

	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	e/Time of Computation		8/13/2015 3:00:50 PM									
5	From File		ProUCLinput C-12-004_0-5.xls									
6	Full Precision		OFF									
7	Confidence Coefficient		95%									
8	f Bootstrap Operations		2000									
9												
10												
11	Aluminum											
12												
13	General Statistics											
14	Total Number of Observations				10		Number of Distinct Observations				10	
15							Number of Missing Observations				0	
16	Minimum				5470		Mean				12766	
17	Maximum				18500		Median				12250	
18	SD				4065		Std. Error of Mean				1285	
19	Coefficient of Variation				0.31		Skewness				-0.055	
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic				0.93		Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value				0.84		Data appear Normal at 5% Significance Level					
24	Lilliefors Test Statistic				0.19		Lilliefors GOF Test					
25	5% Lilliefors Critical Value				0.28		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				15122		95% Adjusted-CLT UCL (Chen-1995)				14856	
31							95% Modified-t UCL (Johnson-1978)				15119	
32												
33	Gamma GOF Test											
34	A-D Test Statistic				0.38		Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value				0.72		data appear Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic				0.15		Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value				0.26		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)				9.64		k star (bias corrected MLE)				6.81	
42	Theta hat (MLE)				1324		Theta star (bias corrected MLE)				1873	
43	nu hat (MLE)				192.9		nu star (bias corrected)				136.3	
44	MLE Mean (bias corrected)				12766		MLE Sd (bias corrected)				4889	
45							Approximate Chi Square Value (0.05)				110.4	
46	Adjusted Level of Significance				0.026		Adjusted Chi Square Value				106.3	
47												
48	Assuming Gamma Distribution											
49	Approximate Gamma UCL (use when n>=50)				15771		Adjusted Gamma UCL (use when n<50)				16373	
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic				0.89		Shapiro Wilk Lognormal GOF Test					
53	5% Shapiro Wilk Critical Value				0.84		Data appear Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic				0.17		Lilliefors Lognormal GOF Test					
55	5% Lilliefors Critical Value				0.28		Data appear Lognormal at 5% Significance Level					
56	Data appear Lognormal at 5% Significance Level											
57												
58	Lognormal Statistics											
59	Minimum of Logged Data				8.60		Mean of logged Data				9.40	
60	Maximum of Logged Data				9.82		SD of logged Data				0.35	
61												
62	Assuming Lognormal Distribution											
63	95% H-UCL				16493		90% Chebyshev (MVUE) UCL				17245	

	A	B	C	D	E	F	G	H	I	J	K	L
64	95% Chebyshev (MVUE) UCL					19244	97.5% Chebyshev (MVUE) UCL					22020
65	99% Chebyshev (MVUE) UCL					27472						
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					14880	95% Jackknife UCL					15122
72	95% Standard Bootstrap UCL					14766	95% Bootstrap-t UCL					15142
73	95% Hall's Bootstrap UCL					15036	95% Percentile Bootstrap UCL					14730
74	95% BCA Bootstrap UCL					14799						
75	90% Chebyshev(Mean, Sd) UCL					16622	95% Chebyshev(Mean, Sd) UCL					18369
76	97.5% Chebyshev(Mean, Sd) UCL					20794	99% Chebyshev(Mean, Sd) UCL					25556
77												
78	Suggested UCL to Use											
79	95% Student's-t UCL					15122						
80												
81	ations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
82	ommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
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												
86	highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may											
87	reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.											
88												
89												
90	Barium											
91												
92	General Statistics											
93	Total Number of Observations					10	Number of Distinct Observations					9
94							Number of Missing Observations					0
95	Minimum					143	Mean					186.9
96	Maximum					279	Median					167.5
97	SD					46.25	Std. Error of Mean					14.64
98	Coefficient of Variation					0.24	Skewness					1.40
99												
100	Normal GOF Test											
101	Shapiro Wilk Test Statistic					0.78	Shapiro Wilk GOF Test					
102	5% Shapiro Wilk Critical Value					0.84	Data Not Normal at 5% Significance Level					
103	Lilliefors Test Statistic					0.33	Lilliefors GOF Test					
104	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
105	Data Not Normal at 5% Significance Level											
106												
107	Assuming Normal Distribution											
108	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
109	95% Student's-t UCL					213.7	95% Adjusted-CLT UCL (Chen-1995)					217.9
110							95% Modified-t UCL (Johnson-1978)					214.8
111												
112	Gamma GOF Test											
113	A-D Test Statistic					0.95	Anderson-Darling Gamma GOF Test					
114	5% A-D Critical Value					0.72	Data Not Gamma Distributed at 5% Significance Level					
115	K-S Test Statistic					0.32	Kolmogrov-Smirnoff Gamma GOF Test					
116	5% K-S Critical Value					0.26	Data Not Gamma Distributed at 5% Significance Level					
117	Data Not Gamma Distributed at 5% Significance Level											
118												
119	Gamma Statistics											
120	k hat (MLE)					20.83	k star (bias corrected MLE)					14.64
121	Theta hat (MLE)					8.95	Theta star (bias corrected MLE)					12.71
122	nu hat (MLE)					417.7	nu star (bias corrected)					293.7
123	MLE Mean (bias corrected)					186.9	MLE Sd (bias corrected)					48.7
124							Approximate Chi Square Value (0.05)					255
125	Adjusted Level of Significance					0.024	Adjusted Chi Square Value					248.7
126												

	A	B	C	D	E	F	G	H	I	J	K	L
127	Assuming Gamma Distribution											
128	Approximate Gamma UCL (use when n>=50))					215.3	Adjusted Gamma UCL (use when n<50)					220.7
129												
130	Lognormal GOF Test											
131	Shapiro Wilk Test Statistic					0.82	Shapiro Wilk Lognormal GOF Test					
132	5% Shapiro Wilk Critical Value					0.84	Data Not Lognormal at 5% Significance Level					
133	Lilliefors Test Statistic					0.31	Lilliefors Lognormal GOF Test					
134	5% Lilliefors Critical Value					0.28	Data Not Lognormal at 5% Significance Level					
135	Data Not Lognormal at 5% Significance Level											
136												
137	Lognormal Statistics											
138	Minimum of Logged Data					4.96	Mean of logged Data					5.20
139	Maximum of Logged Data					5.63	SD of logged Data					0.22
140												
141	Assuming Lognormal Distribution											
142	95% H-UCL					215.6	90% Chebyshev (MVUE) UCL					226.4
143	95% Chebyshev (MVUE) UCL					244.4	97.5% Chebyshev (MVUE) UCL					269.4
144	99% Chebyshev (MVUE) UCL					318.6						
145												
146	Nonparametric Distribution Free UCL Statistics											
147	Data do not follow a Discernible Distribution (0.05)											
148												
149	Nonparametric Distribution Free UCLs											
150	95% CLT UCL					211	95% Jackknife UCL					213.7
151	95% Standard Bootstrap UCL					210	95% Bootstrap-t UCL					252.8
152	95% Hall's Bootstrap UCL					332.7	95% Percentile Bootstrap UCL					211.6
153	95% BCA Bootstrap UCL					216.4						
154	90% Chebyshev(Mean, Sd) UCL					230.8	95% Chebyshev(Mean, Sd) UCL					250.7
155	97.5% Chebyshev(Mean, Sd) UCL					278.3	99% Chebyshev(Mean, Sd) UCL					332.6
