

	A	B	C	D	E	F	G	H	I	J	K	L		
1	UCL Statistics for Data Sets with Non-Detects													
2														
3	User Selected Options													
4	Date/Time of Computation		3/6/2016 10:03:34 PM											
5	From File		ProUCLinput 49-005(a) 0-10.xls											
6	Full Precision		OFF											
7	Confidence Coefficient		95%											
8	Number of Bootstrap Operations		2000											
9														
10														
11	Aluminum													
12														
13	General Statistics													
14	Total Number of Observations				18		Number of Distinct Observations				17			
15							Number of Missing Observations				0			
16	Minimum				1630		Mean				8788			
17	Maximum				21900		Median				8565			
18	SD				4508		Std. Error of Mean				1063			
19	Coefficient of Variation				0.513		Skewness				1.279			
20														
21	Normal GOF Test													
22	Shapiro Wilk Test Statistic				0.911		Shapiro Wilk GOF Test							
23	5% Shapiro Wilk Critical Value				0.897		Data appear Normal at 5% Significance Level							
24	Lilliefors Test Statistic				0.127		Lilliefors GOF Test							
25	5% Lilliefors Critical Value				0.209		Data appear Normal at 5% Significance Level							
26	Data appear Normal at 5% Significance Level													
27														
28	Assuming Normal Distribution													
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)							
30	95% Student's-t UCL				10637		95% Adjusted-CLT UCL (Chen-1995)				10879			
31							95% Modified-t UCL (Johnson-1978)				10690			
32														
33	Gamma GOF Test													
34	A-D Test Statistic				0.31		Anderson-Darling Gamma GOF Test							
35	5% A-D Critical Value				0.743		Detected data appear Gamma Distributed at 5% Significance Level							
36	K-S Test Statistic				0.126		Kolmogorov-Smirnoff Gamma GOF Test							
37	5% K-S Critical Value				0.205		Detected data appear Gamma Distributed at 5% Significance Level							
38	Detected data appear Gamma Distributed at 5% Significance Level													
39														
40	Gamma Statistics													
41	k hat (MLE)				3.891		k star (bias corrected MLE)				3.279			
42	Theta hat (MLE)				2259		Theta star (bias corrected MLE)				2680			
43	nu hat (MLE)				140.1		nu star (bias corrected)				118			
44	MLE Mean (bias corrected)				8788		MLE Sd (bias corrected)				4853			
45							Approximate Chi Square Value (0.05)				93.96			
46	Adjusted Level of Significance				0.0357		Adjusted Chi Square Value				91.9			
47														
48	Assuming Gamma Distribution													
49	95% Approximate Gamma UCL (use when n>=50)						11041		% Adjusted Gamma UCL (use when n<50)				11289	
50														
51	Lognormal GOF Test													
52	Shapiro Wilk Test Statistic				0.93		Shapiro Wilk Lognormal GOF Test							
53	5% Shapiro Wilk Critical Value				0.897		Data appear Lognormal at 5% Significance Level							
54	Lilliefors Test Statistic				0.156		Lilliefors Lognormal GOF Test							
55	5% Lilliefors Critical Value				0.209		Data appear Lognormal at 5% Significance Level							
56	Data appear Lognormal at 5% Significance Level													
57														
58	Lognormal Statistics													
59	Minimum of Logged Data				7.396		Mean of logged Data				8.947			
60	Maximum of Logged Data				9.994		SD of logged Data				0.572			
61														
62	Assuming Lognormal Distribution													
63	95% H-UCL				12097		90% Chebyshev (MVUE) UCL				12736			
64	95% Chebyshev (MVUE) UCL				14447		97.5% Chebyshev (MVUE) UCL				16823			
65	99% Chebyshev (MVUE) UCL				21490									
66														
67	Nonparametric Distribution Free UCL Statistics													
68	Data appear to follow a Discernible Distribution at 5% Significance Level													
69														
70	Nonparametric Distribution Free UCLs													
71	95% CLT UCL				10536		95% Jackknife UCL				10637			
72	95% Standard Bootstrap UCL				10495		95% Bootstrap-t UCL				11112			
73	95% Hall's Bootstrap UCL				11713		95% Percentile Bootstrap UCL				10588			
74	95% BCA Bootstrap UCL				10835									
75	90% Chebyshev(Mean, Sd) UCL				11976		95% Chebyshev(Mean, Sd) UCL				13420			
76	97.5% Chebyshev(Mean, Sd) UCL				15424		99% Chebyshev(Mean, Sd) UCL				19361			
77														
78	Suggested UCL to Use													
79	95% Student's-t UCL				10637									
80														
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL													
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002'													
