Quality control

- Quality: Quality can be defined as a property or characteristic of the produced material.
- Control: is a set of procedures leading to obtain more information regarding the work or something specific to a targe
- Quality Control: is a set of activities intended to ensure that quality requirements are actually being met

Control chart

The control chart was invented by Walter A. Shewhart while working for Bell Labs in the 1920s. quality control charts represent one of the most important scientific techniques and well known to control the quality of products (medical, industrial, food , etc). The main purpose to produce high quality product and satisfy the required standards, also to detect any significant deviation and then to remove them if any exist.

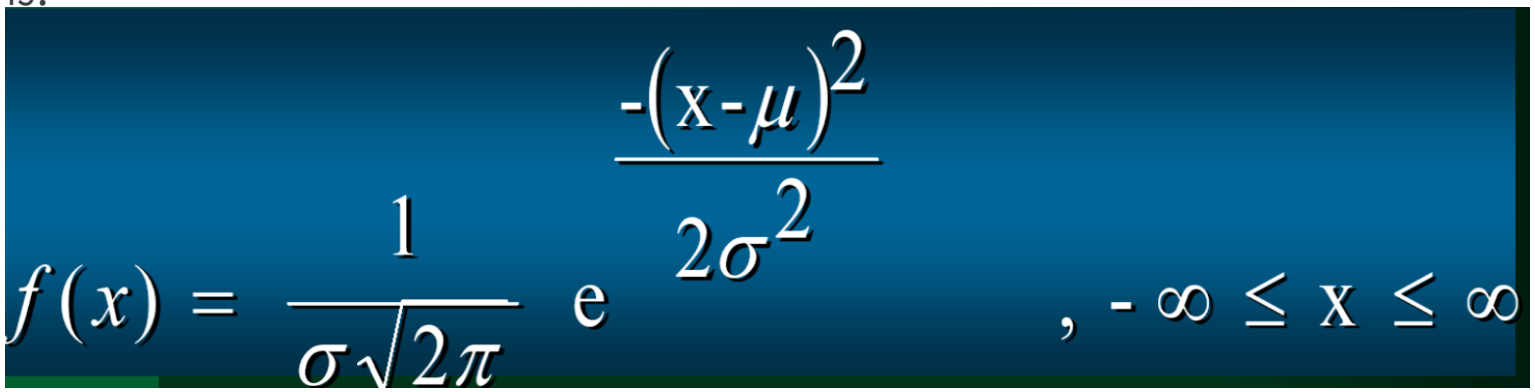
- Control Chart : A graphical record of the variation in quality of a particular characteristics during a specified time period.

Why Use a Control Chart?

- To monitor
- control,
- and improve process performance over time by studying variation and its source

Normal Distribution

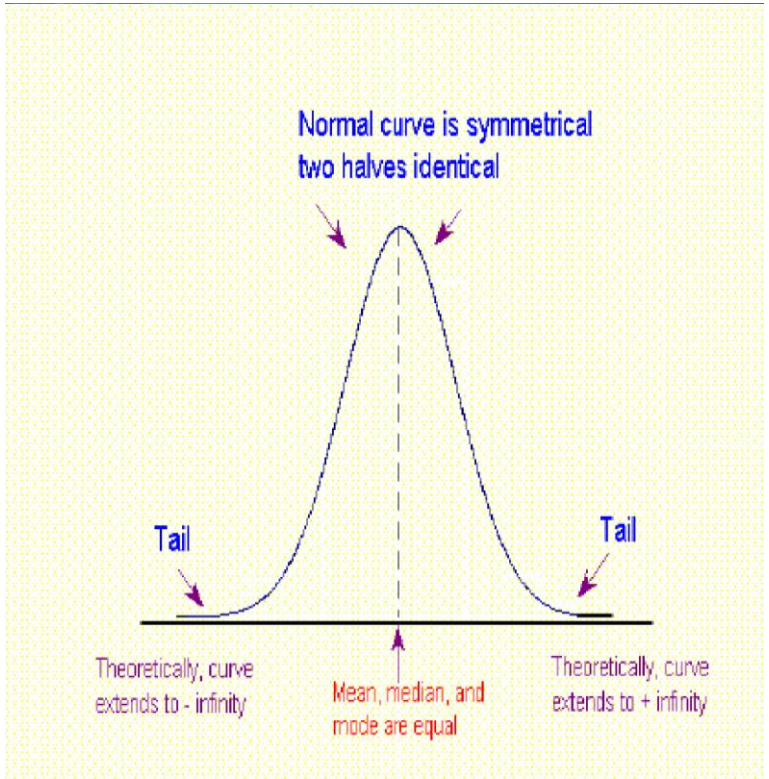
- A continuous random variable X has a normal distribution if the p. d. f. of x is:

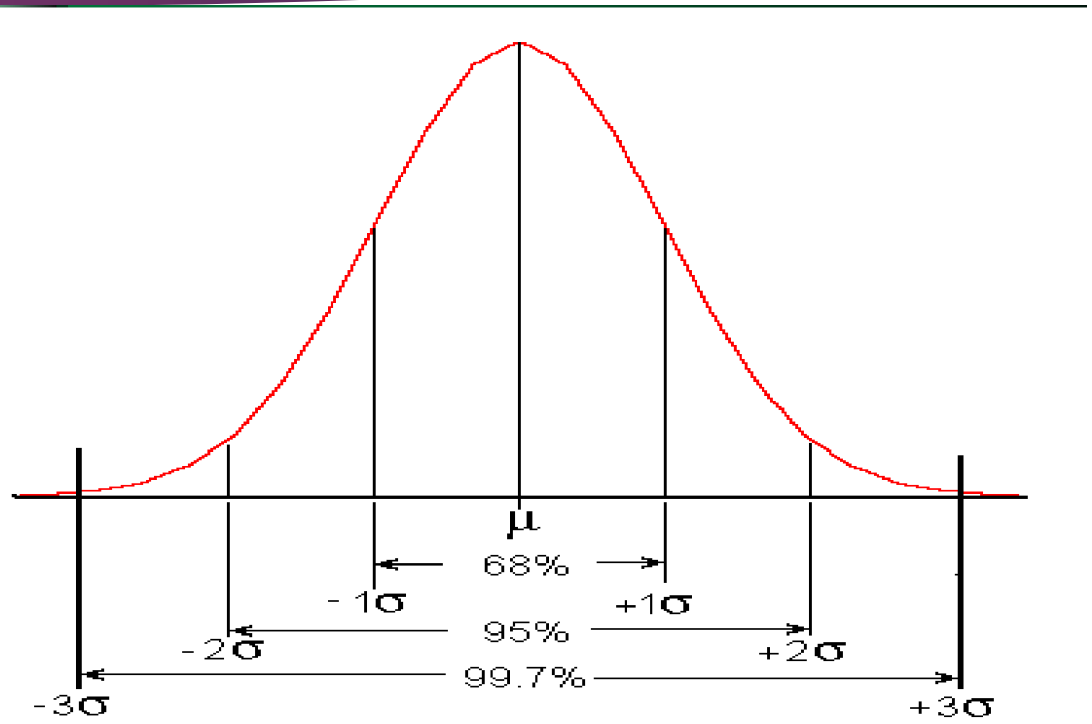


$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{\frac{-(x-\mu)^2}{2\sigma^2}}, \quad -\infty \leq x \leq \infty$$

where μ and σ are constants and σ > 0. f (X) has two parameters μ and σ.
The normal distribution with these parameters can be denoted by N (μ, σ 2).

Properties of normal distribution





Objective of Control Charts

- For quality improvement
- To determine the process capability
- For decisions in regard to product specifications
- For current decisions in regard to the production process
- For current decisions in regard to recently produced items

Quality control charts consist of three straight lines and parallel to the horizontal axis:

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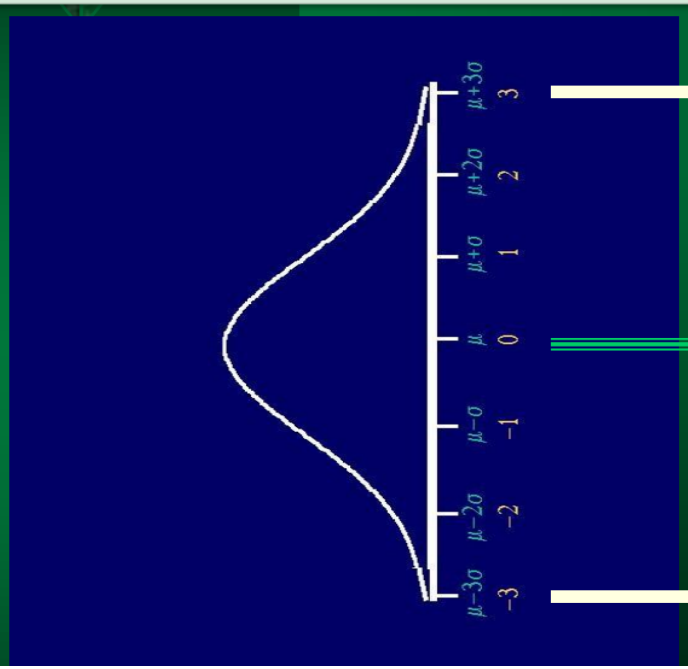

UCL

T

LCL

- 1-Upper Control Limit represents the maximum allowed for the difference in the quality level of produced product , and denoted by (UCL) .It is mathematically expressed as:

$$UCL = T + 3\hat{\sigma}_x$$

- 2-Center (Target)line The target line represents the over all average for the quality of produced product and denoted by (T).
- 3-Lower Control Limit represents the minimum allowed for the difference in the quality level of produced product , and denoted by (LCL) .It is mathematically expressed as:

$$LCL = T - 3\hat{\sigma}_x$$