156												
157	Suggested UCL to Use											
158	95% Student's-t UCL					213.7	or 95% Modified-t UCL					214.8
159												
160	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
161	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Singh											
162	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
163	For additional insight the user may want to consult a statistician.											
164												
165												
166	Calcium											
167												
168	General Statistics											
169	Total Number of Observations					10	Number of Distinct Observations					10
170							Number of Missing Observations					0
171	Minimum					1990	Mean					2429
172	Maximum					3810	Median					2250
173	SD					540	Std. Error of Mean					170.8
174	Coefficient of Variation					0.22	Skewness					2.13
175												
176	Normal GOF Test											
177	Shapiro Wilk Test Statistic					0.75	Shapiro Wilk GOF Test					
178	5% Shapiro Wilk Critical Value					0.84	Data Not Normal at 5% Significance Level					
179	Lilliefors Test Statistic					0.23	Lilliefors GOF Test					
180	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level					
181	Data appear Approximate Normal at 5% Significance Level											
182												
183	Assuming Normal Distribution											
184	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
185	95% Student's-t UCL					2742	95% Adjusted-CLT UCL (Chen-1995)					2833
186							95% Modified-t UCL (Johnson-1978)					2761
187												
188	Gamma GOF Test											
189	A-D Test Statistic					0.77	Anderson-Darling Gamma GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L	
253	Shapiro Wilk Test Statistic					0.62	Shapiro Wilk GOF Test						
254	5% Shapiro Wilk Critical Value					0.84	Data Not Normal at 5% Significance Level						
255	Lilliefors Test Statistic					0.37	Lilliefors GOF Test						
256	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level						
257	Data Not Normal at 5% Significance Level												
258													
259	Assuming Normal Distribution												
260	95% Normal UCL						95% UCLs (Adjusted for Skewness)						
261	95% Student's-t UCL					18.4	95% Adjusted-CLT UCL (Chen-1995)					20.0	
262							95% Modified-t UCL (Johnson-1978)					18.7	
263													
264	Gamma GOF Test												
265	A-D Test Statistic					1.20	Anderson-Darling Gamma GOF Test						
266	5% A-D Critical Value					0.72	Data Not Gamma Distributed at 5% Significance Level						
267	K-S Test Statistic					0.34	Kolmogrov-Smirnoff Gamma GOF Test						
268	5% K-S Critical Value					0.26	Data Not Gamma Distributed at 5% Significance Level						
269	Data Not Gamma Distributed at 5% Significance Level												
270													
271	Gamma Statistics												
272	k hat (MLE)					7.13	k star (bias corrected MLE)					5.06	
273	Theta hat (MLE)					2.01	Theta star (bias corrected MLE)					2.83	
274	nu hat (MLE)					142.7	nu star (bias corrected)					101.2	
275	MLE Mean (bias corrected)					14.3	MLE Sd (bias corrected)					6.37	
276							Approximate Chi Square Value (0.05)					78.9	
277	Adjusted Level of Significance					0.02	Adjusted Chi Square Value					75.5	
278													
279	Assuming Gamma Distribution												
280	Approximate Gamma UCL (use when n>=50)					18.3	Adjusted Gamma UCL (use when n<50)					19.1	
281													
282	Lognormal GOF Test												
283	Shapiro Wilk Test Statistic					0.77	Shapiro Wilk Lognormal GOF Test						
284	5% Shapiro Wilk Critical Value					0.84	Data Not Lognormal at 5% Significance Level						
285	Lilliefors Test Statistic					0.32	Lilliefors Lognormal GOF Test						
286	5% Lilliefors Critical Value					0.28	Data Not Lognormal at 5% Significance Level						