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets													
84	For additional insight the user may want to consult a statistician.													
85														

	A	B	C	D	E	F	G	H	I	J	K	L
86	Arsenic											
87												
88	General Statistics											
89	Total Number of Observations					18	Number of Distinct Observations					14
90	Number of Detects					16	Number of Non-Detects					2
91	Number of Distinct Detects					12	Number of Distinct Non-Detects					2
92	Minimum Detect					0.96	Minimum Non-Detect					1.2
93	Maximum Detect					3.4	Maximum Non-Detect					1.3
94	Variance Detects					0.491	Percent Non-Detects					11.11%
95	Mean Detects					2.31	SD Detects					0.701
96	Median Detects					2.3	CV Detects					0.303
97	Skewness Detects					-0.242	Kurtosis Detects					-0.731
98	Mean of Logged Detects					0.787	SD of Logged Detects					0.344
99												
100	Normal GOF Test on Detects Only											
101	Shapiro Wilk Test Statistic					0.967	Shapiro Wilk GOF Test					
102	5% Shapiro Wilk Critical Value					0.887	Detected Data appear Normal at 5% Significance Level					
103	Lilliefors Test Statistic					0.133	Lilliefors GOF Test					
104	5% Lilliefors Critical Value					0.222	Detected Data appear Normal at 5% Significance Level					
105	Detected Data appear Normal at 5% Significance Level											
106												
107	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
108	Mean					2.16	Standard Error of Mean					0.187
109	SD					0.768	95% KM (BCA) UCL					2.453
110	95% KM (t) UCL					2.485	95% KM (Percentile Bootstrap) UCL					2.462
111	95% KM (z) UCL					2.467	95% KM Bootstrap t UCL					2.477
112	90% KM Chebyshev UCL					2.721	95% KM Chebyshev UCL					2.974
113	97.5% KM Chebyshev UCL					3.327	99% KM Chebyshev UCL					4.019
114												
115	Gamma GOF Tests on Detected Observations Only											
116	A-D Test Statistic					0.36	Anderson-Darling GOF Test					
117	5% A-D Critical Value					0.739	Detected data appear Gamma Distributed at 5% Significance Level					
118	K-S Test Statistic					0.168	Kolmogrov-Smirnoff GOF					
119	5% K-S Critical Value					0.215	Detected data appear Gamma Distributed at 5% Significance Level					
120	Detected data appear Gamma Distributed at 5% Significance Level											
121												
122	Gamma Statistics on Detected Data Only											
123	k hat (MLE)					10.06	k star (bias corrected MLE)					8.214
124	Theta hat (MLE)					0.23	Theta star (bias corrected MLE)					0.281
125	nu hat (MLE)					321.8	nu star (bias corrected)					262.8
126	MLE Mean (bias corrected)					2.31	MLE Sd (bias corrected)					0.806
127												
128	Gamma Kaplan-Meier (KM) Statistics											
129	k hat (KM)					7.92	nu hat (KM)					285.1
130	Approximate Chi Square Value (285.11, $\alpha$ )					247	Adjusted Chi Square Value (285.11, $\beta$ )					243.6
131	95% Gamma Approximate KM-UCL (use when n>=50)					2.493	Gamma Adjusted KM-UCL (use when n<50)					2.528
132												
133	Gamma ROS Statistics using Imputed Non-Detects											
134	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
135	GROS may not be used when kstar of detected data is small such as < 0.1											
136	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
137	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
138	Minimum					0.96	Mean					2.18
139	Maximum					3.4	Median					2.25
140	SD					0.759	CV					0.348
141	k hat (MLE)					7.804	k star (bias corrected MLE)					6.541
142	Theta hat (MLE)					0.279	Theta star (bias corrected MLE)					0.333
143	nu hat (MLE)					281	nu star (bias corrected)					235.5
144	MLE Mean (bias corrected)					2.18	MLE Sd (bias corrected)					0.852
145							Adjusted Level of Significance ( $\beta$ )					0.0357
146	Approximate Chi Square Value (235.46, $\alpha$ )					200.9	Adjusted Chi Square Value (235.46, $\beta$ )					197.9
147	95% Gamma Approximate UCL (use when n>=50)					2.555	Gamma Adjusted UCL (use when n<50)					2.594
148												
149	Lognormal GOF Test on Detected Observations Only											
150	Shapiro Wilk Test Statistic					0.926	Shapiro Wilk GOF Test					
151	5% Shapiro Wilk Critical Value					0.887	Detected Data appear Lognormal at 5% Significance Level					
152	Lilliefors Test Statistic					0.19	Lilliefors GOF Test					
153	5% Lilliefors Critical Value					0.222	Detected Data appear Lognormal at 5% Significance Level					
154	Detected Data appear Lognormal at 5% Significance Level											
155												
156	Lognormal ROS Statistics Using Imputed Non-Detects											
157	Mean in Original Scale					2.181	Mean in Log Scale					0.715
158	SD in Original Scale					0.757	SD in Log Scale					0.385
159	95% t UCL (assumes normality of ROS data)					2.492	95% Percentile Bootstrap UCL					2.462
160	95% BCA Bootstrap UCL					2.45	95% Bootstrap t UCL					2.49
161	95% H-UCL (Log ROS)					2.633						
162												
163	UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed											
164	KM Mean (logged)					0.695	95% H-UCL (KM -Log)					2.637
165	KM SD (logged)					0.408	95% Critical H Value (KM-Log)					1.938
166	KM Standard Error of Mean (logged)					0.0993						
167												
168	DL/2 Statistics											
169	DL/2 Normal						DL/2 Log-Transformed					
170	Mean in Original Scale					2.123	Mean in Log Scale					0.647

