CONCEPT

Infrared Thermography for Condition Monitoring: Electrical, Mechanical and Process Inspection

22 – 26 November 2026
Riyadh - KAFD district five-star



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Ref: 306_15550 **Date:** 22 – 26 November 2026 **Location:** Riyadh - KAFD district five-star **Fees:** 20000 SAR

Introduction:

Infrared thermography for condition monitoring often disappoints because images are taken with the wrong emissivity, the reflected apparent temperature is ignored, or a hot spot is reported without load data or a severity rating, so loose terminations and failing bearings still reach breakdown. This Core Concept course trains maintenance and electrical staff to set up a radiometric camera, capture defensible thermograms of electrical, mechanical, process and building assets, rank anomalies by severity and run a thermographic route. Participants produce a Thermographic Inspection Route and Anomaly Report Pack for their own plant.

Course Objectives:

- Apply heat transfer and radiation principles to predict how a fault will show on an infrared image of plant equipment
- Configure a radiometric thermal camera with correct emissivity, reflected apparent temperature, distance, focus and temperature span for each target
- Carry out qualitative and quantitative inspections of connections, switchgear, motor control centres, bearings, couplings and motors under suitable load
- Evaluate thermal anomalies on process vessels, refractory linings, steam traps and building envelopes and separate real defects from reflections and solar gain
- Rank findings with temperature-rise severity criteria and write anomaly reports that give a clear repair priority and re-inspection date
- Plan a thermographic inspection route with safe working arrangements for live equipment and link its results to the wider condition monitoring programme

Target Audience:

- Maintenance engineers accountable for the availability of electrical distribution and rotating equipment
- Electrical technicians who open, inspect and repair switchboards, motor control centres and terminations
- Condition monitoring technicians who carry out thermographic, vibration or oil sampling routes
- Reliability engineers who select monitoring techniques and follow up repeat equipment failures
- Process and inspection staff who watch furnace, vessel, piping and insulation condition in operation
- Facilities engineers responsible for building envelopes, roofs and HVAC plant

Course Outline:

Day 1: Heat Transfer, Radiation and Thermal Camera Basics

- Conduction, Convection and Radiation Paths in Energised and Rotating Plant
- Stefan-Boltzmann Relationship and the Infrared Spectral Bands Used by Thermal Cameras
- Detector Types, Field of View, IFOV and Spatial Resolution Checks
- Radiometric Versus Non-Radiometric Imagers and Selection by Inspection Task
- Thermography Programme Current-State Review with an Asset and Access Checklist

Day 2: Measurement Physics, Standards and Camera Settings

- Emissivity by Material, Angle and Surface Finish with the Tape Reference Method
- Reflected Apparent Temperature Measurement with the Crumpled Foil Reflector
- Atmospheric Transmission, Distance, Humidity and Window Transmittance Corrections
- Focus, Level, Span, Palette and Image Fusion Settings for Defensible Thermograms
- ISO 18434-1 General Procedures and the ASTM Guide for Examining Electrical and Mechanical Equipment

Day 3: Electrical and Mechanical Inspection Practice

- Bolted Connection, Fuse Clip and Cable Termination Hot Spot Patterns Under Load
- Switchgear, Distribution Board and Motor Control Centre Survey Sequence
- Three-Phase Load Imbalance and Harmonic Heating Comparison Method
- Bearing, Coupling, Belt Drive and Motor Frame Thermal Signatures
- Qualitative Comparative Surveys Versus Quantitative Temperature Measurements

Day 4: Process, Refractory and Building Applications and Severity Judgement

- Refractory Lining, Furnace Tube and Kiln Shell Hot Spot Mapping
- Steam Trap, Valve Passing and Tank Level Detection with Thermal Contrast
- Building Envelope, Roof Moisture and Insulation Loss Surveys with ISO 6781
- Temperature-Rise Severity Criteria: Delta-T Against Reference and Ambient
- Measurement Error Sources: Reflections, Solar Loading, Wind Cooling and Low Load

Day 5: Inspection Walkthroughs and the Thermographic Anomaly Report Pack

- Live Inspection Safety Walkthrough: Approach Boundaries, Infrared Windows and Arc-Rated Clothing
- Switchroom and Motor Control Centre Thermographic Walkthrough with Load Recording
- Rotating Equipment and Process Unit Thermographic Walkthrough
- Inspection Route Frequency Planning Referencing NFPA 70B and Programme Integration
- Thermographic Inspection Route and Anomaly Report Pack Drafting and Peer Review

Skills You Will Gain:

- Thermal Camera Configuration
- Emissivity and Reflected Temperature Compensation
- Electrical Thermographic Survey
- Mechanical Thermal Signature Analysis
- Refractory and Insulation Assessment
- Thermal Anomaly Severity Rating
- Thermographic Route Planning
- Thermography Report Writing

Why Attend This Course:

- Return with a Thermographic Inspection Route and Anomaly Report Pack prepared for assets from your own plant
- Stop reporting images with wrong temperatures by correcting emissivity, reflections and distance on every shot
- Give planners findings they can schedule, each with a severity rank, load condition and re-inspection date
- Compare thermography practice with peers from power, oil and gas, water, manufacturing and facilities

Conclusion:

Infrared thermography pays off when correct camera physics, safe access and a disciplined reporting routine work together. The course moves from heat transfer, radiation and camera selection, through emissivity, reflected apparent temperature, atmospheric correction and the ISO 18434-1 general procedures, to electrical and mechanical inspection practice, then to process, refractory and building surveys and severity judgement. The final day applies the material in inspection walkthroughs and produces a Thermographic Inspection Route and Anomaly Report Pack.