287	Data Not Lognormal at 5% Significance Level												
288													
289	Lognormal Statistics												
290	Minimum of Logged Data					2.21	Mean of logged Data					2.59	
291	Maximum of Logged Data					3.51	SD of logged Data					0.36	
292													
293	Assuming Lognormal Distribution												
294	95% H-UCL					18.2	90% Chebyshev (MVUE) UCL					19.0	
295	95% Chebyshev (MVUE) UCL					21.2	97.5% Chebyshev (MVUE) UCL					24.3	
296	99% Chebyshev (MVUE) UCL					30.3							
297													
298	Nonparametric Distribution Free UCL Statistics												
299	Data do not follow a Discernible Distribution (0.05)												
300													
301	Nonparametric Distribution Free UCLs												
302	95% CLT UCL					17.9	95% Jackknife UCL					18.4	
303	95% Standard Bootstrap UCL					17.8	95% Bootstrap-t UCL					29.3	
304	95% Hall's Bootstrap UCL					37.6	95% Percentile Bootstrap UCL					18.3	
305	95% BCA Bootstrap UCL					20.3							
306	90% Chebyshev(Mean, Sd) UCL					21.0	95% Chebyshev(Mean, Sd) UCL					24.0	
307	97.5% Chebyshev(Mean, Sd) UCL					28.2	99% Chebyshev(Mean, Sd) UCL					36.4	
308													
309	Suggested UCL to Use												
310	95% Student's-t UCL					18.4	or 95% Modified-t UCL					18.7	
311													
312	Instructions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate												
313	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and												
314	Singh and Singh and Singh (2003). However, simulations results will not cover all Real World data sets												
315	For additional insight the user may want to consult a statistician.												

	A	B	C	D	E	F	G	H	I	J	K	L	
316													
317													
318	Cobalt												
319													
320	General Statistics												
321	Total Number of Observations					10	Number of Distinct Observations					10	
322							Number of Missing Observations					0	
323	Minimum					4.56	Mean					5.33	
324	Maximum					7.27	Median					5.01	
325	SD					0.87	Std. Error of Mean					0.27	
326	Coefficient of Variation					0.16	Skewness					1.53	
327													
328	Normal GOF Test												
329	Shapiro Wilk Test Statistic					0.81	Shapiro Wilk GOF Test						
330	5% Shapiro Wilk Critical Value					0.84	Data Not Normal at 5% Significance Level						
331	Lilliefors Test Statistic					0.27	Lilliefors GOF Test						
332	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level						
333	Data appear Approximate Normal at 5% Significance Level												
334													
335	Assuming Normal Distribution												
336	95% Normal UCL						95% UCLs (Adjusted for Skewness)						
337	95% Student's-t UCL					5.84	95% Adjusted-CLT UCL (Chen-1995)					5.94	
338							95% Modified-t UCL (Johnson-1978)					5.87	
339													
340	Gamma GOF Test												
341	A-D Test Statistic					0.73	Anderson-Darling Gamma GOF Test						
342	5% A-D Critical Value					0.72	Data Not Gamma Distributed at 5% Significance Level						
343	K-S Test Statistic					0.25	Kolmogrov-Smirnoff Gamma GOF Test						
344	5% K-S Critical Value					0.26	Data appear Gamma Distributed at 5% Significance Level						
345	Detected data follow Appr. Gamma Distribution at 5% Significance Level												
346													
347	Gamma Statistics												
348	k hat (MLE)					45.74	k star (bias corrected MLE)					32.07	
349	Theta hat (MLE)					0.11	Theta star (bias corrected MLE)					0.16	
350	nu hat (MLE)					914.5	nu star (bias corrected)					641.5	
351	MLE Mean (bias corrected)					5.33	MLE Sd (bias corrected)					0.94	
352							Approximate Chi Square Value (0.05)					583.7	
353	Adjusted Level of Significance					0.02	Adjusted Chi Square Value					574.1	
354													
355	Assuming Gamma Distribution												
356	Approximate Gamma UCL (use when n>=50))					5.86	Adjusted Gamma UCL (use when n<50)					5.96	
357													
358	Lognormal GOF Test												
359	Shapiro Wilk Test Statistic					0.84	Shapiro Wilk Lognormal GOF Test						
360	5% Shapiro Wilk Critical Value					0.84	Data appear Lognormal at 5% Significance Level						
361	Lilliefors Test Statistic					0.24	Lilliefors Lognormal GOF Test						
362	5% Lilliefors Critical Value					0.28	Data appear Lognormal at 5% Significance Level						
363	Data appear Lognormal at 5% Significance Level												
364													
365	Lognormal Statistics												
366	Minimum of Logged Data					1.51	Mean of logged Data					1.66	
367	Maximum of Logged Data					1.98	SD of logged Data					0.15	
368													
369	Assuming Lognormal Distribution												
370	95% H-UCL					5.86	90% Chebyshev (MVUE) UCL					6.10	
371	95% Chebyshev (MVUE) UCL					6.45	97.5% Chebyshev (MVUE) UCL					6.94	
372	99% Chebyshev (MVUE) UCL					7.89							
373													
374	Nonparametric Distribution Free UCL Statistics												
375	Data appear to follow a Discernible Distribution at 5% Significance Level												
376													
377	Nonparametric Distribution Free UCLs												
378	95% CLT UCL					5.79	95% Jackknife UCL					5.84	

	A	B	C	D	E	F	G	H	I	J	K	L
379	95% Standard Bootstrap UCL					5.77	95% Bootstrap-t UCL					6.52
380	95% Hall's Bootstrap UCL					8.48	95% Percentile Bootstrap UCL					5.81
381	95% BCA Bootstrap UCL					5.92						
382	90% Chebyshev(Mean, Sd) UCL					6.17	95% Chebyshev(Mean, Sd) UCL					6.55
383	97.5% Chebyshev(Mean, Sd) UCL					7.07	99% Chebyshev(Mean, Sd) UCL					8.10
384												
385	Suggested UCL to Use											
386	95% Student's-t UCL					5.84						
387												
388	Directions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
389	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
390	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
391	For additional insight the user may want to consult a statistician.											
392												
393												
394	Copper											
395												
396	General Statistics											
397	Total Number of Observations					10	Number of Distinct Observations					10
398							Number of Missing Observations					0
399	Minimum					5.77	Mean					9.92
400	Maximum					28.1	Median					7.98
401	SD					6.50	Std. Error of Mean					2.05
402	Coefficient of Variation					0.65	Skewness					2.95
403												
404	Normal GOF Test											
405	Shapiro Wilk Test Statistic					0.54	Shapiro Wilk GOF Test					
406	5% Shapiro Wilk Critical Value					0.84	Data Not Normal at 5% Significance Level					
407	Lilliefors Test Statistic					0.37	Lilliefors GOF Test					
408	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
409	Data Not Normal at 5% Significance Level											
410												
411	Assuming Normal Distribution											
412	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
413	95% Student's-t UCL					13.65	95% Adjusted-CLT UCL (Chen-1995)					15.35
414							95% Modified-t UCL (Johnson-1978)					14.05
415												
416	Gamma GOF Test											
417	A-D Test Statistic					1.51	Anderson-Darling Gamma GOF Test					
418	5% A-D Critical Value					0.72	Data Not Gamma Distributed at 5% Significance Level					
419	K-S Test Statistic					0.33	Kolmogorov-Smirnov Gamma GOF Test					
420	5% K-S Critical Value					0.26	Data Not Gamma Distributed at 5% Significance Level					
421	Data Not Gamma Distributed at 5% Significance Level											
422												
423	Gamma Statistics											
424	k hat (MLE)					4.63	k star (bias corrected MLE)					3.31
425	Theta hat (MLE)					2.14	Theta star (bias corrected MLE)					2.99
426	nu hat (MLE)					92.64	nu star (bias corrected)					66.14
427	MLE Mean (bias corrected)					9.92	MLE Sd (bias corrected)					5.45
428							Approximate Chi Square Value (0.05)					48.4
429	Adjusted Level of Significance					0.02	Adjusted Chi Square Value					45.8
430												
431	Assuming Gamma Distribution											
432	Approximate Gamma UCL (use when n>=50))					13.55	Adjusted Gamma UCL (use when n<50)					14.35
433												
434	Lognormal GOF Test											
435	Shapiro Wilk Test Statistic					0.71	Shapiro Wilk Lognormal GOF Test					
436	5% Shapiro Wilk Critical Value					0.84	Data Not Lognormal at 5% Significance Level					
437	Lilliefors Test Statistic					0.30	Lilliefors Lognormal GOF Test					
438	5% Lilliefors Critical Value					0.28	Data Not Lognormal at 5% Significance Level					
439	Data Not Lognormal at 5% Significance Level											
440												
441	Lognormal Statistics											

	A	B	C	D	E	F	G	H	I	J	K	L
442	Minimum of Logged Data					1.75	Mean of logged Data					2.18
443	Maximum of Logged Data					3.33	SD of logged Data					0.43
444												
445	Assuming Lognormal Distribution											
446	95% H-UCL					13.24	90% Chebyshev (MVUE) UCL					13.64
447	95% Chebyshev (MVUE) UCL					15.51	97.5% Chebyshev (MVUE) UCL					18.04
448	99% Chebyshev (MVUE) UCL					23.01						
449												
450	Nonparametric Distribution Free UCL Statistics											
451	Data do not follow a Discernible Distribution (0.05)											
452												
453	Nonparametric Distribution Free UCLs											
454	95% CLT UCL					13.31	95% Jackknife UCL					13.64
455	95% Standard Bootstrap UCL					13.14	95% Bootstrap-t UCL					27.74
456	95% Hall's Bootstrap UCL					30.92	95% Percentile Bootstrap UCL					13.81
457	95% BCA Bootstrap UCL					15.84						
458	90% Chebyshev(Mean, Sd) UCL					16.09	95% Chebyshev(Mean, Sd) UCL					18.81
459	97.5% Chebyshev(Mean, Sd) UCL					22.71	99% Chebyshev(Mean, Sd) UCL					30.31