	A	B	C	D	E	F	G	H	I	J	K	L
171		SD in Original Scale				0.854	SD in Log Scale				0.52	
172		95% t UCL (Assumes normality)				2.473	95% H-Stat UCL				2.827	
173		DL/2 is not a recommended method, provided for comparisons and historical reasons										
174												
175		Nonparametric Distribution Free UCL Statistics										
176		Detected Data appear Normal Distributed at 5% Significance Level										
177												
178		Suggested UCL to Use										
179		95% KM (t) UCL				2.485	95% KM (Percentile Bootstrap) UCL				2.462	
180												
181		Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL										
182		Recommendations are based upon data size, data distribution, and skewness.										
183		These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006)										
184		However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician										
185												
186												
187	Barium											
188												
189		General Statistics										
190		Total Number of Observations				18	Number of Distinct Observations				18	
191							Number of Missing Observations				0	
192		Minimum				26.6	Mean				109.3	
193		Maximum				207	Median				99.6	
194		SD				55.47	Std. Error of Mean				13.07	
195		Coefficient of Variation				0.508	Skewness				0.305	
196												
197		Normal GOF Test										
198		Shapiro Wilk Test Statistic				0.953	Shapiro Wilk GOF Test					
199		5% Shapiro Wilk Critical Value				0.897	Data appear Normal at 5% Significance Level					
200		Lilliefors Test Statistic				0.155	Lilliefors GOF Test					
201		5% Lilliefors Critical Value				0.209	Data appear Normal at 5% Significance Level					
202		Data appear Normal at 5% Significance Level										
203												
204		Assuming Normal Distribution										
205		95% Normal UCL					95% UCLs (Adjusted for Skewness)					
206		95% Student's-t UCL				132	95% Adjusted-CLT UCL (Chen-1995)				131.8	
207							95% Modified-t UCL (Johnson-1978)				132.2	
208												
209		Gamma GOF Test										
210		A-D Test Statistic				0.257	Anderson-Darling Gamma GOF Test					
211		5% A-D Critical Value				0.744	Detected data appear Gamma Distributed at 5% Significance Level					
212		K-S Test Statistic				0.108	Kolmogrov-Smirnoff Gamma GOF Test					
213		5% K-S Critical Value				0.205	Detected data appear Gamma Distributed at 5% Significance Level					
214		Detected data appear Gamma Distributed at 5% Significance Level										
215												
216		Gamma Statistics										
217		k hat (MLE)				3.562	k star (bias corrected MLE)				3.006	
218		Theta hat				30.68	Theta star (bias corrected MLE)				36.36	
219		nu hat (MLE)				128.2	nu star (bias corrected)				108.2	
220		MLE Mean (bias corrected)				109.3	MLE Sd (bias corrected)				63.03	
221							Approximate Chi Square Value (0.05)				85.19	
222		Adjusted Level of Significance				0.0357	Adjusted Chi Square Value				83.23	
223												
224		Assuming Gamma Distribution										
225		95% Approximate Gamma UCL (use when n>=50)					138.8	6 Adjusted Gamma UCL (use when n<50)				142
226												
227		Lognormal GOF Test										
228		Shapiro Wilk Test Statistic				0.943	Shapiro Wilk Lognormal GOF Test					
229		5% Shapiro Wilk Critical Value				0.897	Data appear Lognormal at 5% Significance Level					
230		Lilliefors Test Statistic				0.114	Lilliefors Lognormal GOF Test					
231		5% Lilliefors Critical Value				0.209	Data appear Lognormal at 5% Significance Level					
232		Data appear Lognormal at 5% Significance Level										
233												
234		Lognormal Statistics										
235		Minimum of Logged Data				3.281	Mean of logged Data				4.547	
236		Maximum of Logged Data				5.333	SD of logged Data				0.595	
237												
238		Assuming Lognormal Distribution										
239		95% H-UCL				152.8	90% Chebyshev (MVUE) UCL				160.3	
240		95% Chebyshev (MVUE) UCL				182.5	97.5% Chebyshev (MVUE) UCL				213.3	
241		99% Chebyshev (MVUE) UCL				273.9						
242												
243		Nonparametric Distribution Free UCL Statistics										
244		Data appear to follow a Discernible Distribution at 5% Significance Level										
245												
246		Nonparametric Distribution Free UCLs										
247		95% CLT UCL				130.8	95% Jackknife UCL				132	
248		95% Standard Bootstrap UCL				130.1	95% Bootstrap-t UCL				132.4	
249		95% Hall's Bootstrap UCL				130.8	95% Percentile Bootstrap UCL				130	
250		95% BCA Bootstrap UCL				131						
251		90% Chebyshev(Mean, Sd) UCL				148.5	95% Chebyshev(Mean, Sd) UCL				166.3	
252		97.5% Chebyshev(Mean, Sd) UCL				190.9	99% Chebyshev(Mean, Sd) UCL				239.4	
253												
254		Suggested UCL to Use										
255		95% Student's-t UCL				132						

	A	B	C	D	E	F	G	H	I	J	K	L
256												
257	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL											
258	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002											
259	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
260	For additional insight the user may want to consult a statistician.											
261												
262	Beryllium											
263												
264	General Statistics											
265	Total Number of Observations				18		Number of Distinct Observations				17	
266	Number of Detects				16		Number of Non-Detects				2	
267	Number of Distinct Detects				15		Number of Distinct Non-Detects				2	
268	Minimum Detect				0.45		Minimum Non-Detect				0.51	
269	Maximum Detect				1.9		Maximum Non-Detect				0.52	
270	Variance Detects				0.0952		Percent Non-Detects				11.11%	
271	Mean Detects				0.958		SD Detects				0.308	
272	Median Detects				0.925		CV Detects				0.322	
273	Skewness Detects				1.705		Kurtosis Detects				6.026	
274	Mean of Logged Detects				-0.0877		SD of Logged Detects				0.308	
275												
276	Normal GOF Test on Detects Only											
277	Shapiro Wilk Test Statistic				0.793		Shapiro Wilk GOF Test					
278	5% Shapiro Wilk Critical Value				0.887		Detected Data Not Normal at 5% Significance Level					
279	Lilliefors Test Statistic				0.258		Lilliefors GOF Test					
280	5% Lilliefors Critical Value				0.222		Detected Data Not Normal at 5% Significance Level					
281	Detected Data Not Normal at 5% Significance Level											
282												
283	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
284	Mean				0.901		Standard Error of Mean				0.0788	
285	SD				0.324		95% KM (BCA) UCL				1.052	
286	95% KM (t) UCL				1.038		95% KM (Percentile Bootstrap) UCL				1.037	
287	95% KM (z) UCL				1.031		95% KM Bootstrap t UCL				1.062	
288	90% KM Chebyshev UCL				1.137		95% KM Chebyshev UCL				1.245	
289	97.5% KM Chebyshev UCL				1.393		99% KM Chebyshev UCL				1.685	
290												
291	Gamma GOF Tests on Detected Observations Only											
292	A-D Test Statistic				1.125		Anderson-Darling GOF Test					
293	5% A-D Critical Value				0.739		Detected Data Not Gamma Distributed at 5% Significance Level					
294	K-S Test Statistic				0.244		Kolmogrov-Smirnoff GOF					
295	5% K-S Critical Value				0.215		Detected Data Not Gamma Distributed at 5% Significance Level					
296	Detected Data Not Gamma Distributed at 5% Significance Level											
297												
298	Gamma Statistics on Detected Data Only											
299	k hat (MLE)				11.45		k star (bias corrected MLE)				9.347	
