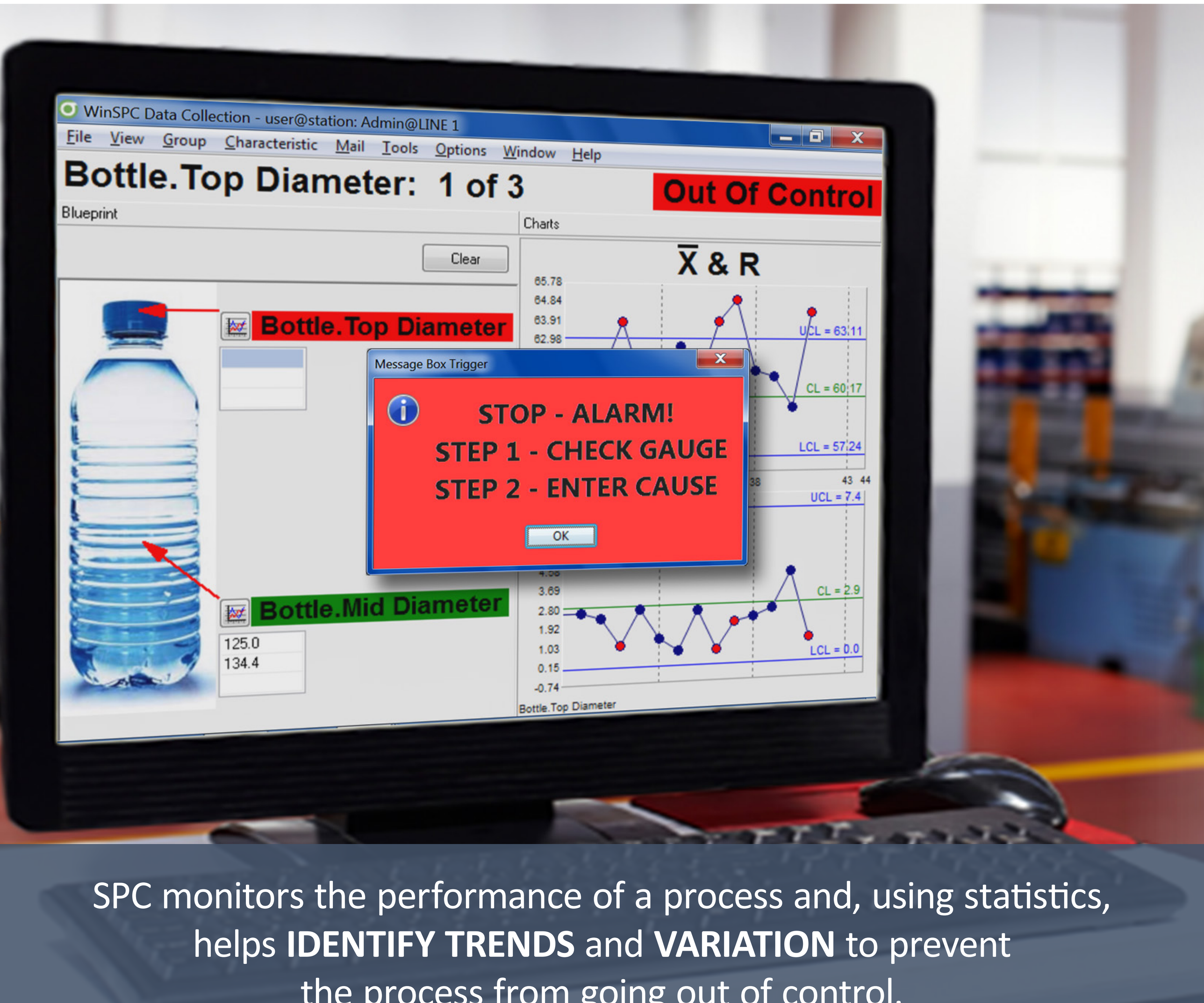
WHY DO SPC?

