

Censored Probability Plot Correlation Coefficient
Arsenic Concentrations Detected in Crawford and Bexar Stony Soils
Camp Stanley Storage Activity, Texas

					Normal				Lognormal				
Uniform Order		Normal Order			Ordered Concentrations (mg/kg)				Ln of Ordered Concentrations (mg/kg)				
Order(i)	Statistic Medians	Statistic Medians	$M_i - M_{avg}$	$(M_i - M_{avg})^2$	$x_{(i)}$	$X_i - X_{avg}$	$(X_i - X_{avg})^2$	$(X_i - X_{avg}) * (M_i - M_{avg})$	$\ln(x_{(i)})$	$X_i - X_{avg}$	$(X_i - X_{avg})^2$	$(X_i - X_{avg}) * (M_i - M_{avg})$	
1	0.06697	-1.49877			1.2				0.18				Censored
2	0.16233	-0.98495			1.3				0.22				Censored
3	0.25880	-0.64704			1.4				0.34				Censored
4	0.35528	-0.37110			1.3				0.22				Censored
5	0.45176	-0.12121	-0.43276	0.187	3.4	-4.819	23.220	2.085386	1.22	-0.348	0.121	0.150528	
6	0.54824	0.12121	-0.19034	0.036	4	-4.219	17.798	0.802983	1.39	-0.185	0.034	0.035271	
7	0.64472	0.37110	0.05955	0.004	4.4	-3.819	14.583	-0.227399	1.48	-0.090	0.008	-0.005359	
8	0.74120	0.64704	0.33549	0.113	5.3	-2.919	8.519	-0.979201	1.67	0.096	0.009	0.032241	
9	0.83767	0.98495	0.67340	0.453	20	11.781	138.798	7.933441	3.00	1.424	2.028	0.959002	
10	0.93415	1.50746	1.19591	1.430	26	17.781	316.173	21.264763	3.26	1.686	2.844	2.016893	
Total:				2.223	Totals:		519.091	30.879974	Sum:		5.045	3.188576	
$M_{avg} =$		0.3116			$X_{avg} =$		8.2188		$X_{avg} =$		1.5716		
					$r =$		0.90899		$r =$		0.952067		

Censored
Censored
Censored
Censored

Probability Plot Correlation Coefficient^{a,b}

$$r = \text{Corr}(X, M) = \frac{\sum_{i=1}^n (X_i - X_{avg}) * (M_i - M_{avg})}{\sqrt{\sum_{i=1}^n (X_i - X_{avg})^2 * \sum_{i=1}^n (M_i - M_{avg})^2}}$$

$M_i = \Phi^{-1}(m_i) = i$ th Normal order statistic median
 where $\Phi^{-1} =$ inverse of standard Normal cumulative distribution
 $= f(z, 0, 1)^{-1} = \sqrt{2\pi} e^{z^2/2}$

$$m_i = \begin{cases} 1 - (.5)^{1/n} & \text{for } i = 1 \\ (i - .3175)/(n + .365) & \text{for } 1 < i < n \\ (.5)^{1/n} & \text{for } i = n \end{cases}$$

M_{avg} = average of M_i
 X_{avg} = average of X_i

^a The Probability Plot Correlation Coefficient Test for Normality, James J. Filliben, Technometrics, Vol. 17, No. 1, February 1975

^b Statistical Training Course for Ground-Water Monitoring Data Analysis-Draft Addendum to Interim Final Guidance, EPA /530-R-93-003, 1992