300	Theta hat (MLE)				0.0836		Theta star (bias corrected MLE)				0.102	
301	nu hat (MLE)				366.5		nu star (bias corrected)				299.1	
302	MLE Mean (bias corrected)				0.958		MLE Sd (bias corrected)				0.313	
303												
304	Gamma Kaplan-Meier (KM) Statistics											
305	k hat (KM)				7.753		nu hat (KM)				279.1	
306	Approximate Chi Square Value (279.11, $\alpha$ )				241.4		Adjusted Chi Square Value (279.11, $\beta$ )				238.1	
307	95% Gamma Approximate KM-UCL (use when $n \geq 50$ )				1.042		Gamma Adjusted KM-UCL (use when $n < 50$ )				1.057	
308												
309	Gamma ROS Statistics using Imputed Non-Detects											
310	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
311	GROS may not be used when kstar of detected data is small such as < 0.1											
312	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
313	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
314	Minimum				0.45		Mean				0.905	
315	Maximum				1.9		Median				0.92	
316	SD				0.327		CV				0.361	
317	k hat (MLE)				8.739		k star (bias corrected MLE)				7.32	
318	Theta hat (MLE)				0.104		Theta star (bias corrected MLE)				0.124	
319	nu hat (MLE)				314.6		nu star (bias corrected)				263.5	
320	MLE Mean (bias corrected)				0.905		MLE Sd (bias corrected)				0.335	
321							Adjusted Level of Significance ( $\beta$ )				0.0357	
322	Approximate Chi Square Value (263.50, $\alpha$ )				226.9		Adjusted Chi Square Value (263.50, $\beta$ )				223.7	
323	95% Gamma Approximate UCL (use when $n \geq 50$ )				1.051		Gamma Adjusted UCL (use when $n < 50$ )				1.067	
324												
325	Lognormal GOF Test on Detected Observations Only											
326	Shapiro Wilk Test Statistic				0.862		Shapiro Wilk GOF Test					
327	5% Shapiro Wilk Critical Value				0.887		Detected Data Not Lognormal at 5% Significance Level					
328	Lilliefors Test Statistic				0.264		Lilliefors GOF Test					
329	5% Lilliefors Critical Value				0.222		Detected Data Not Lognormal at 5% Significance Level					
330	Detected Data Not Lognormal at 5% Significance Level											
331												
332	Lognormal ROS Statistics Using Imputed Non-Detects											
333	Mean in Original Scale				0.91		Mean in Log Scale				-0.148	
334	SD in Original Scale				0.321		SD in Log Scale				0.338	
335	95% t UCL (assumes normality of ROS data)				1.042		95% Percentile Bootstrap UCL				1.035	
336	95% BCA Bootstrap UCL				1.068		95% Bootstrap t UCL				1.081	
337	95% H-UCL (Log ROS)				1.066							
338												
339	DL/2 Statistics											
340	DL/2 Normal						DL/2 Log-Transformed					

	A	B	C	D	E	F	G	H	I	J	K	L
341	Mean in Original Scale					0.88	Mean in Log Scale					-0.229
342	SD in Original Scale					0.368	SD in Log Scale					0.502
343	95% t UCL (Assumes normality)					1.03	95% H-Stat UCL					1.154
344	DL/2 is not a recommended method, provided for comparisons and historical reasons											
345												
346	Nonparametric Distribution Free UCL Statistics											
347	Data do not follow a Discernible Distribution at 5% Significance Level											
348												
349	Suggested UCL to Use											
350	95% KM (Chebyshev) UCL					1.245						
351												
352	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL											
353	Recommendations are based upon data size, data distribution, and skewness.											
354	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006)											
355	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician											
356												
357												
358	Chromium											
359												
360	General Statistics											
361	Total Number of Observations					18	Number of Distinct Observations					18
362							Number of Missing Observations					0
363	Minimum					4.2	Mean					7.672
364	Maximum					18.4	Median					7.6
365	SD					3.369	Std. Error of Mean					0.794
366	Coefficient of Variation					0.439	Skewness					1.942
367												
368	Normal GOF Test											
369	Shapiro Wilk Test Statistic					0.811	Shapiro Wilk GOF Test					
370	5% Shapiro Wilk Critical Value					0.897	Data Not Normal at 5% Significance Level					
371	Lilliefors Test Statistic					0.191	Lilliefors GOF Test					
372	5% Lilliefors Critical Value					0.209	Data appear Normal at 5% Significance Level					
373	Data appear Approximate Normal at 5% Significance Level											
374												
375	Assuming Normal Distribution											
376	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
377	95% Student's-t UCL					9.053	95% Adjusted-CLT UCL (Chen-1995)					9.367
378							95% Modified-t UCL (Johnson-1978)					9.114
379												
380	Gamma GOF Test											
381	A-D Test Statistic					0.536	Anderson-Darling Gamma GOF Test					
382	5% A-D Critical Value					0.742	Detected data appear Gamma Distributed at 5% Significance Level					
383	K-S Test Statistic					0.133	Kolmogrov-Smirnoff Gamma GOF Test					
384	5% K-S Critical Value					0.204	Detected data appear Gamma Distributed at 5% Significance Level					
385	Detected data appear Gamma Distributed at 5% Significance Level											
386												
387	Gamma Statistics											
388	k hat (MLE)					6.887	k star (bias corrected MLE)					5.776
389	Theta hat (MLE)					1.114	Theta star (bias corrected MLE)					1.328
390	nu hat (MLE)					247.9	nu star (bias corrected)					207.9
391	MLE Mean (bias corrected)					7.672	MLE Sd (bias corrected)					3.192
392							Approximate Chi Square Value (0.05)					175.6
393	Adjusted Level of Significance					0.0357	Adjusted Chi Square Value					172.7
394												
395	Assuming Gamma Distribution											
396	95% Approximate Gamma UCL (use when n>=50))					9.087	Adjusted Gamma UCL (use when n<50)					9.237
397												
398	Lognormal GOF Test											
399	Shapiro Wilk Test Statistic					0.928	Shapiro Wilk Lognormal GOF Test					
400	5% Shapiro Wilk Critical Value					0.897	Data appear Lognormal at 5% Significance Level					
401	Lilliefors Test Statistic					0.126	Lilliefors Lognormal GOF Test					
402	5% Lilliefors Critical Value					0.209	Data appear Lognormal at 5% Significance Level					
403	Data appear Lognormal at 5% Significance Level											
404												
405	Lognormal Statistics											
406	Minimum of Logged Data					1.435	Mean of logged Data					1.963
407	Maximum of Logged Data					2.912	SD of logged Data					0.384
408												
409	Assuming Lognormal Distribution											
410	95% H-UCL					9.168	90% Chebyshev (MVUE) UCL					9.752
411	95% Chebyshev (MVUE) UCL					10.71	97.5% Chebyshev (MVUE) UCL					12.04
412	99% Chebyshev (MVUE) UCL					14.66						
413												
414	Nonparametric Distribution Free UCL Statistics											
415	Data appear to follow a Discernible Distribution at 5% Significance Level											
416												
417	Nonparametric Distribution Free UCLs											
418	95% CLT UCL					8.978	95% Jackknife UCL					9.053
419	95% Standard Bootstrap UCL					8.95	95% Bootstrap-t UCL					9.698
420	95% Hall's Bootstrap UCL					15.55	95% Percentile Bootstrap UCL					9.067
421	95% BCA Bootstrap UCL					9.372						
422	90% Chebyshev(Mean, Sd) UCL					10.05	95% Chebyshev(Mean, Sd) UCL					11.13
423	97.5% Chebyshev(Mean, Sd) UCL					12.63	99% Chebyshev(Mean, Sd) UCL					15.57
424												
425	Suggested UCL to Use											

