مركز المستشار الوطني للتدريب
National Consultant Centre For Training
YOUR GATE TO HANDS-ON TRAINING

5-Day Cement Industry Training Course
In

QUALITY ASSURANCE AND PRODUCT COMPLIANCE IN CEMENT PRODUCTION (SITE VISIT)

Cairo - Egypt, 11 – 15 May 2026

COURSE LEVEL: INTERMEDIATE

COURSE OVERVIEW:

Quality assurance and product compliance are the critical safeguards that ensure cement meets the rigorous demands of the construction industry and international standards. This course defines the systematic approach required to maintain consistency in physical and chemical properties throughout the manufacturing cycle. It establishes a high standard for laboratory excellence and process control to guarantee that the final product is both safe and durable.

The scope of this training encompasses the entire quality management system, from raw material quarrying to the final bag of cement. It covers the application of ISO 9001 standards in a cement plant and the specific requirements of regional and global cement codes such as ASTM and EN. Furthermore, the course addresses the role of advanced analytical technology—like XRF and XRD—in providing real-time data for proactive process adjustments.

Coverage includes detailed modules on sampling protocols, physical testing of cement strength, and the chemical analysis of clinker. Participants will engage in a site visit to the quality control laboratory to observe the preparation and testing of samples according to standardized methods. Through the study of statistical process control and compliance audits, attendees will gain the skills necessary to lead a quality-focused production environment.

COURSE OBJECTIVES:

After completion of this course, the participants will be able to:

- Explain the principles of Quality Assurance (QA) and Quality Control (QC).
- Understand the requirements of international cement standards (EN/ASTM).
- Implement a robust sampling plan for all stages of production.
- Interpret chemical analysis results for clinker and cement.
- Describe the physical testing procedures for strength and fineness.
- Manage the quality of raw materials and alternative fuels.
- Understand the impact of gypsum and additives on cement quality.
- Utilize Statistical Process Control (SPC) for trend analysis.
- Conduct internal quality audits to ensure product compliance.
- Identify the causes of quality deviations and implement corrections.
- Ensure the accuracy and calibration of laboratory equipment.
- Prepare comprehensive quality reports for plant management.

TARGET AUDIENCE:

This course is intended for Quality Assurance Managers, Lab Technicians, Chemist, Process Engineers, and Production Supervisors.

TRAINING COURSE METHODOLOGY:

A highly interactive combination of lectures, discussion sessions, and case studies will be employed to maximize the transfer of information, knowledge, and experience. The course will be intensive, practical, and highly interactive. The sessions will start by raising the most relevant questions and motivating everybody to find the right answers. The attendants will also be encouraged to raise more of their questions and to share in developing the right answers using their analysis and experience. There will also be some indoor experiential activities to enhance the learning experience. Course material will be provided in PowerPoint, with necessary animations, learning videos, and general discussions.

The course participants shall be evaluated before, during, and at the end of the course.

COURSE CERTIFICATE:

National Consultant Centre for Training LLC (NCC) will issue an Attendance Certificate to all participants completing a minimum of 80% of the total attendance time requirement.

COURSE OUTLINE / COURSE CONTENT:

MODULE 1: PRINCIPLES OF QUALITY MANAGEMENT

- Difference between Quality Assurance and Quality Control.
- Overview of ISO 9001:2015 in the cement industry.
- Establishing quality objectives and Key Performance Indicators (KPIs).
- The cost of poor quality: Rejection, rework, and reputation.
- Role of the Quality Manager in the organizational structure.

MODULE 2: CEMENT STANDARDS AND PRODUCT SPECIFICATIONS

- Detailed review of EN 197-1 and ASTM C150 standards.
- Classification of cement types and their performance requirements.
- Understanding the "CE" and "G-Mark" compliance systems.
- Customer requirements and special project specifications.
- Documentation and record-keeping for regulatory compliance.

MODULE 3: RAW MATERIAL AND FUEL QUALITY CONTROL

- Chemical screening of limestone, clay, and iron ore.
- Managing the variability of alternative fuels and their ash.
- Quality control of gypsum and mineral components (Slag, Fly Ash).
- Impact of raw material homogeneity on kiln stability.
- Supplier evaluation and incoming material inspection.

MODULE 4: SAMPLING TECHNIQUES AND AUTOMATION

- Theory of sampling: Representativeness and bias.
- Operation of automatic samplers for raw meal and cement.
- Pneumatic sample transport systems to the laboratory.
- Sample preparation techniques: Grinding and pelletizing.
- Maintaining the integrity of "Retained Samples."

MODULE 5: CHEMICAL ANALYSIS AND MINERALOGY (SITE VISIT)

- Principles of X-Ray Fluorescence (XRF) for elemental analysis.
- Using X-Ray Diffraction (XRD) for clinker phase identification.
- Monitoring Free Lime and SO3 levels for process control.
- Role of the automated laboratory (Robo-Lab) in high-speed testing.
- Interpreting Bogue calculations and clinker mineralogy.

MODULE 6: PHYSICAL TESTING OF CEMENT

- Determining fineness: Blaine method and laser diffraction.
- Measuring setting time using the Vicat needle.
- Soundness testing: Le Chatelier and Autoclave methods.
- Water demand and workability of different cement grades.
- Color measurement and consistency control.

MODULE 7: STRENGTH DEVELOPMENT AND TESTING

- Preparation of standard mortar prisms according to EN/ASTM.
- Curing protocols and the impact of humidity and temperature.
- Testing compressive strength at 2, 7, and 28 days.
- Statistical analysis of strength data and target setting.
- Troubleshooting low strength and inconsistent results.

MODULE 8: STATISTICAL PROCESS CONTROL (SPC)

- Introduction to control charts and variability analysis.
- Calculating process capability indices (Cp and Cpk).
- Identification of "Out of Control" conditions and trends.
- Using data to optimize chemical targets and LSF.
- Software tools for quality data management and reporting.

MODULE 9: PRODUCT COMPLIANCE AND TRACEABILITY

- Managing the "Mill Test Report" (MTR) and certificates.
- Traceability from the final bag back to the raw meal batch.
- Handling customer complaints and technical support.
- Internal and external audit preparation.
- Management of non-conforming products and segregation.

MODULE 10: LABORATORY MANAGEMENT AND SAFETY

- Calibration and maintenance of high-precision instruments.
- Laboratory safety protocols: Chemicals, heat, and dust.
- Training and competency assessment for lab personnel.

- Site visit debriefing and final examination.
- Course wrap-up and distribution of certificates.