mean, Sd) UCL	3,184	99% Chebyshev(Mean, Sd) UCL	4,435

## Suggested UCL to Use

95% Adjusted Gamma UCL	1,946
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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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

## Output Crap SP3

Pirene

## General Statistics

Total Number of Observations	26,00	Number of Distinct Observations	26,00
		Number of Missing Observations	0
Minimum	0,0153	Mean	1,725
Maximum	15,16	Median	0,428
SD	3,326	Std. Error of Mean	0,652
Coefficient of Variation	1,929	Skewness	3,093

## Normal GOF Test

Shapiro Wilk Test Statistic	0,549
5% Shapiro Wilk Critical Value	0,920
Lilliefors Test Statistic	0,325
5% Lilliefors Critical Value	0,170

## Shapiro Wilk GOF Test

Data Not Normal at 5% Significance Level

## Lilliefors GOF Test

Data Not Normal at 5% Significance Level

**Data Not Normal at 5% Significance Level**

## Assuming Normal Distribution

## 95% Normal UCL

95% Student's-t UCL	2,839
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## 95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	3,220
95% Modified-t UCL (Johnson-1978)	2,905

## Gamma GOF Test

A-D Test Statistic	1,165
5% A-D Critical Value	0,810
K-S Test Statistic	0,182
5% K-S Critical Value	0,181

## Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

## Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

**Data Not Gamma Distributed at 5% Significance Level**

## Gamma Statistics

k hat (MLE)	0,491	k star (bias corrected MLE)	0,460
Theta hat (MLE)	3,512	Theta star (bias corrected MLE)	3,748
nu hat (MLE)	25,54	nu star (bias corrected)	23,93
MLE Mean (bias corrected)	1,725	MLE Sd (bias corrected)	2,543
		Approximate Chi Square Value (0,0500)	13,79
Adjusted Level of Significance	0,0398	Adjusted Chi Square Value	13,28

## Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2,992	95% Adjusted Gamma UCL (use when n<50)	3,106
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## Lognormal GOF Test

Shapiro Wilk Test Statistic	0,985
5% Shapiro Wilk Critical Value	0,920
Lilliefors Test Statistic	0,0853
5% Lilliefors Critical Value	0,170

## Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 5% Significance Level

## Lilliefors Lognormal GOF Test

Data appear Lognormal at 5% Significance Level

**Data appear Lognormal at 5% Significance Level**

## Lognormal Statistics

Minimum of Logged Data	-4,181	Mean of logged Data	-0,752
Maximum of Logged Data	2,718	SD of logged Data	1,674

## Assuming Lognormal Distribution

95% H-UCL	6,153	90% Chebyshev (MVUE) UCL	3,843
95% Chebyshev (MVUE) UCL	4,810	97,5% Chebyshev (MVUE) UCL	6,152
99% Chebyshev (MVUE) UCL	8,789		

## Nonparametric Distribution Free UCL Statistics

**Data appear to follow a Discernible Distribution at 5% Significance Level**

## Nonparametric Distribution Free UCLs

95% CLT UCL	2,798	95% Jackknife UCL	2,839
95% Standard Bootstrap UCL	2,788	95% Bootstrap-t UCL	4,146
95% Hall's Bootstrap UCL	3,551	95% Percentile Bootstrap UCL	2,949
95% BCA Bootstrap UCL	3,338		
90% Chebyshev(Mean, Sd) UCL	3,682	95% Chebyshev(Mean, Sd) UCL	4,568
97,5% Chebyshev(Mean, Sd) UCL	5,799	99% Chebyshev(Mean, Sd) UCL	8,215

## Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	4,568
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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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