	A	B	C	D	E	F	G	H	I	J	K	L
426	95% Student's-t UCL					9.053						
427												
428	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL											
429	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002											
430	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
431	For additional insight the user may want to consult a statistician.											
432												
433												
434	Cobalt											
435												
436	General Statistics											
437	Total Number of Observations					18	Number of Distinct Observations					17
438							Number of Missing Observations					0
439	Minimum					1.1	Mean					3.289
440	Maximum					6.4	Median					2.8
441	SD					1.653	Std. Error of Mean					0.39
442	Coefficient of Variation					0.503	Skewness					0.537
443												
444	Normal GOF Test											
445	Shapiro Wilk Test Statistic					0.927	Shapiro Wilk GOF Test					
446	5% Shapiro Wilk Critical Value					0.897	Data appear Normal at 5% Significance Level					
447	Lilliefors Test Statistic					0.162	Lilliefors GOF Test					
448	5% Lilliefors Critical Value					0.209	Data appear Normal at 5% Significance Level					
449	Data appear Normal at 5% Significance Level											
450												
451	Assuming Normal Distribution											
452	95% Normal UCL					95% UCLs (Adjusted for Skewness)						
453	95% Student's-t UCL					3.967	95% Adjusted-CLT UCL (Chen-1995)					3.982
454							95% Modified-t UCL (Johnson-1978)					3.975
455												
456	Gamma GOF Test											
457	A-D Test Statistic					0.323	Anderson-Darling Gamma GOF Test					
458	5% A-D Critical Value					0.743	Detected data appear Gamma Distributed at 5% Significance Level					
459	K-S Test Statistic					0.14	Kolmogrov-Smirnoff Gamma GOF Test					
460	5% K-S Critical Value					0.205	Detected data appear Gamma Distributed at 5% Significance Level					
461	Detected data appear Gamma Distributed at 5% Significance Level											
462												
463	Gamma Statistics											
464	k hat (MLE)					4.114	k star (bias corrected MLE)					3.465
465	Theta hat (MLE)					0.8	Theta star (bias corrected MLE)					0.949
466	nu hat (MLE)					148.1	nu star (bias corrected)					124.7
467	MLE Mean (bias corrected)					3.289	MLE Sd (bias corrected)					1.767
468							Approximate Chi Square Value (0.05)					99.95
469	Adjusted Level of Significance					0.0357	Adjusted Chi Square Value					97.82
470												
471	Assuming Gamma Distribution											
472	95% Approximate Gamma UCL (use when n>=50))					4.105	5% Adjusted Gamma UCL (use when n<50)					4.194
473												
474	Lognormal GOF Test											
475	Shapiro Wilk Test Statistic					0.96	Shapiro Wilk Lognormal GOF Test					
476	5% Shapiro Wilk Critical Value					0.897	Data appear Lognormal at 5% Significance Level					
477	Lilliefors Test Statistic					0.147	Lilliefors Lognormal GOF Test					
478	5% Lilliefors Critical Value					0.209	Data appear Lognormal at 5% Significance Level					
479	Data appear Lognormal at 5% Significance Level											
480												
481	Lognormal Statistics											
482	Minimum of Logged Data					0.0953	Mean of logged Data					1.064
483	Maximum of Logged Data					1.856	SD of logged Data					0.529
484												
485	Assuming Lognormal Distribution											
486	95% H-UCL					4.338	90% Chebyshev (MVUE) UCL					4.589
487	95% Chebyshev (MVUE) UCL					5.171	97.5% Chebyshev (MVUE) UCL					5.979
488	99% Chebyshev (MVUE) UCL					7.565						
489												
490	Nonparametric Distribution Free UCL Statistics											
491	Data appear to follow a Discernible Distribution at 5% Significance Level											
492												
493	Nonparametric Distribution Free UCLs											
494	95% CLT UCL					3.93	95% Jackknife UCL					3.967
495	95% Standard Bootstrap UCL					3.898	95% Bootstrap-t UCL					3.994
496	95% Hall's Bootstrap UCL					3.962	95% Percentile Bootstrap UCL					3.878
497	95% BCA Bootstrap UCL					3.978						
498	90% Chebyshev(Mean, Sd) UCL					4.458	95% Chebyshev(Mean, Sd) UCL					4.987
499	97.5% Chebyshev(Mean, Sd) UCL					5.722	99% Chebyshev(Mean, Sd) UCL					7.165