*SPC helps manufacturers make the **HIGHEST QUALITY PRODUCT** at the **LOWEST POSSIBLE COST.***



SPC monitors the performance of a process and, using statistics, helps **IDENTIFY TRENDS** and **VARIATION** to prevent the process from going out of control.

BENEFITS OF AUTOMATED SPC

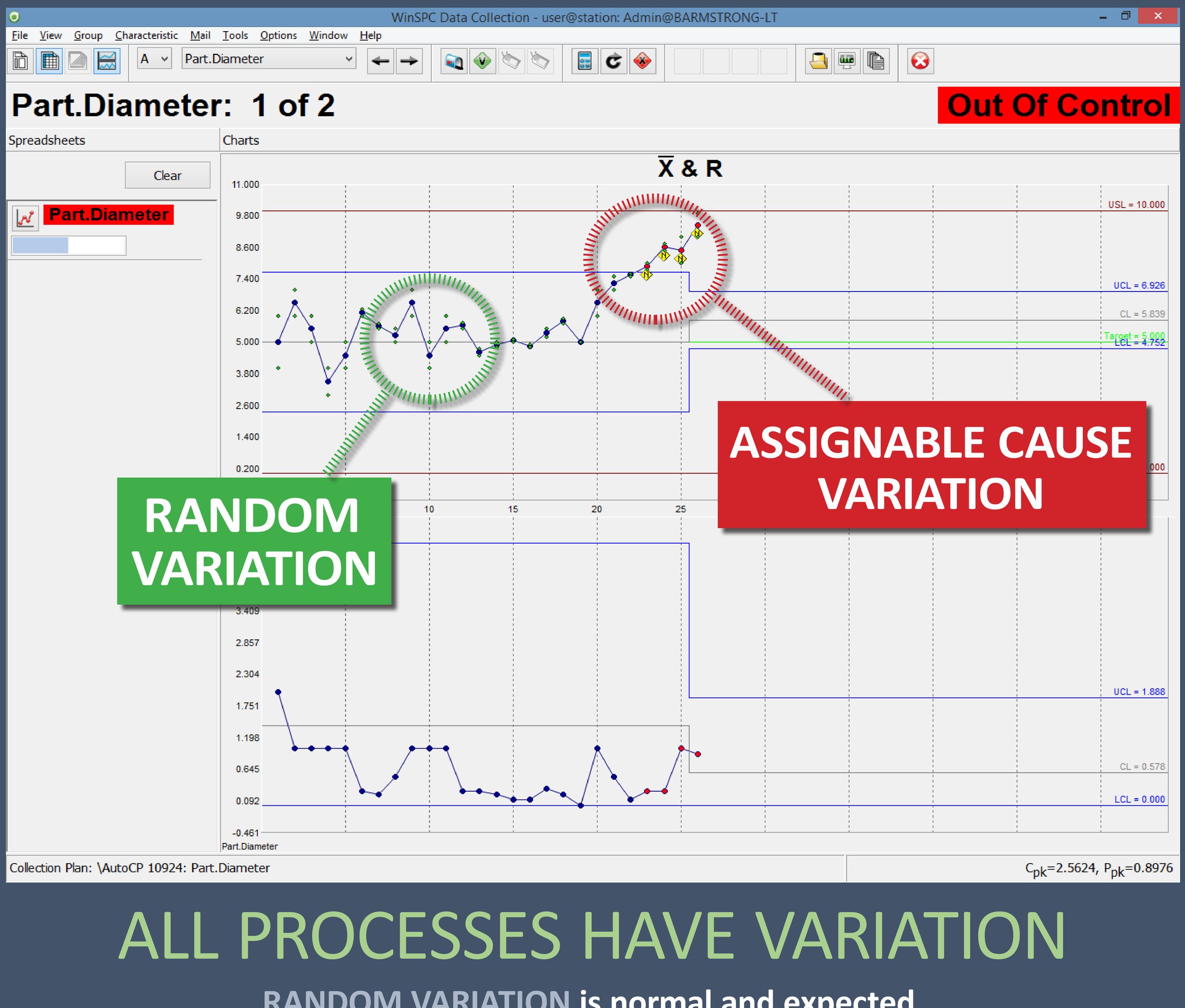
Statistical Process Control

- MONITOR PROCESSES IN REAL-TIME
- IMPROVE QUALITY
- REDUCE VARIATION, SCRAP & REWORK
- ELIMINATE PAPERWORK
- COMPLY WITH CUSTOMER & REGULATORY REQUIREMENTS