460												
461	Suggested UCL to Use											
462	95% Student's-t UCL					13.64	or 95% Modified-t UCL					14.01
463												
464	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
465	recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
466	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
467	For additional insight the user may want to consult a statistician.											
468												
469												
470	Iron											
471												
472	General Statistics											
473	Total Number of Observations					10	Number of Distinct Observations					8
474							Number of Missing Observations					0
475	Minimum					9480	Mean					13568
476	Maximum					15500	Median					13950
477	SD					1828	Std. Error of Mean					578
478	Coefficient of Variation					0.13	Skewness					-1.25
479												
480	Normal GOF Test											
481	Shapiro Wilk Test Statistic					0.88	Shapiro Wilk GOF Test					
482	5% Shapiro Wilk Critical Value					0.84	Data appear Normal at 5% Significance Level					
483	Lilliefors Test Statistic					0.17	Lilliefors GOF Test					
484	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level					
485	Data appear Normal at 5% Significance Level											
486												
487	Assuming Normal Distribution											
488	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
489	95% Student's-t UCL					14627	95% Adjusted-CLT UCL (Chen-1995)					14274
490							95% Modified-t UCL (Johnson-1978)					14589
491												
492	Gamma GOF Test											
493	A-D Test Statistic					0.55	Anderson-Darling Gamma GOF Test					
494	5% A-D Critical Value					0.72	data appear Gamma Distributed at 5% Significance Level					
495	K-S Test Statistic					0.18	Kolmogorov-Smirnov Gamma GOF Test					
496	5% K-S Critical Value					0.26	data appear Gamma Distributed at 5% Significance Level					
497	Detected data appear Gamma Distributed at 5% Significance Level											
498												
499	Gamma Statistics											
500	k hat (MLE)					54.54	k star (bias corrected MLE)					38.24
501	Theta hat (MLE)					248.8	Theta star (bias corrected MLE)					354.8
502	nu hat (MLE)					1091	nu star (bias corrected)					764.9
503	MLE Mean (bias corrected)					13568	MLE Sd (bias corrected)					2194
504							Approximate Chi Square Value (0.05)					701.7

	A	B	C	D	E	F	G	H	I	J	K	L	
505	Adjusted Level of Significance					0.02	Adjusted Chi Square Value					691.2	
506													
507	Assuming Gamma Distribution												
508	Approximate Gamma UCL (use when n>=50))					14790	Adjusted Gamma UCL (use when n<50)					15015	
509													
510	Lognormal GOF Test												
511	Shapiro Wilk Test Statistic					0.84	Shapiro Wilk Lognormal GOF Test						
512	5% Shapiro Wilk Critical Value					0.84	Data Not Lognormal at 5% Significance Level						
513	Lilliefors Test Statistic					0.19	Lilliefors Lognormal GOF Test						
514	5% Lilliefors Critical Value					0.28	Data appear Lognormal at 5% Significance Level						
515	Data appear Approximate Lognormal at 5% Significance Level												
516													
517	Lognormal Statistics												
518	Minimum of Logged Data					9.15	Mean of logged Data					9.50	
519	Maximum of Logged Data					9.64	SD of logged Data					0.14	
520													
521	Assuming Lognormal Distribution												
522	95% H-UCL					14875	90% Chebyshev (MVUE) UCL					15479	
523	95% Chebyshev (MVUE) UCL					16340	97.5% Chebyshev (MVUE) UCL					17537	
524	99% Chebyshev (MVUE) UCL					19886							
525													
526	Nonparametric Distribution Free UCL Statistics												
527	Data appear to follow a Discernible Distribution at 5% Significance Level												
528													
529	Nonparametric Distribution Free UCLs												
530	95% CLT UCL					14519	95% Jackknife UCL					14627	
531	95% Standard Bootstrap UCL					14483	95% Bootstrap-t UCL					14409	
532	95% Hall's Bootstrap UCL					14359	95% Percentile Bootstrap UCL					14430	
533	95% BCA Bootstrap UCL					14320							
534	90% Chebyshev(Mean, Sd) UCL					15302	95% Chebyshev(Mean, Sd) UCL					16087	
535	97.5% Chebyshev(Mean, Sd) UCL					17177	99% Chebyshev(Mean, Sd) UCL					19319	
536													
537	Suggested UCL to Use												
538	95% Student's-t UCL					14627							
539													
540	Directions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate												
541	recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and												
542	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.												
543	For additional insight the user may want to consult a statistician.												
544													
545	Highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be												
546	reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.												