500												
501	Suggested UCL to Use											
502	95% Student's-t UCL					3.967						
503												
504	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL											
505	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002											
506	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
507	For additional insight the user may want to consult a statistician.											
508												
509												
510	Copper											

	A	B	C	D	E	F	G	H	I	J	K	L
511												
512	General Statistics											
513	Total Number of Observations					18	Number of Distinct Observations					16
514							Number of Missing Observations					0
515	Minimum					1.9	Mean					5.467
516	Maximum					8.5	Median					5.5
517	SD					1.864	Std. Error of Mean					0.439
518	Coefficient of Variation					0.341	Skewness					-0.184
519												
520	Normal GOF Test											
521	Shapiro Wilk Test Statistic					0.973	Shapiro Wilk GOF Test					
522	5% Shapiro Wilk Critical Value					0.897	Data appear Normal at 5% Significance Level					
523	Lilliefors Test Statistic					0.0892	Lilliefors GOF Test					
524	5% Lilliefors Critical Value					0.209	Data appear Normal at 5% Significance Level					
525	Data appear Normal at 5% Significance Level											
526												
527	Assuming Normal Distribution											
528	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
529	95% Student's-t UCL					6.231	95% Adjusted-CLT UCL (Chen-1995)					6.169
530							95% Modified-t UCL (Johnson-1978)					6.228
531												
532	Gamma GOF Test											
533	A-D Test Statistic					0.355	Anderson-Darling Gamma GOF Test					
534	5% A-D Critical Value					0.741	Detected data appear Gamma Distributed at 5% Significance Level					
535	K-S Test Statistic					0.115	Kolmogrov-Smirnoff Gamma GOF Test					
536	5% K-S Critical Value					0.204	Detected data appear Gamma Distributed at 5% Significance Level					
537	Detected data appear Gamma Distributed at 5% Significance Level											
538												
539	Gamma Statistics											
540	k hat (MLE)					7.536	k star (bias corrected MLE)					6.317
541	Theta hat (MLE)					0.725	Theta star (bias corrected MLE)					0.865
542	nu hat (MLE)					271.3	nu star (bias corrected)					227.4
543	MLE Mean (bias corrected)					5.467	MLE Sd (bias corrected)					2.175
544							Approximate Chi Square Value (0.05)					193.5
545	Adjusted Level of Significance					0.0357	Adjusted Chi Square Value					190.5
546												
547	Assuming Gamma Distribution											
548	95% Approximate Gamma UCL (use when n>=50))					6.424	Adjusted Gamma UCL (use when n<50)					6.526
549												
550	Lognormal GOF Test											
551	Shapiro Wilk Test Statistic					0.907	Shapiro Wilk Lognormal GOF Test					
552	5% Shapiro Wilk Critical Value					0.897	Data appear Lognormal at 5% Significance Level					
553	Lilliefors Test Statistic					0.141	Lilliefors Lognormal GOF Test					
554	5% Lilliefors Critical Value					0.209	Data appear Lognormal at 5% Significance Level					
555	Data appear Lognormal at 5% Significance Level											
556												
557	Lognormal Statistics											
558	Minimum of Logged Data					0.642	Mean of logged Data					1.631
559	Maximum of Logged Data					2.14	SD of logged Data					0.405
560												
561	Assuming Lognormal Distribution											
562	95% H-UCL					6.706	90% Chebyshev (MVUE) UCL					7.135
563	95% Chebyshev (MVUE) UCL					7.867	97.5% Chebyshev (MVUE) UCL					8.884
564	99% Chebyshev (MVUE) UCL					10.88						
565												
566	Nonparametric Distribution Free UCL Statistics											
567	Data appear to follow a Discernible Distribution at 5% Significance Level											
568												
569	Nonparametric Distribution Free UCLs											
570	95% CLT UCL					6.189	95% Jackknife UCL					6.231
571	95% Standard Bootstrap UCL					6.179	95% Bootstrap-t UCL					6.225
572	95% Hall's Bootstrap UCL					6.144	95% Percentile Bootstrap UCL					6.183
573	95% BCA Bootstrap UCL					6.122						
574	90% Chebyshev(Mean, Sd) UCL					6.785	95% Chebyshev(Mean, Sd) UCL					7.382
575	97.5% Chebyshev(Mean, Sd) UCL					8.211	99% Chebyshev(Mean, Sd) UCL					9.839
576												
577	Suggested UCL to Use											
578	95% Student's-t UCL					6.231						
579												
580	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL											
581	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002'											
582	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
583	For additional insight the user may want to consult a statistician.											
584												
585	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
586	reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.											
587												
588												
589												
590	Nickel											
591												
592	General Statistics											
593	Total Number of Observations					18	Number of Distinct Observations					15
594							Number of Missing Observations					0
595	Minimum					3.9	Mean					7.028

	A	B	C	D	E	F	G	H	I	J	K	L	
596	Maximum					12.1	Median					7.5	
597	SD					2.108	Std. Error of Mean					0.497	
598	Coefficient of Variation					0.3	Skewness					0.38	
599													
600	Normal GOF Test												
601	Shapiro Wilk Test Statistic					0.943	Shapiro Wilk GOF Test						
602	5% Shapiro Wilk Critical Value					0.897	Data appear Normal at 5% Significance Level						
603	Lilliefors Test Statistic					0.144	Lilliefors GOF Test						
604	5% Lilliefors Critical Value					0.209	Data appear Normal at 5% Significance Level						
605	Data appear Normal at 5% Significance Level												
606													
607	Assuming Normal Distribution												
608	95% Normal UCL					95% UCLs (Adjusted for Skewness)							
609	95% Student's-t UCL					7.892	95% Adjusted-CLT UCL (Chen-1995)					7.893	
610							95% Modified-t UCL (Johnson-1978)					7.9	
611													
612	Gamma GOF Test												
613	A-D Test Statistic					0.472	Anderson-Darling Gamma GOF Test						
614	5% A-D Critical Value					0.739	Detected data appear Gamma Distributed at 5% Significance Level						
615	K-S Test Statistic					0.181	Kolmogrov-Smirnoff Gamma GOF Test						
616	5% K-S Critical Value					0.203	Detected data appear Gamma Distributed at 5% Significance Level						
617	Detected data appear Gamma Distributed at 5% Significance Level												
618													
619	Gamma Statistics												
620	k hat (MLE)					11.37	k star (bias corrected MLE)					9.51	
621	Theta hat (MLE)					0.618	Theta star (bias corrected MLE)					0.739	
622	nu hat (MLE)					409.2	nu star (bias corrected)					342.4	
623	MLE Mean (bias corrected)					7.028	MLE Sd (bias corrected)					2.279	
624							Approximate Chi Square Value (0.05)					300.5	
625	Adjusted Level of Significance					0.0357	Adjusted Chi Square Value					296.7	
626													
627	Assuming Gamma Distribution												
628	95% Approximate Gamma UCL (use when n>=50))					8.007	% Adjusted Gamma UCL (use when n<50)					8.109	
629													
630	Lognormal GOF Test												
631	Shapiro Wilk Test Statistic					0.934	Shapiro Wilk Lognormal GOF Test						
632	5% Shapiro Wilk Critical Value					0.897	Data appear Lognormal at 5% Significance Level						
633	Lilliefors Test Statistic					0.192	Lilliefors Lognormal GOF Test						
634	5% Lilliefors Critical Value					0.209	Data appear Lognormal at 5% Significance Level						
635	Data appear Lognormal at 5% Significance Level												
636													
637	Lognormal Statistics												
638	Minimum of Logged Data					1.361	Mean of logged Data					1.905	
639	Maximum of Logged Data					2.493	SD of logged Data					0.314	
640													
641	Assuming Lognormal Distribution												
642	95% H-UCL					8.134	90% Chebyshev (MVUE) UCL					8.622	
643	95% Chebyshev (MVUE) UCL					9.339	97.5% Chebyshev (MVUE) UCL					10.33	
644	99% Chebyshev (MVUE) UCL					12.29							
645													
646	Nonparametric Distribution Free UCL Statistics												
647	Data appear to follow a Discernible Distribution at 5% Significance Level												
648													
649	Nonparametric Distribution Free UCLs												
650	95% CLT UCL					7.845	95% Jackknife UCL					7.892	
651	95% Standard Bootstrap UCL					7.841	95% Bootstrap-t UCL					7.949	
652	95% Hall's Bootstrap UCL					7.966	95% Percentile Bootstrap UCL					7.817	
653	95% BCA Bootstrap UCL					7.867							
654	90% Chebyshev(Mean, Sd) UCL					8.518	95% Chebyshev(Mean, Sd) UCL					9.194	
655	97.5% Chebyshev(Mean, Sd) UCL					10.13	99% Chebyshev(Mean, Sd) UCL					11.97	
656													
657	Suggested UCL to Use												
658	95% Student's-t UCL					7.892							
659													
660	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL												
661	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002'												