WINSPC® STATISTICAL PROCESS CONTROL

VARIATION

In SPC, variation refers to differences in observed measurements from the expected target value.



ALL PROCESSES HAVE VARIATION

RANDOM VARIATION is normal and expected.

ASSIGNABLE CAUSE VARIATION is the result of at least one EXTERNAL INFLUENCE and indicates a process is OUT OF CONTROL.

KEY TERMS

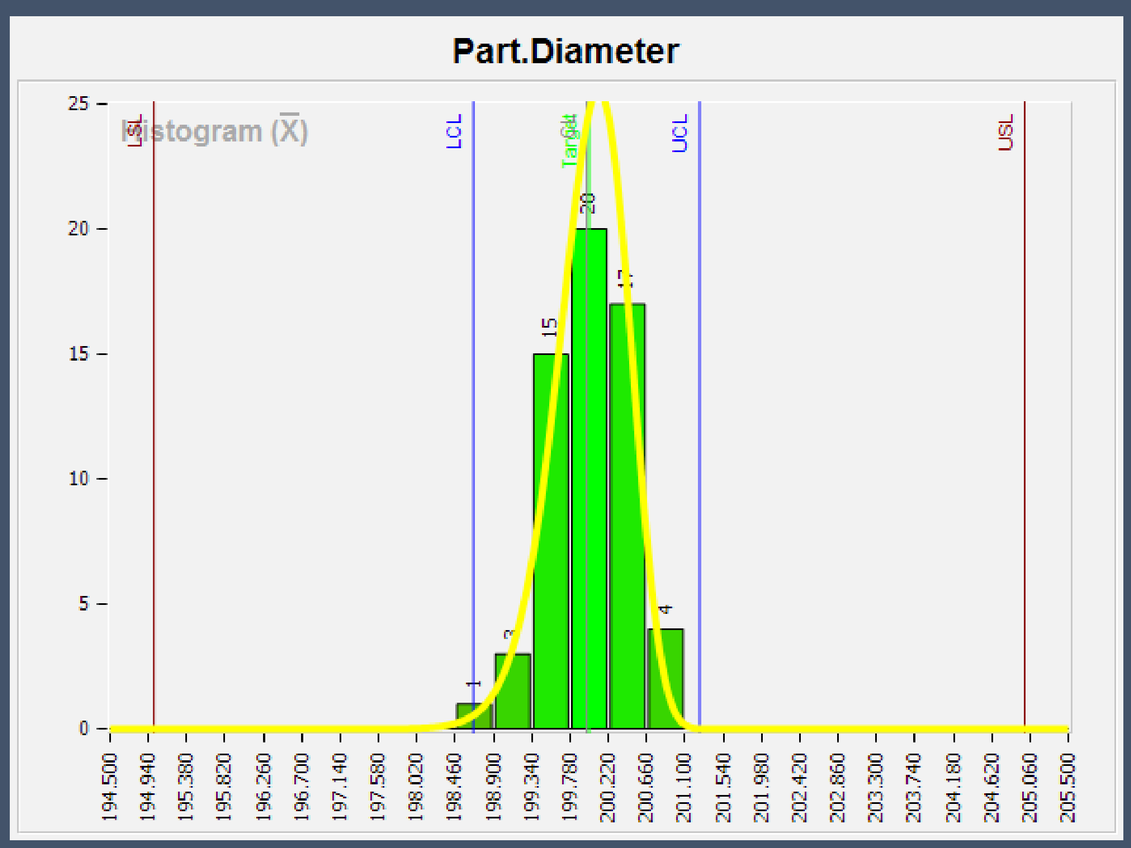
MEAN | **AVERAGE of MEASUREMENTS**
SIGMA | **SPREAD of MEASUREMENTS** (process distribution)
STANDARD DEVIATION | The **EXTENT of VARIATION** for a set of data values
SUBGROUP | **GROUP of MEASUREMENTS** used to plot a point

