



Statistical Quality Control

in Chemistry and Process industry

WHY A SPECIFIC SQC COURSE?

Where SPC (Statistical Process Control) can be roughly defined as ‘control charting’, SQC (Statistical Quality Control) has a much broader meaning; it involves SPC, capability analysis as well as Measurement System Analysis (MSA).

However, the way SQC is being treated in most textbooks and courses doesn’t focus enough on the typical problems of complex processes, and very often standard methods are not directly applicable. Also the specificity of the measurement system has its implications on the statistics involved, and should be explicitly taken into account.

In this course modifications and extensions to classical SPC are being proposed.

COURSE SET-UP

This two-day course consists of four modules. The statistics module serves as a quick refresher of the material of ‘Applied Statistics – A primer’ plus a treatment of discrete random variables. In each module, theoretical aspects are alternated with practical exercises. All examples and exercises are based on chemical processes.

The book “Introduction to Statistical Quality Control” by Douglas C. Montgomery is strongly recommended as additional reference material.

COURSE OBJECTIVES

The goal of this course: to offer a thorough introduction to SPC and MSA, with emphasis on typical situations in the process industry: one-at-a-time sampling, short-run processes, batch processes, serial correlations (“drifts”) and complex measurements.

INTENDED AUDIENCE AND PRIOR KNOWLEDGE

This course addresses those who are at level with the material treated in ‘Applied Statistics – A primer’. No prior knowledge of SQC is required.



COURSE CONTENTS

Module I : Introductory statistics for SQC

- Review of ‘Applied Statistics – A primer’
- Probability for discrete variables: Binomial, Poisson, Geometric

Module II : Standard SQC

- Basic concepts
- Traditional control charts: \bar{X} , \bar{X} -bar, R, S, S^2 , MR2, p, np, c and u
- Moving Average (MA) chart
 - Exponentially Weighted MA (EWMA) chart
 - Cumulative Sum (CUSUM) charts (classical and tabular)
- Process Capability: meaningful use and required conditions

Module III : SQC in process industry - specific solutions

- SQC in the lab
- Control charts for “short run” processes, and “between-within batch” charts
- Serial correlation: detection and remedy
- SPC versus engineering (automatic) process control

Module IV : Measurement System Analysis

- Bias/Accuracy, Resolution and Linearity
- Measurement capability / Precision to Tolerance

PRACTICAL

This course is offered in-company only.