SSIAM™ Example

Example: Consider a process that requires ***registration*** of two controlled actions, images, or components (hitting a moving target): e.g., print-to-image, punch-to-image, emboss-to-mark, cut-to-mark, etc. Registration is continuously monitored with periodic data collection. Actual register error is measured in sets of nine data points per ***proof-of-performance check***. The goals are:

Strategic goal	6 sigma (<4 dpM)
Minimum goal (corrective action req'd)	4-1/2 sigma (1 dpK [99.9% yield])
Control setpoint	0
Tolerance	± 0.005 inches

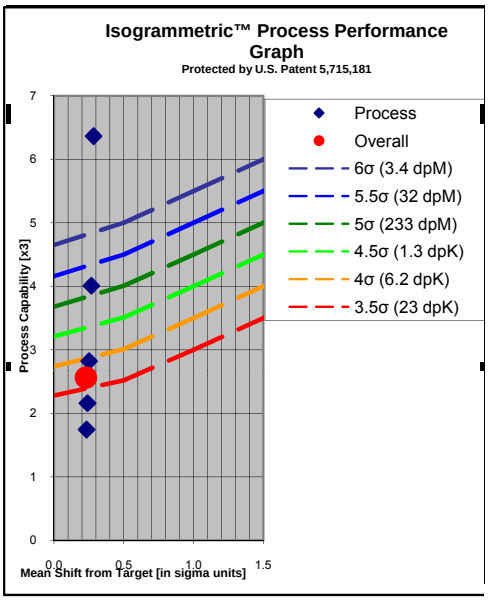
The process control behavior is sometimes irregular (not Gaussian) and worst case, cycles between high and low values of a range.

The observed max/min excursions are different for different machines (or processes) due to operator skill factors, non-uniform process dynamics, materials variation, machine wear-and-tear, and other usage/age special causes. For five machines A through E, the results (in mils) are:

Error

A—ranges between +1 and –1 (0,1,1, 0,-1,-1, 0,1,1)
B—ranges between +2 and –2 (0,1,2, 0,-1,-2, 0,1,2)
C—ranges between +3 and –3 (0,1,3, 0,-1,-3, 0,1,3)
D—ranges between +4 and –4 (0,1,4, 0,-1,-4, 0,1,4)
E—ranges between +5 and –5 (0,1,5, 0,-1,-5, 0,1,5)

During the test, there is ***no discovered scrap*** and all measured data are within tolerance! ***Is this six-sigma performance?*** Which machines, if any, require corrective maintenance?



The achieved sigma-level for each machine is shown on the accompanying Isogrammetric™ Process Performance Graph.[1] By calculating statistical mean and sigma values using appropriate formulas, we are able to show the probable yield on an isogrammetric graph that consists of a family of curves of constant process yield (isograms). Note that the ordinate (y-axis) is a measure of process capability, and the abscissa (x-axis) is the mean-value shift from target in sigma measure.

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[1] *Protected by U.S. Patent 5,715,181 and copyright 1998-2004.*