## Output Crap SP3

## 1,2,4,5-tetracloro benzene

General Statistics			
Total Number of Observations	10,00	Number of Distinct Observations	10,00
		Number of Missing Observations	0
Minimum	0,00583	Mean	5,188
Maximum	23,19	Median	2,729
SD	7,433	Std. Error of Mean	2,350
Coefficient of Variation	1,433	Skewness	1,838
Normal GOF Test			
Shapiro Wilk Test Statistic	0,749	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0,842	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0,246	Lilliefors GOF Test	
5% Lilliefors Critical Value	0,262	Data appear Normal at 5% Significance Level	
Data appear Approximate Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	9,497	95% Adjusted-CLT UCL (Chen-1995)	10,51
		95% Modified-t UCL (Johnson-1978)	9,724
Gamma GOF Test			
A-D Test Statistic	0,635	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0,824	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0,232	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0,290	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0,274	k star (bias corrected MLE)	0,259
Theta hat (MLE)	18,91	Theta star (bias corrected MLE)	20,05
nu hat (MLE)	5,487	nu star (bias corrected)	5,174
MLE Mean (bias corrected)	5,188	MLE Sd (bias corrected)	10,20
		Approximate Chi Square Value (0,0500)	1,234
Adjusted Level of Significance	0,0267	Adjusted Chi Square Value	0,934
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	21,76	95% Adjusted Gamma UCL (use when n<50)	28,73
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0,832	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0,842	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0,269	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0,262	Data Not Lognormal at 5% Significance Level	
Data Not Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-5,145	Mean of logged Data	-0,904
Maximum of Logged Data	3,144	SD of logged Data	3,439
Assuming Lognormal Distribution			
95% H-UCL	4331563	90% Chebyshev (MVUE) UCL	80,81
95% Chebyshev (MVUE) UCL	107,6	97,5% Chebyshev (MVUE) UCL	144,7
99% Chebyshev (MVUE) UCL	217,6		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	9,054	95% Jackknife UCL	9,497
95% Standard Bootstrap UCL	8,936	95% Bootstrap-t UCL	14,86
95% Hall's Bootstrap UCL	26,87	95% Percentile Bootstrap UCL	9,197
95% BCA Bootstrap UCL	10,81		
90% Chebyshev(Mean, Sd) UCL	12,24	95% Chebyshev(Mean, Sd) UCL	15,43
97,5% Chebyshev(Mean, Sd) UCL	19,87	99% Chebyshev(Mean, Sd) UCL	28,57
Suggested UCL to Use			
95% Student's-t UCL	9,497		

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

## Output Crap SP3

## Pentacloro benzene

## General Statistics

Total Number of Observations	13,00	Number of Distinct Observations	13,00
		Number of Missing Observations	0
Minimum	0,00855	Mean	2,411
Maximum	12,10	Median	0,762
SD	4,028	Std. Error of Mean	1,117
Coefficient of Variation	1,671	Skewness	1,870

## Normal GOF Test

Shapiro Wilk Test Statistic	0,660
5% Shapiro Wilk Critical Value	0,866
Lilliefors Test Statistic	0,321
5% Lilliefors Critical Value	0,234

## Shapiro Wilk GOF Test

Data Not Normal at 5% Significance Level

## Lilliefors GOF Test

Data Not Normal at 5% Significance Level

**Data Not Normal at 5% Significance Level**

## Assuming Normal Distribution

## 95% Normal UCL

95% Student's-t UCL	4,402
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## 95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	4,867
95% Modified-t UCL (Johnson-1978)	4,498

## Gamma GOF Test

A-D Test Statistic	0,566
5% A-D Critical Value	0,826
K-S Test Statistic	0,199
5% K-S Critical Value	0,256

## Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

## Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

**Detected data appear Gamma Distributed at 5% Significance Level**

## Gamma Statistics

k hat (MLE)	0,317	k star (bias corrected MLE)	0,295
Theta hat (MLE)	7,613	Theta star (bias corrected MLE)	8,176
nu hat (MLE)	8,232	nu star (bias corrected)	7,666
MLE Mean (bias corrected)	2,411	MLE Sd (bias corrected)	4,439
		Approximate Chi Square Value (0,0500)	2,543
Adjusted Level of Significance	0,0301	Adjusted Chi Square Value	2,143

## Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	7,266	95% Adjusted Gamma UCL (use when n<50)	8,625
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## Lognormal GOF Test

Shapiro Wilk Test Statistic	0,895
5% Shapiro Wilk Critical Value	0,866
Lilliefors Test Statistic	0,185
5% Lilliefors Critical Value	0,234

## Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 5% Significance Level

## Lilliefors Lognormal GOF Test

Data appear Lognormal at 5% Significance Level

**Data appear Lognormal at 5% Significance Level**

## Lognormal Statistics

Minimum of Logged Data	-4,762	Mean of logged Data	-1,279
Maximum of Logged Data	2,493	SD of logged Data	2,681

## Assuming Lognormal Distribution

95% H-UCL	1279	90% Chebyshev (MVUE) UCL	15,10
95% Chebyshev (MVUE) UCL	19,89	97,5% Chebyshev (MVUE) UCL	26,53
99% Chebyshev (MVUE) UCL	39,57		