547													
548													
549	Lead												
550													
551	General Statistics												
552	Total Number of Observations					10	Number of Distinct Observations					9	
553							Number of Missing Observations					0	
554	Minimum					7.8	Mean					17.5	
555	Maximum					58.6	Median					11.7	
556	SD					15.7	Std. Error of Mean					4.96	
557	Coefficient of Variation					0.89	Skewness					2.44	
558													
559	Normal GOF Test												
560	Shapiro Wilk Test Statistic					0.62	Shapiro Wilk GOF Test						
561	5% Shapiro Wilk Critical Value					0.84	Data Not Normal at 5% Significance Level						
562	Lilliefors Test Statistic					0.39	Lilliefors GOF Test						
563	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level						
564	Data Not Normal at 5% Significance Level												
565													
566	Assuming Normal Distribution												
567	95% Normal UCL						95% UCLs (Adjusted for Skewness)						

	A	B	C	D	E	F	G	H	I	J	K	L
568	95% Student's-t UCL					26.63	95% Adjusted-CLT UCL (Chen-1995)					29.8
569							95% Modified-t UCL (Johnson-1978)					27.2
570												
571	Gamma GOF Test											
572	A-D Test Statistic					1.24	Anderson-Darling Gamma GOF Test					
573	5% A-D Critical Value					0.73	Data Not Gamma Distributed at 5% Significance Level					
574	K-S Test Statistic					0.35	Kolmogrov-Smirnoff Gamma GOF Test					
575	5% K-S Critical Value					0.26	Data Not Gamma Distributed at 5% Significance Level					
576	Data Not Gamma Distributed at 5% Significance Level											
577												
578	Gamma Statistics											
579	k hat (MLE)					2.41	k star (bias corrected MLE)					1.75
580	Theta hat (MLE)					7.26	Theta star (bias corrected MLE)					9.98
581	nu hat (MLE)					48.24	nu star (bias corrected)					35.1
582	MLE Mean (bias corrected)					17.53	MLE Sd (bias corrected)					13.27
583							Approximate Chi Square Value (0.05)					22.5
584	Adjusted Level of Significance					0.024	Adjusted Chi Square Value					20.8
585												
586	Assuming Gamma Distribution											
587	Approximate Gamma UCL (use when n>=50))					27.25	Adjusted Gamma UCL (use when n<50)					29.5
588												
589	Lognormal GOF Test											
590	Shapiro Wilk Test Statistic					0.79	Shapiro Wilk Lognormal GOF Test					
591	5% Shapiro Wilk Critical Value					0.84	Data Not Lognormal at 5% Significance Level					
592	Lilliefors Test Statistic					0.30	Lilliefors Lognormal GOF Test					
593	5% Lilliefors Critical Value					0.28	Data Not Lognormal at 5% Significance Level					
594	Data Not Lognormal at 5% Significance Level											
595												
596	Lognormal Statistics											
597	Minimum of Logged Data					2.05	Mean of logged Data					2.64
598	Maximum of Logged Data					4.07	SD of logged Data					0.62
599												
600	Assuming Lognormal Distribution											
601	95% H-UCL					27.94	90% Chebyshev (MVUE) UCL					26.7
602	95% Chebyshev (MVUE) UCL					31.25	97.5% Chebyshev (MVUE) UCL					37.5
603	99% Chebyshev (MVUE) UCL					49.96						
604												
605	Nonparametric Distribution Free UCL Statistics											
606	Data do not follow a Discernible Distribution (0.05)											
607												
608	Nonparametric Distribution Free UCLs											
609	95% CLT UCL					25.7	95% Jackknife UCL					26.6
610	95% Standard Bootstrap UCL					25.13	95% Bootstrap-t UCL					71.6
611	95% Hall's Bootstrap UCL					76.5	95% Percentile Bootstrap UCL					26.0
612	95% BCA Bootstrap UCL					29.4						
613	90% Chebyshev(Mean, Sd) UCL					32.42	95% Chebyshev(Mean, Sd) UCL					39.1
614	97.5% Chebyshev(Mean, Sd) UCL					48.53	99% Chebyshev(Mean, Sd) UCL					66.9
615												
616	Suggested UCL to Use											
617	95% Chebyshev (Mean, Sd) UCL					39.1						
618												
619	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
620	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
621	Singh and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
622	For additional insight the user may want to consult a statistician.											
623												
624												
625	Magnesium											
626												
627	General Statistics											
628	Total Number of Observations					10	Number of Distinct Observations					9
629							Number of Missing Observations					0
630	Minimum					1570	Mean					2155

	A	B	C	D	E	F	G	H	I	J	K	L
631	Maximum					2610	Median					2155
632	SD					339.7	Std. Error of Mean					107.4
633	Coefficient of Variation					0.15	Skewness					-0.24
634												
635	Normal GOF Test											
636	Shapiro Wilk Test Statistic					0.93	Shapiro Wilk GOF Test					
637	5% Shapiro Wilk Critical Value					0.84	Data appear Normal at 5% Significance Level					
638	Lilliefors Test Statistic					0.18	Lilliefors GOF Test					
639	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level					
640	Data appear Normal at 5% Significance Level											
641												
642	Assuming Normal Distribution											
643	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
644	95% Student's-t UCL					2352	95% Adjusted-CLT UCL (Chen-1995)					2323
645							95% Modified-t UCL (Johnson-1978)					2351
646												
647	Gamma GOF Test											
648	A-D Test Statistic					0.40	Anderson-Darling Gamma GOF Test					
649	5% A-D Critical Value					0.72	data appear Gamma Distributed at 5% Significance Level					
650	K-S Test Statistic					0.20	Kolmogrov-Smirnoff Gamma GOF Test					
651	5% K-S Critical Value					0.26	data appear Gamma Distributed at 5% Significance Level					
652	Detected data appear Gamma Distributed at 5% Significance Level											
653												
654	Gamma Statistics											
655	k hat (MLE)					43.0	k star (bias corrected MLE)					30.1
656	Theta hat (MLE)					50.1	Theta star (bias corrected MLE)					71.4
657	nu hat (MLE)					860.3	nu star (bias corrected)					603.5
658	MLE Mean (bias corrected)					2155	MLE Sd (bias corrected)					392.3
659							Approximate Chi Square Value (0.05)					547.5
660	Adjusted Level of Significance					0.02	Adjusted Chi Square Value					538.2
661												
662	Assuming Gamma Distribution											
663	Approximate Gamma UCL (use when n>=50))					2375	Adjusted Gamma UCL (use when n<50)					2416
664												
665	Lognormal GOF Test											
666	Shapiro Wilk Test Statistic					0.92	Shapiro Wilk Lognormal GOF Test					
667	5% Shapiro Wilk Critical Value					0.84	Data appear Lognormal at 5% Significance Level					
668	Lilliefors Test Statistic					0.2	Lilliefors Lognormal GOF Test					
669	5% Lilliefors Critical Value					0.28	Data appear Lognormal at 5% Significance Level					
670	Data appear Lognormal at 5% Significance Level											
671												
672	Lognormal Statistics											
673	Minimum of Logged Data					7.35	Mean of logged Data					7.66
674	Maximum of Logged Data					7.86	SD of logged Data					0.16
675												
676	Assuming Lognormal Distribution											
677	95% H-UCL					2387	90% Chebyshev (MVUE) UCL					2489
678	95% Chebyshev (MVUE) UCL					2641	97.5% Chebyshev (MVUE) UCL					2850
679	99% Chebyshev (MVUE) UCL					3263						
680												
681	Nonparametric Distribution Free UCL Statistics											
682	Data appear to follow a Discernible Distribution at 5% Significance Level											
683												
684	Nonparametric Distribution Free UCLs											
685	95% CLT UCL					2332	95% Jackknife UCL					2352
686	95% Standard Bootstrap UCL					2321	95% Bootstrap-t UCL					2345
687	95% Hall's Bootstrap UCL					2318	95% Percentile Bootstrap UCL					2326
688	95% BCA Bootstrap UCL					2327						
689	90% Chebyshev(Mean, Sd) UCL					2477	95% Chebyshev(Mean, Sd) UCL					2623
690	97.5% Chebyshev(Mean, Sd) UCL					2826	99% Chebyshev(Mean, Sd) UCL					3224
691												
692	Suggested UCL to Use											
693	95% Student's-t UCL					2352						

	A	B	C	D	E	F	G	H	I	J	K	L	
694													
695	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate UCL. Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Singh (2003). However, simulations results will not cover all Real World data sets												
