CONCEPT

Refractory Inspection and Maintenance: Lining Installation, Repair and Thermal Insulation

6 – 10 December 2026
Dammam - Eastern Province five-star



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Ref: 324_15602 **Date:** 6 – 10 December 2026 **Location:** Dammam - Eastern Province five-star **Fees:** 19500 SAR

Introduction:

Refractory inspection and maintenance decides how long furnaces, heaters, boilers, kilns and reactors run between turnarounds. Linings fail early when the wrong castable is chosen, anchors are poorly welded, dry-out is rushed or shell hot spots go untracked, while insulation that holds water hides corrosion on the steel beneath. This Core Concept course trains inspection, maintenance and turnaround staff to select, install, inspect and repair refractory linings and insulation systems and to supervise contractors against acceptance criteria. Participants produce a Refractory Lining Inspection and Repair Plan.

Course Objectives:

- Classify shaped, monolithic and ceramic fibre refractories and explain where each suits a furnace, heater, boiler, kiln or reactor lining
- Select lining materials and anchoring systems for a given service temperature, process chemistry and abrasion duty
- Specify casting, gunning and ramming installation controls and a dry-out and heat-up schedule with hold points
- Inspect in-service linings using visual, shell temperature and thickness evidence and attribute damage to spalling, erosion or chemical attack
- Assess hot and cold insulation systems for heat loss and corrosion under insulation risk at overview level
- Plan turnaround refractory repairs and supervise contractors with an inspection and test plan and acceptance criteria

Target Audience:

- Inspection engineers who assess refractory linings, shells and insulation during shutdowns and in operation
- Maintenance engineers who scope and budget lining repairs on furnaces, heaters, boilers and kilns
- Turnaround planners responsible for refractory work packages, material call-offs and critical path
- Refractory supervisors who direct installation crews and release hold points
- QA/QC inspectors who witness material testing, placement and dry-out records

Course Outline:

Day 1: Refractory Fundamentals and Lining Condition Baseline

- ASTM C71 Definition and Acidic, Basic and Neutral Refractory Families
- Shaped Products: Dense Firebrick, Insulating Firebrick and Special Shapes
- Monolithic Products: Dense Castables, Low-Cement Castables, Plastics and Ramming Mixes
- Ceramic Fibre Blankets, Modules and Boards for Lightweight Linings
- Lining Condition Baseline Register for Furnaces, Kilns and Reactors

Day 2: Material Selection, Lining Design and Anchoring Systems

- Service Temperature Limits and Hot Face to Shell Temperature Profile Calculation
- Chemical Compatibility With Slag, Alkali, Sulphur and Reducing Atmospheres
- Abrasion Resistance Selection for Cyclones, Risers and Transfer Lines
- V-Anchors, Hexmesh and Ceramic Anchors: Spacing, Alloy Choice and Stud Weld Checks
- Multi-Component Lining Design Sheet With Expansion Joint Allowances

Day 3: Installation Methods, Dry-Out and Quality Control

- Casting and Vibration Placement With Formwork and Water Addition Control
- Dry and Wet Gunning Methods With Rebound Loss and Density Checks
- Ramming and Plastic Installation Around Burner Blocks and Nozzles
- Dry-Out and Heat-Up Schedule: Hold Points, Heating Rates and Steam Venting
- Inspection and Test Plan: Sample Panels, Cold Crushing Strength and Hammer Tests

Day 4: Failure Mechanisms, In-Service Inspection and Insulation Systems

- Spalling From Thermal Shock and Trapped Steam Pressure: Crack Pattern Recognition
- Erosion, Slag and Alkali Attack and Anchor Oxidation Damage Signatures
- Shell Hot Spot Surveys With Thermal Scans, Temperature Crayons and Remaining Thickness Estimates
- Hot and Cold Insulation Systems: Mineral Wool, Calcium Silicate, Cellular Glass and Vapour Barriers
- Corrosion Under Insulation Risk Ranking With Jacketing and Coating Prevention Overview

Day 5: Turnaround Repair Planning and Lining Inspection Walkthrough

- Cement Kiln and Reformer Case: From Hot Spot History to Repair Scope Decision
- Turnaround Refractory Work Package: Demolition, Quantities, Materials and Critical Path
- Contractor Supervision Checklist: Mixing, Placement, Curing and Hold Point Sign-Off
- Refractory Lining Walkthrough Against Visual and Dimensional Acceptance Criteria
- Refractory Lining Inspection and Repair Plan Drafting and Peer Review

Skills You Will Gain:

- Refractory Material Classification
- Lining Design and Anchoring
- Monolithic Installation Control
- Dry-Out Schedule Planning
- Refractory Damage Diagnosis
- Shell Hot Spot Assessment
- Insulation System Review
- Refractory Contractor Supervision

Why Attend This Course:

- Return with a Refractory Lining Inspection and Repair Plan built for an asset from your own site
- Reduce early lining failures by checking material choice, anchors and dry-out before the unit goes back into service
- Give turnaround teams repair scopes with quantities, hold points and acceptance criteria they can price and schedule
- Compare lining practice with peers from refining, petrochemicals, cement, steel, power and minerals processing

Conclusion:

Refractory linings and insulation last when material choice, anchoring, installation, dry-out and inspection are managed as one chain rather than separate jobs. The course moves from refractory families and product forms, through selection by temperature, chemistry and abrasion and anchor design, to casting, gunning, ramming, dry-out and quality control, then to spalling, erosion, chemical attack, shell hot spots and insulation systems. The final day applies this in turnaround cases and a lining walkthrough and produces a Refractory Lining Inspection and Repair Plan.