TOLERANCE INTERVALS

TOLERANCE INTERVAL: An estimate of the range of a quality characteristic which accounts for sampling error.

NOTES: (1) Typically a tolerance interval is specified by assigning a desired percentage of population process output interval coverage at a predetermined percentage confidence level. (2) Assumptions for standard calculation assume process behavior is normal (Gaussian) & that the characteristic of interest is in statistical control.

Tolerance Interval Calculation

X-bar ± Kσ

where **X-bar** = Process Mean
σ = Process Standard Deviation (calculated from data in which it has been demonstrated that the process is operating under statistical control.
K = Special Factor that adjusts the width of the tolerance interval to account for uncertainty.

FACTORS FOR TOLERANCE INTERVALS
(based on 99.73% coverage; 95% confidence)

SAMPLE SIZE	K factor
20	4.163
25	3.981
30	3.859
35	3.769
40	3.701
50	3.601
60	3.532
80	3.440
100	3.381
200	3.244
400	3.156

For samples sizes of 500 or more, use the following formula:

X-bar ± Kσ (SQRT [n/ (n-1)]) where **n** = Sample Size