

CAPABILITY

\bar{X}

- 4 σ - 3 σ - 2 σ - 1 σ + 1 σ + 2 σ + 3 σ + 4 σ

+ / - 1 SIGMA
+ / - 2 SIGMA
+ / - 3 SIGMA
+ / - 4 SIGMA

CAPABILITY INDICES

Cp = US - LS

6 SIGMA

Cp : HOW GOOD WE CAN BE

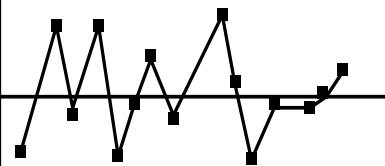
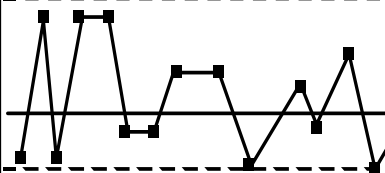
Cpk = CLOSEST SPEC TO \bar{X} - \bar{X}

3 SIGMA

Cpk: HOW GOOD WE ARE

Cp INDEX IS THE MAXIMUM VALUE OF Cpk PROBABILITY OF NON-CONFORMANCE

CPK	0	> 1	> 1.33	> 2.0
% N. C.	50 %	< 0.27 %	< 0.006 %	APPROX 0
PPM	500 K	< 2700	< 60	< 2 BILLION

CONTROL		CHART TYPE			
CENTRAL TENDENCY: \bar{X} , \bar{X} CHART  $UCL_{\bar{X}} = \bar{\bar{X}} + A_2 \bar{R}$ $\bar{\bar{X}} = \frac{\sum \bar{X}}{k}$ $LCL_{\bar{X}} = \bar{\bar{X}} - A_2 \bar{R}$		# OF OBSER. (n)	\bar{X}	R	$\sigma = \frac{\bar{R}}{d_2}$
VARIATION: MR, R CHART  $UCL_R = D_4 \bar{R}$ $\bar{R} = \frac{\sum R}{k}$			A_2	D_4	d_2
		IMR	2.66	3.268	1.128
		n = 2	1.880	3.268	1.128
		n = 3	1.023	2.574	1.693
		n = 4	0.729	2.282	2.059
		n = 5	0.577	2.114	2.326
		ANY SAMPLE SIZE	$\sigma_A = \frac{\sigma_1}{\text{SQR}n}$	A: AVERAGES I: INDIVIDUALS SQR: SQUARE ROOT	
SPECIAL CAUSES EXIST WHEN: <ul style="list-style-type: none"> • RUN - 7 PTS ONE SIDE OF THE CTR LINE • POINT OUTSIDE CONTROL LIMITS • TREND - 6 SUCCESSIVE INC OR DEC PTS • TWO POINTS IN A ROW NEAR LIMITS • CYCLES • PATTERNS • STRATIFICATION • HUGGING • MEAN SHIFTS $>1\sigma$ 					