WINSPC® STATISTICAL PROCESS CONTROL

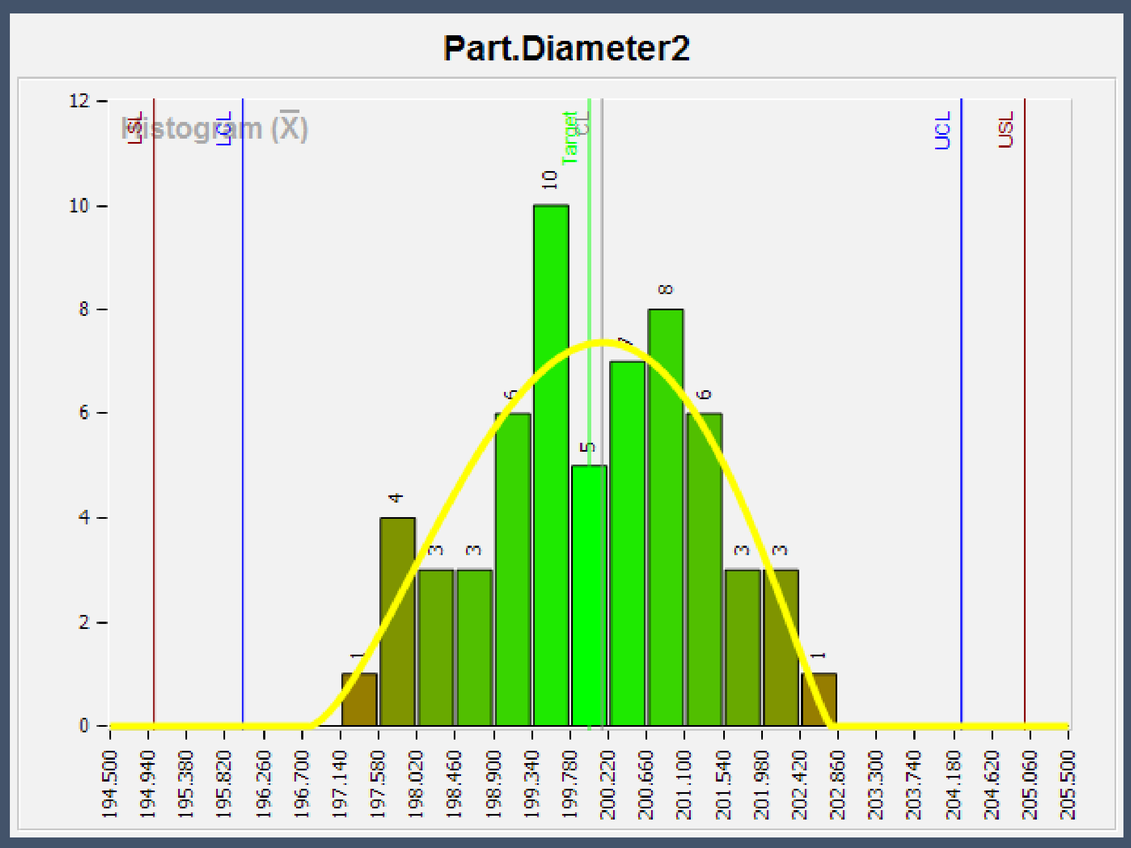
PROCESS CAPABILITY

A method of analyzing a process to determine its capacity to produce units within specification limits.

