



Process Control Design using SPC

(16 hours)

Audience and Purpose:

Course is for Engineers, Scientists and Managers who have direct responsibility for designing and implementing closed loop process control. The course covers the basic concepts sensor design, selection of alarms, control logic and out of control action plans. Statistical process control charts for variables and attributes and associated limit calculations are also presented.

Course Objectives:

Upon completion of the course the participants will be able to:

- Understand the language and compute the basic statistics associated with SPC
- Apply the 10 process control requirements to achieve process control
- Determine rational subgroup formation, sample size and frequency
- Select appropriate control chart for control requirements
- Compute appropriate control limits
- Select the appropriate SPC Charts
- Design appropriate OCAPs
- Determine process capability
- Describe the roles and responsibilities for using SPC
- Use the analytical software to analyze process variation patterns, generate SPC charts and determine process capability

Software: JMP, Excel

Prerequisites: ESDA is recommended

Course Outline:

Section I Introduction & Basic Statistics

SPC a basis for control
Basic statistics
Normal distribution
Standard error of the mean
Central limit theorem

Section II 10 Requirements for Effective Process Control

Clear product specifications
Effective metrology
Process characterization
Sampling plan
Control chart selection (variables and attributes)
Alarms and out of control action plans (OCAP)
Process documentation
Operator and engineering training



Database
Routine line audits

Section III Process Capability
Determining process stability prior to computation of capability
Cp and Cpk
Application of specifications and yield estimation
Tests for normality
Distribution fitting for non-normal parameters
Sigma and z as measures of process capability
Pareto plots and measures of process capability for attributes

Section IV Process Control Implementation Roles & Responsibilities
Management
Process Engineer
Process Control Specialist
Supervisor
Operator