## Nonparametric Distribution Free UCL Statistics

**Data appear to follow a Discernible Distribution at 5% Significance Level**

## Nonparametric Distribution Free UCLs

95% CLT UCL	4,248	95% Jackknife UCL	4,402
95% Standard Bootstrap UCL	4,175	95% Bootstrap-t UCL	7,830
95% Hall's Bootstrap UCL	7,687	95% Percentile Bootstrap UCL	4,286
95% BCA Bootstrap UCL	4,836		
90% Chebyshev(Mean, Sd) UCL	5,762	95% Chebyshev(Mean, Sd) UCL	7,281
97,5% Chebyshev(Mean, Sd) UCL	9,388	99% Chebyshev(Mean, Sd) UCL	13,53

## Suggested UCL to Use

95% Adjusted Gamma UCL	8,625
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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.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

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

## Output Crap SP3

## Somma PCDD/F (conversione TEQ)

General Statistics			
Total Number of Observations	43,00	Number of Distinct Observations	43,00
		Number of Missing Observations	0
Minimum	2,3613E-7	Mean	0,00971
Maximum	0,150	Median	9,5000E-4
SD	0,0255	Std. Error of Mean	0,00388
Coefficient of Variation	2,622	Skewness	4,431

Normal GOF Test		Shapiro Wilk GOF Test	
Shapiro Wilk Test Statistic	0,436	Data Not Normal at 5% Significance Level	
5% Shapiro Wilk Critical Value	0,943	Lilliefors GOF Test	
Lilliefors Test Statistic	0,363	Data Not Normal at 5% Significance Level	
5% Lilliefors Critical Value	0,134		

**Data Not Normal at 5% Significance Level**

Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0,0162	95% Adjusted-CLT UCL (Chen-1995)	0,0189
		95% Modified-t UCL (Johnson-1978)	0,0167

Gamma GOF Test		Anderson-Darling Gamma GOF Test	
A-D Test Statistic	1,017	Data Not Gamma Distributed at 5% Significance Level	
5% A-D Critical Value	0,877	Kolmogorov-Smirnov Gamma GOF Test	
K-S Test Statistic	0,147	Detected data appear Gamma Distributed at 5% Significance Level	
5% K-S Critical Value	0,148		

**Detected data follow Appr. Gamma Distribution at 5% Significance Level**

Gamma Statistics			
k hat (MLE)	0,268	k star (bias corrected MLE)	0,265
Theta hat (MLE)	0,0363	Theta star (bias corrected MLE)	0,0367
nu hat (MLE)	23,02	nu star (bias corrected)	22,75
MLE Mean (bias corrected)	0,00971	MLE Sd (bias corrected)	0,0189
		Approximate Chi Square Value (0,0500)	12,90
Adjusted Level of Significance	0,0444	Adjusted Chi Square Value	12,64

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50)	0,0171	95% Adjusted Gamma UCL (use when n<50)	0,0175

Lognormal GOF Test		Shapiro Wilk Lognormal GOF Test	
Shapiro Wilk Test Statistic	0,973	Data appear Lognormal at 5% Significance Level	
5% Shapiro Wilk Critical Value	0,943	Lilliefors Lognormal GOF Test	
Lilliefors Test Statistic	0,0739	Data appear Lognormal at 5% Significance Level	
5% Lilliefors Critical Value	0,134		

**Data appear Lognormal at 5% Significance Level**

Lognormal Statistics			
Minimum of Logged Data	-15,26	Mean of logged Data	-7,259
Maximum of Logged Data	-1,899	SD of logged Data	2,956

Assuming Lognormal Distribution			
95% H-UCL	0,565	90% Chebyshev (MVUE) UCL	0,110
95% Chebyshev (MVUE) UCL	0,143	97,5% Chebyshev (MVUE) UCL	0,189
99% Chebyshev (MVUE) UCL	0,280		

**Nonparametric Distribution Free UCL Statistics**  
**Data appear to follow a Discernible Distribution at 5% Significance Level**

Nonparametric Distribution Free UCLs			
95% CLT UCL	0,0161	95% Jackknife UCL	0,0162
95% Standard Bootstrap UCL	0,0158	95% Bootstrap-t UCL	0,0236
95% Hall's Bootstrap UCL	0,0385	95% Percentile Bootstrap UCL	0,0165
95% BCA Bootstrap UCL	0,0200		
90% Chebyshev(Mean, Sd) UCL	0,0214	95% Chebyshev(Mean, Sd) UCL	0,0266
97,5% Chebyshev(Mean, Sd) UCL	0,0340	99% Chebyshev(Mean, Sd) UCL	0,0483

**Suggested UCL to Use**  
 95% Adjusted Gamma UCL 0,0175

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test  
 When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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.  
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).  
 However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.