662	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets												
663	For additional insight the user may want to consult a statistician.												
664													
665													
666	Selenium												
667													
668	General Statistics												
669	Total Number of Observations					18	Number of Distinct Observations					15	
670	Number of Detects					16	Number of Non-Detects					2	
671	Number of Distinct Detects					13	Number of Distinct Non-Detects					2	
672	Minimum Detect					0.77	Minimum Non-Detect					0.81	
673	Maximum Detect					1.3	Maximum Non-Detect					0.88	
674	Variance Detects					0.036	Percent Non-Detects					11.11%	
675	Mean Detects					1.005	SD Detects					0.19	
676	Median Detects					0.975	CV Detects					0.189	
677	Skewness Detects					0.49	Kurtosis Detects					-1.187	
678	Mean of Logged Detects					-0.0113	SD of Logged Detects					0.185	
679													
680	Normal GOF Test on Detects Only												



A	B	C	D	E	F	G	H	I	J	K	L
681	Shapiro Wilk Test Statistic				0.894	Shapiro Wilk GOF Test					
682	5% Shapiro Wilk Critical Value				0.887	Detected Data appear Normal at 5% Significance Level					
683	Lilliefors Test Statistic				0.153	Lilliefors GOF Test					
684	5% Lilliefors Critical Value				0.222	Detected Data appear Normal at 5% Significance Level					
685	Detected Data appear Normal at 5% Significance Level										
686											
687	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs										
688	Mean				0.982	Standard Error of Mean				0.0452	
689	SD				0.185	95% KM (BCA) UCL				1.06	
690	95% KM (t) UCL				1.06	95% KM (Percentile Bootstrap) UCL				1.057	
691	95% KM (z) UCL				1.056	95% KM Bootstrap t UCL				1.07	
692	90% KM Chebyshev UCL				1.117	95% KM Chebyshev UCL				1.179	
693	97.5% KM Chebyshev UCL				1.264	99% KM Chebyshev UCL				1.431	
694											
695	Gamma GOF Tests on Detected Observations Only										
696	A-D Test Statistic				0.544	Anderson-Darling GOF Test					
697	5% A-D Critical Value				0.736	Detected data appear Gamma Distributed at 5% Significance Level					
698	K-S Test Statistic				0.158	Kolmogrov-Smirnoff GOF					
699	5% K-S Critical Value				0.215	Detected data appear Gamma Distributed at 5% Significance Level					
700	Detected data appear Gamma Distributed at 5% Significance Level										
701											
702	Gamma Statistics on Detected Data Only										
703	k hat (MLE)				30.94	k star (bias corrected MLE)				25.18	
704	Theta hat (MLE)				0.0325	Theta star (bias corrected MLE)				0.0399	
705	nu hat (MLE)				990.1	nu star (bias corrected)				805.8	
706	MLE Mean (bias corrected)				1.005	MLE Sd (bias corrected)				0.2	
707											
708	Gamma Kaplan-Meier (KM) Statistics										
709	k hat (KM)				28.08	nu hat (KM)				1011	
710	Approximate Chi Square Value (N/A, $\alpha$ )				938.2	Adjusted Chi Square Value (N/A, $\beta$ )				931.5	
711	95% Gamma Approximate KM-UCL (use when $n \geq 50$ )				1.058	Gamma Adjusted KM-UCL (use when $n < 50$ )				1.066	
712											
713	Gamma ROS Statistics using Imputed Non-Detects										
714	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
715	GROS may not be used when kstar of detected data is small such as < 0.1										
716	For such situations, GROS method tends to yield inflated values of UCLs and BTVs										
717	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
718	Minimum				0.719	Mean				0.979	
719	Maximum				1.3	Median				0.94	
720	SD				0.195	CV				0.199	
721	k hat (MLE)				27.94	k star (bias corrected MLE)				23.32	
722	Theta hat (MLE)				0.035	Theta star (bias corrected MLE)				0.042	
723	nu hat (MLE)				1006	nu star (bias corrected)				839.7	
724	MLE Mean (bias corrected)				0.979	MLE Sd (bias corrected)				0.203	
725						Adjusted Level of Significance ( $\beta$ )				0.0357	
726	Approximate Chi Square Value (839.67, $\alpha$ )				773.4	Adjusted Chi Square Value (839.67, $\beta$ )				767.3	
727	95% Gamma Approximate UCL (use when $n \geq 50$ )				1.063	Gamma Adjusted UCL (use when $n < 50$ )				1.071	
728											
729	Lognormal GOF Test on Detected Observations Only										
730	Shapiro Wilk Test Statistic				0.912	Shapiro Wilk GOF Test					
731	5% Shapiro Wilk Critical Value				0.887	Detected Data appear Lognormal at 5% Significance Level					
732	Lilliefors Test Statistic				0.15	Lilliefors GOF Test					
733	5% Lilliefors Critical Value				0.222	Detected Data appear Lognormal at 5% Significance Level					
734	Detected Data appear Lognormal at 5% Significance Level										
735											
736	Lognormal ROS Statistics Using Imputed Non-Detects										
737	Mean in Original Scale				0.98	Mean in Log Scale				-0.0378	
738	SD in Original Scale				0.193	SD in Log Scale				0.191	
739	95% t UCL (assumes normality of ROS data)				1.059	95% Percentile Bootstrap UCL				1.057	