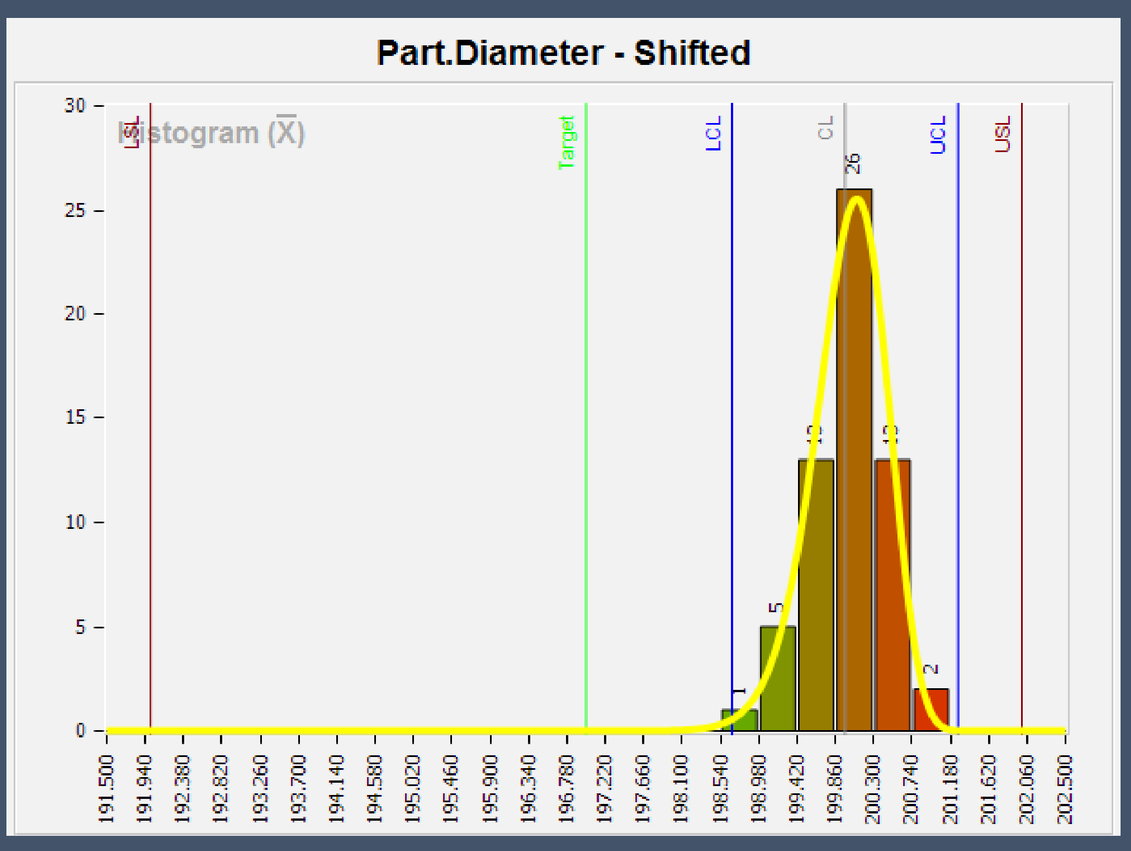
High Cpk | High Cp
Cpk = 1.68 | Cp = 1.68



