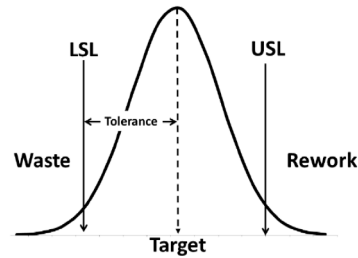


Process Capability Analysis

Process capability determines if a process will deliver a product or service that meets the customers requirements.

Customer requirements are defined using an Upper Specification Limit (USL) and a Lower Specification Limit (LSL).



A process has to be stable before it can be determined to be capable.

Process Capability Metrics

Cp - Capability Index

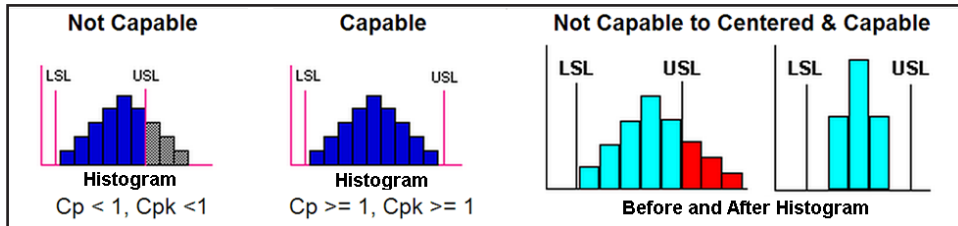
Measures how well the data fits between the USL and LSL.

$Cp \geq 1.33$ is desirable

Cpk - Centering Capability Index

Measures how well the data is centered between the USL and LSL.

$Cpk \geq 1.33$ is desirable



Don't Confuse Cp Cpk with Pp Ppk

Cp, Cpk (Capability Indices)

- Use when you have a sample and are testing the potential capability of a process.
- Cp Cpk use sigma estimator.

Pp, Ppk (Performance Indices)

- Use when you have the total population and are testing the performance of a process.
- Pp Ppk use standard deviation.

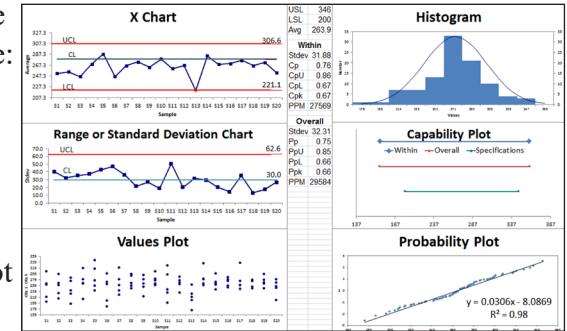
Learn more: www.qimacros.com/training/videos/capability-suite/

Process Capability Tools in the QI Macros

Capability Suite of Six Charts

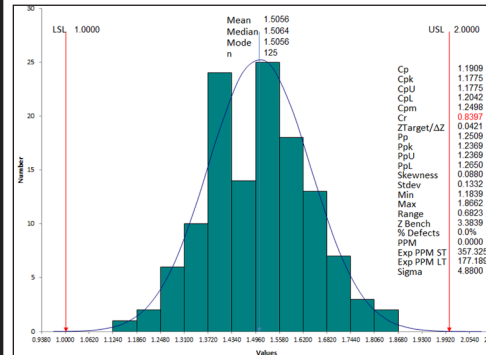
Use the Capability Suite or the X Chart Templates to Evaluate:

- Process Stability using Control Charts
- Process Capability using Histogram with Cp Cpk, Capability Plot, Values Plot
- Data Normality using Probability Plot



Histograms with Cp, Cpk, Pp, Ppk

- Select your data, and then the Histogram with Cp Cpk from the QI Macros menu.
- Draws the chart and does all the calculations for you.
- Interactive results allow you to change: USL, LSL, number of bars, and bin intervals.



Cp, Cpk Template

Calculates Cp, Cpk, Pp, Ppk capability metrics for multiple data sets, side-by-side.

Just drop in your data and your customers' specification limits.

Characteristic	S 1	S 2	S 3	S 4	S 5
Target	1.500	1.500	1.500	1.500	1.500
Tol	0.250	0.250	0.250	0.250	0.250
Tot	0.250	0.250	0.250	0.250	0.250
USL	1.750	1.750	1.750	1.750	1.750
LSL	1.250	1.250	1.250	1.250	1.250
AVE	1.488	1.487	1.524	1.456	1.564
MAX	1.711	1.767	1.837	1.646	1.866
MIN	1.286	1.274	1.296	1.184	1.193
USL-LSL	0.500	0.500	0.500	0.500	0.500
e	0.111	0.137	0.137	0.122	0.145
oest	0.099	0.131	0.132	0.114	0.152
Cp	0.940	0.634	0.630	0.728	0.548
Cpk	0.798	0.601	0.570	0.629	0.409
CpU	0.881	0.667	0.570	0.827	0.409
CpL	0.798	0.601	0.689	0.629	0.688
Cr	1.191	1.577	1.588	1.374	1.823
AZ	0.112	0.095	0.173	0.275	0.440
Cpm	0.748	0.607	0.600	0.659	0.526
Pp	0.753	0.609	0.609	0.684	0.575
Ppk	0.716	0.578	0.551	0.591	0.429
PpU	0.791	0.641	0.551	0.777	0.429
PpL	0.716	0.578	0.666	0.591	0.722
Sample #	S 1	S 2	S 3	S 4	S 5
Z	1.324	1.413	1.674	1.457	1.691
Z	1.431	1.359	1.608	1.467	1.611
S	1.428	1.487	1.463	1.432	1.667

Learn more: www.qimacros.com/control-chart/capability-suite/