740	95% BCA Bootstrap UCL				1.059	95% Bootstrap t UCL				1.072	
741	95% H-UCL (Log ROS)				1.065						
742											
743	UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed										
744	KM Mean (logged)				-0.0353	95% H-UCL (KM -Log)				1.062	
745	KM SD (logged)				0.182	95% Critical H Value (KM-Log)				1.777	
746	KM Standard Error of Mean (logged)				0.0445						
747											
748	DL/2 Statistics										
749	DL/2 Normal					DL/2 Log-Transformed					
750	Mean in Original Scale				0.94	Mean in Log Scale				-0.106	
751	SD in Original Scale				0.259	SD in Log Scale				0.326	
752	95% t UCL (Assumes normality)				1.047	95% H-Stat UCL				1.1	
753	DL/2 is not a recommended method, provided for comparisons and historical reasons										
754											
755	Nonparametric Distribution Free UCL Statistics										
756	Detected Data appear Normal Distributed at 5% Significance Level										
757											
758	Suggested UCL to Use										
759	95% KM (t) UCL				1.06	95% KM (Percentile Bootstrap) UCL				1.057	
760											
761	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL										
762	Recommendations are based upon data size, data distribution, and skewness.										
763	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006)										
764	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician										
765											

	A	B	C	D	E	F	G	H	I	J	K	L
766	<b>Vanadium</b>											
767												
768	<b>General Statistics</b>											
769	Total Number of Observations				18		Number of Distinct Observations				18	
770							Number of Missing Observations				0	
771	Minimum				4.5		Mean				14.06	
772	Maximum				22.6		Median				14.3	
773	SD				5.826		Std. Error of Mean				1.373	
774	Coefficient of Variation				0.414		Skewness				0.0127	
775												
776	<b>Normal GOF Test</b>											
777	Shapiro Wilk Test Statistic				0.927		<b>Shapiro Wilk GOF Test</b>					
778	5% Shapiro Wilk Critical Value				0.897		Data appear Normal at 5% Significance Level					
779	Lilliefors Test Statistic				0.172		<b>Lilliefors GOF Test</b>					
780	5% Lilliefors Critical Value				0.209		Data appear Normal at 5% Significance Level					
781	<b>Data appear Normal at 5% Significance Level</b>											
782												
783	<b>Assuming Normal Distribution</b>											
784	<b>95% Normal UCL</b>						<b>95% UCLs (Adjusted for Skewness)</b>					
785	95% Student's-t UCL				16.45		95% Adjusted-CLT UCL (Chen-1995)				16.32	
786							95% Modified-t UCL (Johnson-1978)				16.45	
787												
788	<b>Gamma GOF Test</b>											
789	A-D Test Statistic				0.534		<b>Anderson-Darling Gamma GOF Test</b>					
790	5% A-D Critical Value				0.743		Detected data appear Gamma Distributed at 5% Significance Level					
791	K-S Test Statistic				0.151		<b>Kolmogrov-Smirnoff Gamma GOF Test</b>					
792	5% K-S Critical Value				0.204		Detected data appear Gamma Distributed at 5% Significance Level					
793	<b>Detected data appear Gamma Distributed at 5% Significance Level</b>											
794												
795	<b>Gamma Statistics</b>											
796	k hat (MLE)				5.433		k star (bias corrected MLE)				4.564	
797	Theta hat (MLE)				2.588		Theta star (bias corrected MLE)				3.081	
798	nu hat (MLE)				195.6		nu star (bias corrected)				164.3	
799	MLE Mean (bias corrected)				14.06		MLE Sd (bias corrected)				6.581	
800							Approximate Chi Square Value (0.05)				135.7	
801	Adjusted Level of Significance				0.0357		Adjusted Chi Square Value				133.2	
802												
803	<b>Assuming Gamma Distribution</b>											
804	95% Approximate Gamma UCL (use when n>=50))				17.03		95% Adjusted Gamma UCL (use when n<50)				17.35	
805												
806	<b>Lognormal GOF Test</b>											
807	Shapiro Wilk Test Statistic				0.92		<b>Shapiro Wilk Lognormal GOF Test</b>					
808	5% Shapiro Wilk Critical Value				0.897		Data appear Lognormal at 5% Significance Level					
809	Lilliefors Test Statistic				0.164		<b>Lilliefors Lognormal GOF Test</b>					
810	5% Lilliefors Critical Value				0.209		Data appear Lognormal at 5% Significance Level					
811	<b>Data appear Lognormal at 5% Significance Level</b>											
812												
813	<b>Lognormal Statistics</b>											
814	Minimum of Logged Data				1.504		Mean of logged Data				2.549	
815	Maximum of Logged Data				3.118		SD of logged Data				0.469	
816												
817	<b>Assuming Lognormal Distribution</b>											
818	95% H-UCL				17.91		90% Chebyshev (MVUE) UCL				19.03	
819	95% Chebyshev (MVUE) UCL				21.23		97.5% Chebyshev (MVUE) UCL				24.28	
820	99% Chebyshev (MVUE) UCL				30.27							
821												
822	<b>Nonparametric Distribution Free UCL Statistics</b>											
823	<b>Data appear to follow a Discernible Distribution at 5% Significance Level</b>											
824												
825	<b>Nonparametric Distribution Free UCLs</b>											
826	95% CLT UCL				16.32		95% Jackknife UCL				16.45	
827	95% Standard Bootstrap UCL				16.29		95% Bootstrap-t UCL				16.59	
828	95% Hall's Bootstrap UCL				16.26		95% Percentile Bootstrap UCL				16.32	
829	95% BCA Bootstrap UCL				16.31							
830	90% Chebyshev(Mean, Sd) UCL				18.18		95% Chebyshev(Mean, Sd) UCL				20.05	
831	97.5% Chebyshev(Mean, Sd) UCL				22.64		99% Chebyshev(Mean, Sd) UCL				27.72	
832												
833	<b>Suggested UCL to Use</b>											
834	95% Student's-t UCL				16.45							
835												
836	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL											
837	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
838	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
839	For additional insight the user may want to consult a statistician.											
840												