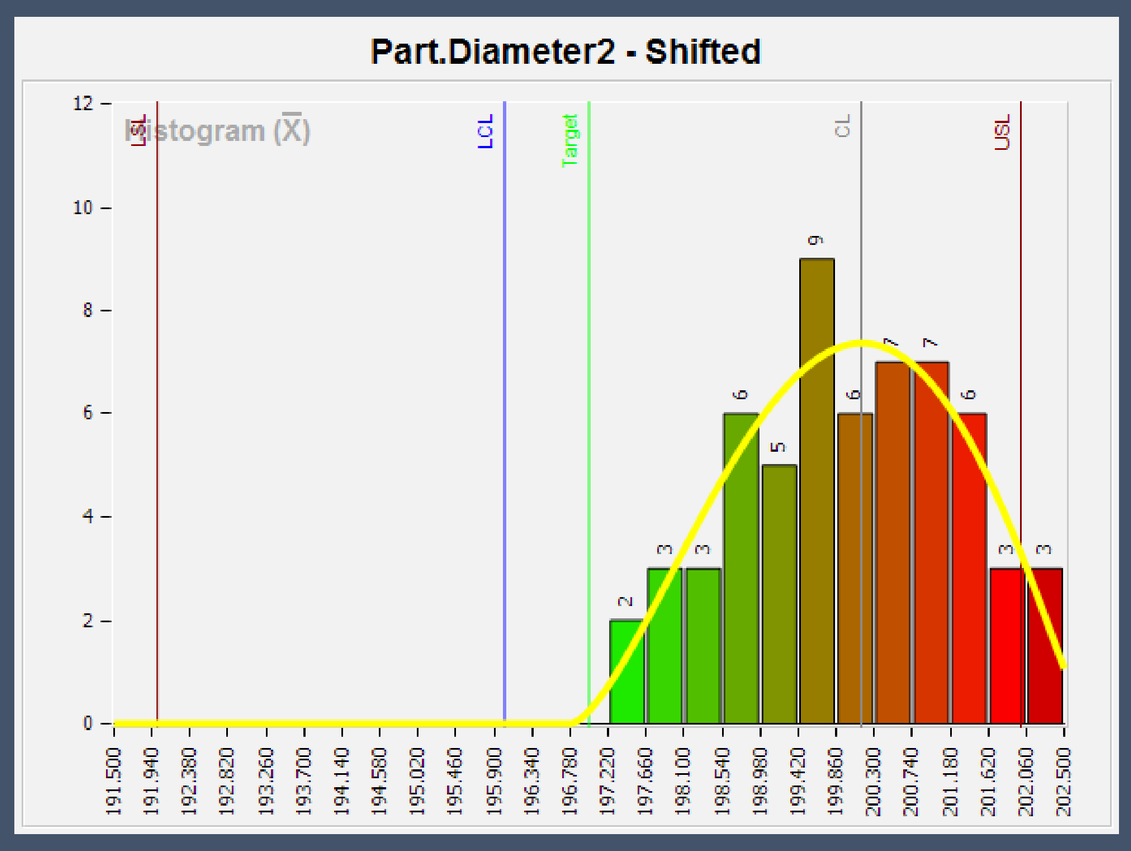
Low Cpk | Low Cp
Cpk = .53 | Cp = .53



Low Cpk | High Cp
Cpk = .67 | Cp = 1.68



Low Cpk | Low Cp
Cpk = .21 | Cp = .53



KEY TERMS

HISTOGRAM | **TALLY of MEASUREMENTS** that shows the **DATA DISTRIBUTION**

CP | Indicates the **DISTRIBUTION WIDTH** for the data (Target Cp > 1.3)

CPK | Indicates the data **WIDTH AND CENTERING** relative to **SPECIFICATIONS** (Target Cpk > 1.3)