696	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets												
697	For additional insight the user may want to consult a statistician.												
698													
699													
700	highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.												
701													
702													
703													
704	Nickel												
705													
706	General Statistics												
707	Total Number of Observations					10	Number of Distinct Observations					10	
708							Number of Missing Observations					0	
709	Minimum					6.25	Mean					7.76	
710	Maximum					9.29	Median					7.72	
711	SD					1.06	Std. Error of Mean					0.33	
712	Coefficient of Variation					0.13	Skewness					0.023	
713													
714	Normal GOF Test												
715	Shapiro Wilk Test Statistic					0.93	Shapiro Wilk GOF Test						
716	5% Shapiro Wilk Critical Value					0.84	Data appear Normal at 5% Significance Level						
717	Lilliefors Test Statistic					0.16	Lilliefors GOF Test						
718	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level						
719	Data appear Normal at 5% Significance Level												
720													
721	Assuming Normal Distribution												
722	95% Normal UCL						95% UCLs (Adjusted for Skewness)						
723	95% Student's-t UCL					8.37	95% Adjusted-CLT UCL (Chen-1995)					8.31	
724							95% Modified-t UCL (Johnson-1978)					8.37	
725													
726	Gamma GOF Test												
727	A-D Test Statistic					0.33	Anderson-Darling Gamma GOF Test						
728	5% A-D Critical Value					0.72	Data appear Gamma Distributed at 5% Significance Level						
729	K-S Test Statistic					0.16	Kolmogorov-Smirnov Gamma GOF Test						
730	5% K-S Critical Value					0.26	Data appear Gamma Distributed at 5% Significance Level						
731	Detected data appear Gamma Distributed at 5% Significance Level												
732													
733	Gamma Statistics												
734	k hat (MLE)					58.99	k star (bias corrected MLE)					41.34	
735	Theta hat (MLE)					0.13	Theta star (bias corrected MLE)					0.18	
736	nu hat (MLE)					1180	nu star (bias corrected)					827.3	
737	MLE Mean (bias corrected)					7.76	MLE Sd (bias corrected)					1.20	
738							Approximate Chi Square Value (0.05)					761.5	
739	Adjusted Level of Significance					0.023	Adjusted Chi Square Value					750.5	
740													
741	Assuming Gamma Distribution												
742	Approximate Gamma UCL (use when n>=50))					8.43	Adjusted Gamma UCL (use when n<50)					8.55	
743													
744	Lognormal GOF Test												
745	Shapiro Wilk Test Statistic					0.93	Shapiro Wilk Lognormal GOF Test						
746	5% Shapiro Wilk Critical Value					0.84	Data appear Lognormal at 5% Significance Level						
747	Lilliefors Test Statistic					0.16	Lilliefors Lognormal GOF Test						
748	5% Lilliefors Critical Value					0.28	Data appear Lognormal at 5% Significance Level						
749	Data appear Lognormal at 5% Significance Level												
750													
751	Lognormal Statistics												
752	Minimum of Logged Data					1.83	Mean of logged Data					2.04	
753	Maximum of Logged Data					2.22	SD of logged Data					0.13	
754													
755	Assuming Lognormal Distribution												
756	95% H-UCL					8.45	90% Chebyshev (MVUE) UCL					8.78	

	A	B	C	D	E	F	G	H	I	J	K	L
757			95% Chebyshev (MVUE) UCL		9.24		97.5% Chebyshev (MVUE) UCL					9.88
758			99% Chebyshev (MVUE) UCL		11.14							
759												
760			Nonparametric Distribution Free UCL Statistics									
761			Data appear to follow a Discernible Distribution at 5% Significance Level									
762												
763			Nonparametric Distribution Free UCLs									
764			95% CLT UCL		8.31		95% Jackknife UCL					8.37
765			95% Standard Bootstrap UCL		8.29		95% Bootstrap-t UCL					8.39
766			95% Hall's Bootstrap UCL		8.27		95% Percentile Bootstrap UCL					8.27
767			95% BCA Bootstrap UCL		8.27							
768			90% Chebyshev(Mean, Sd) UCL		8.76		95% Chebyshev(Mean, Sd) UCL					9.22
769			97.5% Chebyshev(Mean, Sd) UCL		9.85		99% Chebyshev(Mean, Sd) UCL					11.14
770												
771			Suggested UCL to Use									
772			95% Student's-t UCL		8.37							
773												
774			ations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate									
775			ommendations are based upon the results of the simulation studies summarized in Singh, Singh, and									
776			and Singh and Singh (2003). However, simulations results will not cover all Real World data sets									
