QUESTION

How is Cpk calculated for Single-Sided features such as flatness?

ANSWER

All calculations and reports in QC-CALC assume that your data set is a "sample" of the total parts, and not the entire set of data. For this reason, we always calculate "Sigma by N-1". This formula corresponds to Excel's "STDEV()" function.

There are 3 methods of calculating Standard Deviation, also known as Sigma.

- $\sigma_{by\ N-1}$ (Sigma)
- $\sigma_{by\ S}$ (Sigma_by_S)
- $\sigma_{by\ R}$ (Sigma_by_R)

C^pk_u based on upper tolerance $= \dfrac{(USL - \overline{X})}{3\sigma}$

C^pk_L based on lower tolerance $= \dfrac{(\overline{X} - LSL)}{3\sigma}$

Cpk = Lesser { C^pk_u, C^pk_L }

QC-CALC does not calculate one side or the other on Single-Sided features. For example, a flatness only has a plus tolerance so QC-CALC calculates and uses the Cpk_u for Cpk. QC-CALC uses the only Cpk that is calculated for the particular side in use. So for all single-sided upper tolerance features such as True Position, Concentricity, Flatness, Parallelism, Perpendicularity, Roundness, etc... QC-CALC uses C^pk_u for Cpk.