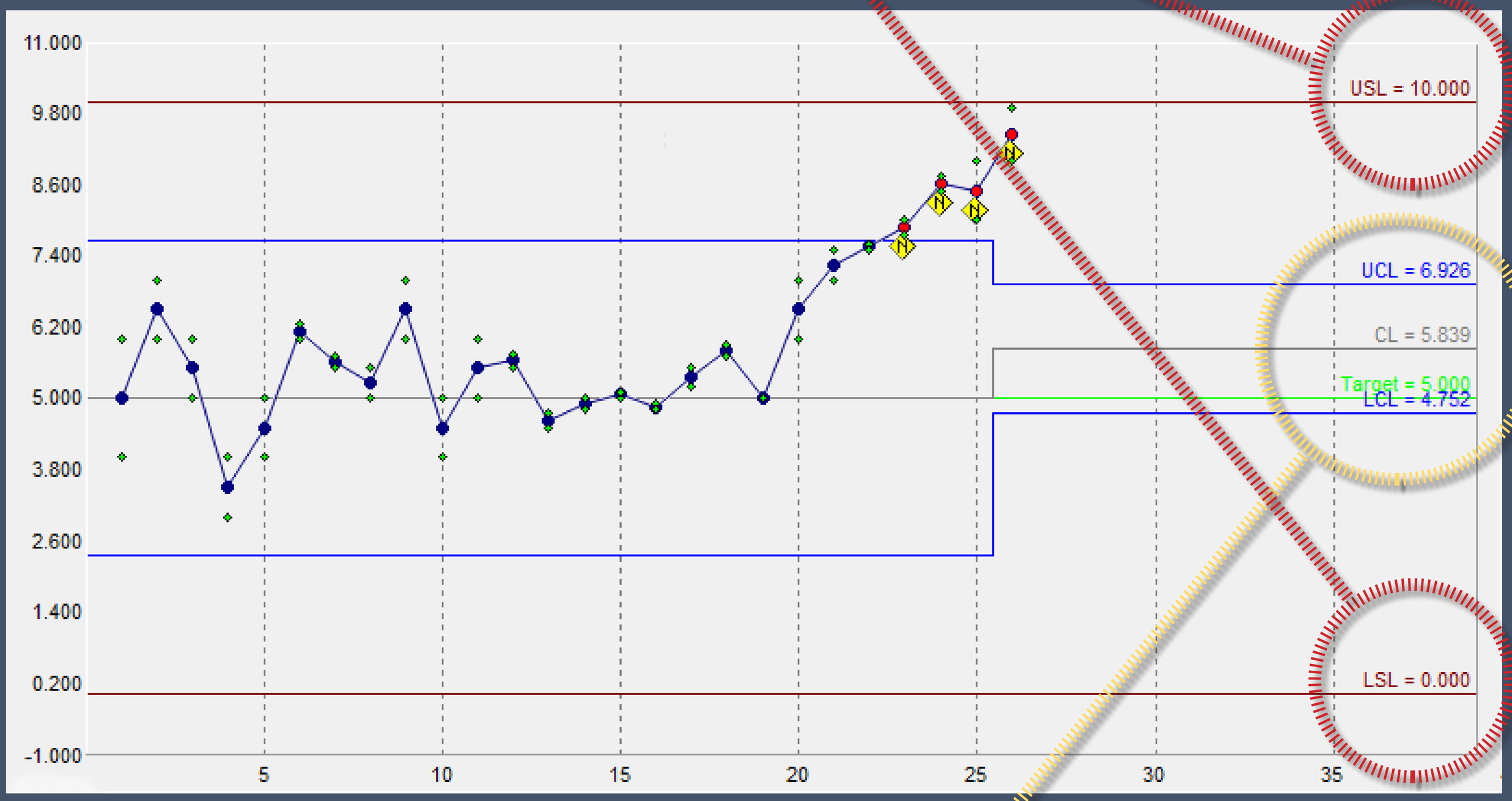
WINSPC® STATISTICAL PROCESS CONTROL

LIMITS

-- SPECIFICATION LIMITS --

Range of acceptable measurements from the CUSTOMER

NOTE: A point outside the specification limits indicates that the part is out of tolerance (defective).