777			For additional insight the user may want to consult a statistician.									
778												
779												
780			Silver									
781												
782			General Statistics									
783			Total Number of Observations		10		Number of Distinct Observations					10
784							Number of Missing Observations					0
785			Minimum		0.43		Mean					0.74
786			Maximum		2.56		Median					0.55
787			SD		0.64		Std. Error of Mean					0.20
788			Coefficient of Variation		0.85		Skewness					3.08
789												
790			Normal GOF Test									
791			Shapiro Wilk Test Statistic		0.47		Shapiro Wilk GOF Test					
792			5% Shapiro Wilk Critical Value		0.84		Data Not Normal at 5% Significance Level					
793			Lilliefors Test Statistic		0.46		Lilliefors GOF Test					
794			5% Lilliefors Critical Value		0.28		Data Not Normal at 5% Significance Level					
795			Data Not Normal at 5% Significance Level									
796												
797			Assuming Normal Distribution									
798			95% Normal UCL				95% UCLs (Adjusted for Skewness)					
799			95% Student's-t UCL		1.11		95% Adjusted-CLT UCL (Chen-1995)					1.29
800							95% Modified-t UCL (Johnson-1978)					1.15
801												
802			Gamma GOF Test									
803			A-D Test Statistic		1.97		Anderson-Darling Gamma GOF Test					
804			5% A-D Critical Value		0.73		Data Not Gamma Distributed at 5% Significance Level					
805			K-S Test Statistic		0.43		Kolmogrov-Smirnoff Gamma GOF Test					
806			5% K-S Critical Value		0.26		Data Not Gamma Distributed at 5% Significance Level					
807			Data Not Gamma Distributed at 5% Significance Level									
808												
809			Gamma Statistics									
810			k hat (MLE)		3.14		k star (bias corrected MLE)					2.26
811			Theta hat (MLE)		0.23		Theta star (bias corrected MLE)					0.33
812			nu hat (MLE)		62.9		nu star (bias corrected)					45.3
813			MLE Mean (bias corrected)		0.74		MLE Sd (bias corrected)					0.49
814							Approximate Chi Square Value (0.05)					30.9
815			Adjusted Level of Significance		0.02		Adjusted Chi Square Value					28.8
816												
817			Assuming Gamma Distribution									
818			Approximate Gamma UCL (use when n>=50))		1.09		Adjusted Gamma UCL (use when n<50)					1.17
819												

	A	B	C	D	E	F	G	H	I	J	K	L
820	Lognormal GOF Test											
821	Shapiro Wilk Test Statistic					0.62	Shapiro Wilk Lognormal GOF Test					
822	5% Shapiro Wilk Critical Value					0.84	Data Not Lognormal at 5% Significance Level					
823	Lilliefors Test Statistic					0.39	Lilliefors Lognormal GOF Test					
824	5% Lilliefors Critical Value					0.28	Data Not Lognormal at 5% Significance Level					
825	Data Not Lognormal at 5% Significance Level											
826												
827	Lognormal Statistics											
828	Minimum of Logged Data					-0.84	Mean of logged Data					-0.45
829	Maximum of Logged Data					0.94	SD of logged Data					0.50
830												
831	Assuming Lognormal Distribution											
832	95% H-UCL					1.05	90% Chebyshev (MVUE) UCL					1.05
833	95% Chebyshev (MVUE) UCL					1.21	97.5% Chebyshev (MVUE) UCL					1.43
834	99% Chebyshev (MVUE) UCL					1.86						
835												
836	Nonparametric Distribution Free UCL Statistics											
837	Data do not follow a Discernible Distribution (0.05)											
838												
839	Nonparametric Distribution Free UCLs											
840	95% CLT UCL					1.08	95% Jackknife UCL					1.11
841	95% Standard Bootstrap UCL					1.06	95% Bootstrap-t UCL					3.01
842	95% Hall's Bootstrap UCL					2.95	95% Percentile Bootstrap UCL					1.14
843	95% BCA Bootstrap UCL					1.34						
844	90% Chebyshev(Mean, Sd) UCL					1.35	95% Chebyshev(Mean, Sd) UCL					1.63
845	97.5% Chebyshev(Mean, Sd) UCL					2.01	99% Chebyshev(Mean, Sd) UCL					2.76
846												
847	Suggested UCL to Use											
848	95% Chebyshev (Mean, Sd) UCL					1.63						
849												
850	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
851	recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
852	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
853	For additional insight the user may want to consult a statistician.											
854												
855												
856	Vanadium											
857												
858	General Statistics											
859	Total Number of Observations					10	Number of Distinct Observations					10
860							Number of Missing Observations					0
861	Minimum					19.2	Mean					25.9
862	Maximum					30.9	Median					27.2
863	SD					3.66	Std. Error of Mean					1.16
864	Coefficient of Variation					0.14	Skewness					-0.86
865												
866	Normal GOF Test											
867	Shapiro Wilk Test Statistic					0.90	Shapiro Wilk GOF Test					
868	5% Shapiro Wilk Critical Value					0.84	Data appear Normal at 5% Significance Level					
869	Lilliefors Test Statistic					0.18	Lilliefors GOF Test					
870	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level					
871	Data appear Normal at 5% Significance Level											
872												
873	Assuming Normal Distribution											
874	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
875	95% Student's-t UCL					28.0	95% Adjusted-CLT UCL (Chen-1995)					27.5
876							95% Modified-t UCL (Johnson-1978)					28.0
877												
878	Gamma GOF Test											
879	A-D Test Statistic					0.59	Anderson-Darling Gamma GOF Test					
880	5% A-D Critical Value					0.72	data appear Gamma Distributed at 5% Significance Level					
881	K-S Test Statistic					0.20	Kolmogorov-Smirnov Gamma GOF Test					
882	5% K-S Critical Value					0.26	data appear Gamma Distributed at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
883	Detected data appear Gamma Distributed at 5% Significance Level											
884												
885	Gamma Statistics											
886	k hat (MLE)				51.14	k star (bias corrected MLE)				35.8		
887	Theta hat (MLE)				0.50	Theta star (bias corrected MLE)				0.72		
888	nu hat (MLE)				1023	nu star (bias corrected)				717.3		
889	MLE Mean (bias corrected)				25.9	MLE Sd (bias corrected)				4.33		
890						Approximate Chi Square Value (0.05)				656.2		
891	Adjusted Level of Significance				0.02	Adjusted Chi Square Value				646		
892												
893	Assuming Gamma Distribution											
894	Approximate Gamma UCL (use when n>=50)				28.3	Adjusted Gamma UCL (use when n<50)				28.8		
895												
896	Lognormal GOF Test											
897	Shapiro Wilk Test Statistic				0.87	Shapiro Wilk Lognormal GOF Test						
898	5% Shapiro Wilk Critical Value				0.84	Data appear Lognormal at 5% Significance Level						
899	Lilliefors Test Statistic				0.21	Lilliefors Lognormal GOF Test						
900	5% Lilliefors Critical Value				0.28	Data appear Lognormal at 5% Significance Level						
