CONCEPT

Chemical Testing Technical Competence Training Course

21 – 25 March 2027
Dammam - Eastern Province five-star



Chemical Testing Technical Competence Training Course

Ref: 2192_31216 **Date:** 21 – 25 March 2027 **Location:** Dammam - Eastern Province five-star **Fees:** 19500 SAR

Introduction:

Chemical testing technical competence training is a 1-week course for chemists, laboratory analysts, technical supervisors and quality officers, ending with a Method Verification and Quality Control File for one routine test. Many testing laboratories run sound methods yet release results without verified performance data, a realistic uncertainty estimate or control charts that would reveal drift before a client or proficiency testing scheme does. Nominees already perform or review chemical tests and work through hands-on laboratory exercises and data sets from water, food, petrochemical and materials testing. CoreConcept Training Center delivers this chemical testing competence course.

Course Objectives:

- Apply wet chemistry, titrimetric and instrumental test procedures with controlled sample preparation and traceable reference materials
- Plan and execute method verification and validation studies following the Eurachem Fitness for Purpose of Analytical Methods guide
- Estimate measurement uncertainty for a chemical result using bottom-up budgets and top-down validation and quality control data
- Set up and interpret control charts for internal quality control and act on out-of-control signals
- Evaluate proficiency testing performance using z-scores and zeta scores and investigate unsatisfactory results
- Review technical results and prepare test reports that state uncertainty and conformity decisions clearly

Target Audience:

- Chemists and analysts who perform routine and non-routine chemical tests at the bench
- Technical supervisors who review, authorise and release analytical results
- Quality officers responsible for internal quality control, control charts and proficiency testing records
- Method development staff who introduce, verify or validate new test methods
- Senior technicians who prepare samples, standards and reagents for chemical analysis

Course Outline:

Day 1: Chemical Testing Workflow and Analyst Competence

- Chemical Testing Workflow from Sample Receipt to Report
- Sampling, Subsampling and Sample Preparation Error Sources
- Volumetric Glassware, Balances and Reagent Grade Selection
- Reference Materials and Metrological Traceability of Chemical Results
- Analyst Competence Gap Assessment Against Laboratory Test Scope

Day 2: Wet Chemistry, Titrimetry and Instrumental Methods

- Gravimetric and Wet Chemistry Procedures for Routine Analysis
- Titrimetric Analysis Endpoint Detection and Titrant Standardisation
- Spectrophotometric Methods and Calibration Curve Construction
- Chromatographic and Atomic Spectrometry Technique Selection Overview
- Standard Method Interpretation and Laboratory Work Instruction Drafting

Day 3: Method Verification and Validation in Practice

- Eurachem Fitness for Purpose Guide Validation Planning
- Selectivity, Linearity and Working Range Experiments
- Trueness and Recovery Studies Using Spiked Samples
- Repeatability and Intermediate Precision Study Design
- Limit of Detection and Limit of Quantification Estimation

Day 4: Measurement Uncertainty, Internal QC and Proficiency Testing

- Eurachem/CITAC Uncertainty Budget Building for Titration Results
- Top-Down Uncertainty from Validation and QC Data
- Nordtest NT TR 569 Control Chart Set-Up and Limits
- Control Chart Out-of-Control Rules and Corrective Actions
- ISO 13528:2022 z-Score and Zeta Score Interpretation

Day 5: Laboratory Exercises and the Method Verification File

- Lab Exercise Verifying a Titrimetric Method's Performance Data
- Lab Exercise Calculating Expanded Uncertainty for a Result
- Unsatisfactory Proficiency Testing Result Root Cause Investigation
- Technical Result Review, Decision Rules and Test Report Content
- Method Verification and Quality Control File Completion

Skills You Will Gain:

- Titrant Standardisation
- Calibration Curve Evaluation
- Method Performance Characterisation
- Uncertainty Budget Construction
- Shewhart Control Charting
- Proficiency Testing Score Analysis
- Analytical Root Cause Investigation
- Technical Result Authorisation

Why Attend This Course:

- Produce a Method Verification and Quality Control File that the technical manager can file as evidence that a routine test performs as intended
- Decide whether a result is fit for release, needs repeat analysis or must be reported with a qualified conformity statement
- Avoid client complaints, repeat testing costs and unsatisfactory proficiency testing scores caused by undetected drift or bias
- Coach fellow analysts on control chart reading, uncertainty calculation and verification study design using the same worked data

Conclusion:

Back at work, the participant hands the Method Verification and Quality Control File to the technical manager, who uses it to approve the method for routine use and to set the control limits analysts will apply each batch. Supervisors use the uncertainty estimate and decision rules when authorising reports. After the first quarter of routine use, the laboratory should review control chart signals, any proficiency testing scores received and the uncertainty estimate, then update the file and extend the same approach to the next test method on the scope.

Frequently Asked Questions FAQ:

What should participants know before a chemical testing technical competence course?

Participants should already perform or review chemical tests and be comfortable with basic laboratory calculations and spreadsheets. Bringing a current method, recent quality control data or a proficiency testing report helps them apply the laboratory exercises to their own routine tests.

How does a chemical testing technical competence course differ from a laboratory quality management course?

A quality management course covers the management system, documents and audits. This course works at the bench and on the data: test methods, verification studies, uncertainty, control charts and proficiency testing scores that decide whether an individual chemical result can be trusted.

Why does chemical testing technical competence need both method validation and internal quality control?

Validation shows that a method can perform as intended before routine use; internal quality control shows that it keeps performing that way on every batch. Without control charts, drift or bias found during validation goes unnoticed until a complaint or proficiency testing result reveals it.

What do participants take back from a chemical testing technical competence course?

Participants take back a Method Verification and Quality Control File for one routine test, holding the verification study results, an uncertainty budget, control chart limits and rules, a proficiency testing review and the decision rules for reporting results.