-- CONTROL LIMITS --

Region based on SPC theory to guide PROCESS IMPROVEMENT

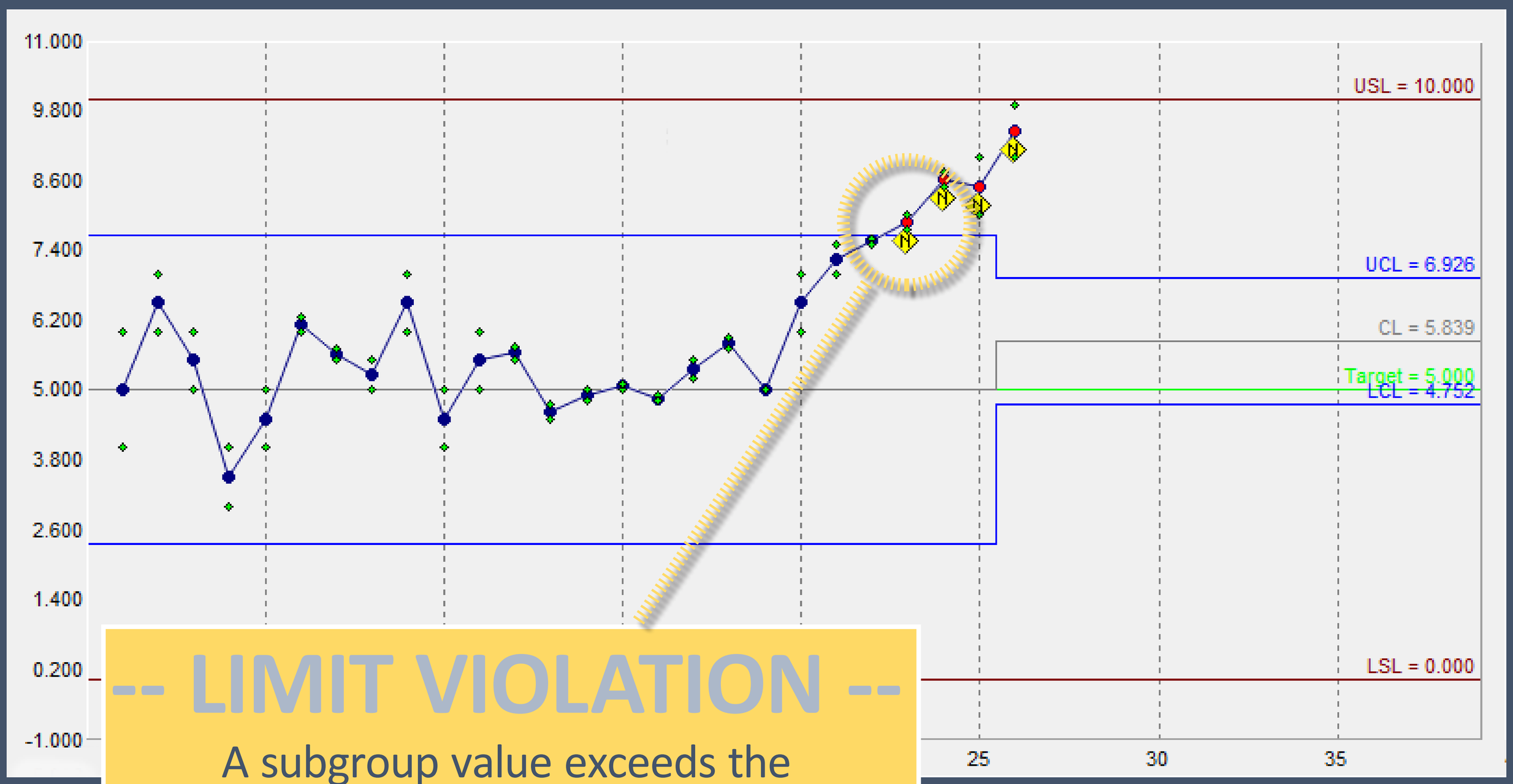
NOTE: A point outside the control limits indicates that the process is out of control.

WINSPC® STATISTICAL PROCESS CONTROL

CONTROL CHART

A chart to visualize process performance against calculated control limits and to reveal variation among measurements.

A PLOT OF DATA AGAINST CONTROL LIMITS



-- LIMIT VIOLATION --

A subgroup value exceeds the **UPPER CONTROL LIMIT (UCL)** indicating that the process is **OUT of CONTROL**.

KEY TERMS

XBAR Chart | **PLOTS the AVERAGE** of a subgroup's measurements
Range Chart | **PLOTS the RANGE** between a subgroup's high and low members
X Chart | **PLOTS each INDIVIDUAL** measurement on its own
MR Chart | **PLOTS the MOVING RANGE** between successive measurements

WINSPC® STATISTICAL PROCESS CONTROL