901	Data appear Lognormal at 5% Significance Level											
902												
903	Lognormal Statistics											
904	Minimum of Logged Data				2.95	Mean of logged Data				3.24		
905	Maximum of Logged Data				3.43	SD of logged Data				0.15		
906												
907	Assuming Lognormal Distribution											
908	95% H-UCL				28.5	90% Chebyshev (MVUE) UCL				29.6		
909	95% Chebyshev (MVUE) UCL				31.3	97.5% Chebyshev (MVUE) UCL				33.7		
910	99% Chebyshev (MVUE) UCL				38.3							
911												
912	Nonparametric Distribution Free UCL Statistics											
913	Data appear to follow a Discernible Distribution at 5% Significance Level											
914												
915	Nonparametric Distribution Free UCLs											
916	95% CLT UCL				27.8	95% Jackknife UCL				28.0		
917	95% Standard Bootstrap UCL				27.7	95% Bootstrap-t UCL				27.6		
918	95% Hall's Bootstrap UCL				27.4	95% Percentile Bootstrap UCL				27.7		
919	95% BCA Bootstrap UCL				27.4							
920	90% Chebyshev(Mean, Sd) UCL				29.4	95% Chebyshev(Mean, Sd) UCL				31		
921	97.5% Chebyshev(Mean, Sd) UCL				33.1	99% Chebyshev(Mean, Sd) UCL				37.4		
922												
923	Suggested UCL to Use											
924	95% Student's-t UCL				28.0							
925												
926	Directions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
927	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
928	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
929	For additional insight the user may want to consult a statistician.											
930												
931	Highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may											
932	be unreliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.											
933												
934												
935	Zinc											
936												
937	General Statistics											
938	Total Number of Observations				10	Number of Distinct Observations				10		
939						Number of Missing Observations				0		
940	Minimum				22.6	Mean				31.6		
941	Maximum				54.9	Median				28.5		
942	SD				9.92	Std. Error of Mean				3.13		
943	Coefficient of Variation				0.31	Skewness				1.57		
944												
945	Normal GOF Test											

	A	B	C	D	E	F	G	H	I	J	K	L	
946	Shapiro Wilk Test Statistic					0.84	Shapiro Wilk GOF Test						
947	5% Shapiro Wilk Critical Value					0.84	Data Not Normal at 5% Significance Level						
948	Lilliefors Test Statistic					0.21	Lilliefors GOF Test						
949	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level						
950	Data appear Approximate Normal at 5% Significance Level												
951													
952	Assuming Normal Distribution												
953	95% Normal UCL						95% UCLs (Adjusted for Skewness)						
954	95% Student's-t UCL					37.36	95% Adjusted-CLT UCL (Chen-1995)					38.40	
955							95% Modified-t UCL (Johnson-1978)					37.60	
956													
957	Gamma GOF Test												
958	A-D Test Statistic					0.45	Anderson-Darling Gamma GOF Test						
959	5% A-D Critical Value					0.72	data appear Gamma Distributed at 5% Significance Level						
960	K-S Test Statistic					0.19	Kolmogrov-Smirnoff Gamma GOF Test						
961	5% K-S Critical Value					0.26	data appear Gamma Distributed at 5% Significance Level						
962	Detected data appear Gamma Distributed at 5% Significance Level												
963													
964	Gamma Statistics												
965	k hat (MLE)					13.33	k star (bias corrected MLE)					9.40	
966	Theta hat (MLE)					2.37	Theta star (bias corrected MLE)					3.36	
967	nu hat (MLE)					266.7	nu star (bias corrected)					188	
968	MLE Mean (bias corrected)					31.6	MLE Sd (bias corrected)					10.3	
969							Approximate Chi Square Value (0.05)					157.3	
970	Adjusted Level of Significance					0.02	Adjusted Chi Square Value					152.4	
971													
972	Assuming Gamma Distribution												
973	Approximate Gamma UCL (use when n>=50))					37.76	Adjusted Gamma UCL (use when n<50)					38.90	
974													
975	Lognormal GOF Test												
976	Shapiro Wilk Test Statistic					0.90	Shapiro Wilk Lognormal GOF Test						
977	5% Shapiro Wilk Critical Value					0.84	Data appear Lognormal at 5% Significance Level						
978	Lilliefors Test Statistic					0.17	Lilliefors Lognormal GOF Test						
979	5% Lilliefors Critical Value					0.28	Data appear Lognormal at 5% Significance Level						
980	Data appear Lognormal at 5% Significance Level												
981													
982	Lognormal Statistics												
983	Minimum of Logged Data					3.11	Mean of logged Data					3.41	
984	Maximum of Logged Data					4.00	SD of logged Data					0.28	
985													
986	Assuming Lognormal Distribution												
987	95% H-UCL					38	90% Chebyshev (MVUE) UCL					39.90	
988	95% Chebyshev (MVUE) UCL					43.74	97.5% Chebyshev (MVUE) UCL					49.00	
989	99% Chebyshev (MVUE) UCL					59.5							
990													
991	Nonparametric Distribution Free UCL Statistics												
992	Data appear to follow a Discernible Distribution at 5% Significance Level												
993													
994	Nonparametric Distribution Free UCLs												
995	95% CLT UCL					36.7	95% Jackknife UCL					37.3	
996	95% Standard Bootstrap UCL					36.4	95% Bootstrap-t UCL					41.0	
997	95% Hall's Bootstrap UCL					43.7	95% Percentile Bootstrap UCL					37.0	
998	95% BCA Bootstrap UCL					38.7							
999	90% Chebyshev(Mean, Sd) UCL					41.0	95% Chebyshev(Mean, Sd) UCL					45.2	
1000	97.5% Chebyshev(Mean, Sd) UCL					51.2	99% Chebyshev(Mean, Sd) UCL					62.8	
1001													
1002	Suggested UCL to Use												
1003	95% Student's-t UCL					37.36							
1004													
1005	Instructions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate												
1006	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and												
1007	Singh and Singh and Singh (2003). However, simulations results will not cover all Real World data sets												
1008	For additional insight the user may want to consult a statistician.												

	A	B	C	D	E	F	G	H	I	J	K	L
1009												