JUPITER PRIME

Consulting • Training • Advisory

جوبيتر برايم للاستشارات والتدريب

COURSE BROCHURE

Advanced Infrared Thermography Inspection Training Course

jupiterprime.uk

info@jupiterprime.uk

Registered in the United Kingdom and Saudi Arabia

Advanced Infrared Thermography Inspection Training Course

Advanced Infrared Thermography Inspection is a 2-week training course for thermographers, reliability engineers and inspection technicians who turn thermal images into maintenance decisions, and it ends with a thermographic inspection report ranking fault severity and repair priorities. A thermal image that is misread can hide a failing joint or trigger an unnecessary shutdown. Jupiter Prime Training offers this course to reliability and inspection departments.

Why Infrared Thermography Inspection Matters Now

Three changes raise the value of skilled thermography. Affordable cameras have put thermal imaging in many hands, but untrained readings produce false alarms and missed faults. Ageing electrical networks, rotating machines and furnaces run harder, so early heat signatures matter more. Insurers and asset owners also ask for documented, repeatable condition evidence. Sites that measure correctly catch loose connections, failing bearings and refractory loss before they cause outages; sites that only take pictures miss them. The course rests on radiometric measurement principles, condition-based maintenance CBM, reliability-centred maintenance RCM and temperature-difference severity criteria.

Who Gains Most from Infrared Thermography Inspection

- Thermographers who plan and carry out routine infrared surveys
- Reliability engineers who decide which findings justify intervention
- Inspection technicians who check furnaces, vessels, piping and insulation
- Electrical maintenance staff who look after switchgear, transformers and motor control centres
- Planners who schedule repairs from condition monitoring findings

A reliability group that sends its thermographer and the engineer who acts on the findings together gains most, because image quality and repair decisions then follow the same rules.

Infrared Thermography Inspection Capabilities

Participants leave able to produce temperature readings they can defend and severity rankings maintenance teams trust.

- Apply emissivity and reflected temperature corrections — accuracy of every reported reading
- Specify camera, lens and settings for each survey type — equipment purchase and survey planning
- Assess electrical, mechanical, refractory and insulation anomalies quantitatively — maintenance priorities
- Calculate heat loss and severity from thermal data — energy and reliability managers
- Design survey routes and frequencies by criticality — condition monitoring programmes

- Communicate findings in clear reports with repair urgency — planners and asset owners

Key Infrared Thermography Inspection Terms

- Emissivity — a surface's efficiency at emitting infrared energy compared with a perfect emitter, affecting measured temperature.
- Reflected apparent temperature — the infrared energy from surroundings reflected by a surface, which must be compensated in measurement.
- Spatial resolution — the smallest target size a camera can measure accurately at a given distance.
- Thermal anomaly — a temperature pattern differing from expected conditions that may indicate a fault.
- Delta-T — the temperature difference between a suspect component and a reference, used to rank severity.
- Atmospheric transmission — the fraction of infrared energy passing through air between target and camera.

Infrared Thermography Inspection Day by Day

Day 1: Thermography in Asset Reliability

- Condition-Based Maintenance and Thermography's Role — Where Infrared Adds Value
- Failure Modes Detectable by Heat — Electrical, Mechanical and Process
- Qualitative Versus Quantitative Surveys — Choosing the Right Approach
- Asset Criticality and Survey Scope — Focusing on High-Consequence Equipment
- Safety for Thermographers — Working Near Energised and Hot Equipment

Day 2: Infrared Physics and Heat Transfer

- Electromagnetic Spectrum and Infrared Bands — Short, Mid and Long Wave Choices
- Blackbody Radiation Laws — Linking Energy to Temperature
- Conduction, Convection and Radiation in Real Faults — Interpreting Heat Patterns
- Transient and Steady-State Thermal Behaviour — Timing Surveys Correctly
- Solar Loading and Wind Effects — Outdoor Survey Errors

Day 3: Emissivity, Reflection and Transmission

- Emissivity Measurement Methods — Tape, Paint and Reference Techniques
- Reflected Temperature Compensation — Avoiding False Hot Spots
- Low-Emissivity Metals and Bus Bars — Measurement Strategies
- Infrared Windows and Viewing Ports — Transmission Corrections
- Atmospheric and Distance Corrections — Long-Range Survey Accuracy

Day 4: Camera Operation and Image Quality

- Detector Types and Thermal Sensitivity — Camera Selection Criteria
- Field of View, Lenses and Spatial Resolution — Measuring Small Targets
- Focus, Range and Level Settings — Capturing Usable Radiometric Images
- Calibration Verification and Drift Checks — Trusting the Instrument
- Image Storage and Naming Conventions — Traceable Survey Records

Day 5: Electrical System Thermography

- Connections, Fuses and Breakers — Resistive Heating Patterns
- Transformers and Bushings — Oil Circulation and Tap Changer Faults
- Load Correction and Minimum Load Rules — Normalising Electrical Readings
- Phase Imbalance and Harmonic Heating — Interpreting Three-Phase Images
- Switchgear Access Methods — Covers, Windows and Arc Flash Precautions

Day 6: Mechanical and Rotating Equipment

- Bearing and Lubrication Faults — Thermal Trends Before Vibration Alarms
- Coupling Misalignment Heat Signatures — Confirming with Other Techniques
- Belt, Gearbox and Motor Overheating — Load and Cooling Causes
- Steam Traps and Valves — Passing and Blocked Indications
- Combining Thermography with Vibration and Oil Analysis — Stronger Diagnosis

Day 7: Refractory, Insulation and Process Equipment

- Furnace and Kiln Shell Surveys — Refractory Loss Mapping
- Fired Heater Tube Imaging Through Flames — Filters and Interpretation
- Insulation Damage and Moisture Ingress — Heat Loss Estimation
- Vessel Level and Sludge Detection — Thermal Contrast Techniques
- Pipe Blockage and Flow Pattern Imaging — Process Problem Location

Day 8: Quantitative Analysis and Severity Ranking

- Spot, Area and Line Measurement Tools — Extracting Reliable Values
- Delta-T Severity Criteria — Ranking Electrical and Mechanical Findings
- Heat Loss Calculation from Surface Temperature — Energy Cost Estimates
- Measurement Uncertainty in Thermography — Stating Confidence in Results
- Trend Analysis Across Surveys — Detecting Deterioration Rates

Day 9: Survey Programmes and Reporting

- Survey Route Design by Criticality — Coverage and Frequency Choices
- Report Structure and Image Annotation — Findings Planners Can Act On
- Repair Verification Surveys — Confirming Corrective Work
- Integration with Maintenance Management Systems — Work Order Links
- Programme Performance Measures — Faults Found and Failures Avoided

Day 10: Practising the Thermographic Inspection Report

- Survey Plan for a Selected Plant Area — Assets, Routes and Conditions
- Corrected Radiometric Measurements — Emissivity and Reflection Applied
- Anomaly Interpretation Across Equipment Types — Electrical, Mechanical and Refractory
- Severity Ranking and Heat Loss Estimates — Prioritised Findings
- Thermographic Inspection Report — Fault Severity and Repair Priorities

Applying Infrared Thermography Inspection After the Course

- Re-survey one critical switchboard with full emissivity and load corrections and compare results with the previous report.
- Draft a criticality-based survey route for a process area and agree survey frequencies with the reliability lead.

Infrared Thermography Inspection Questions FAQ

What is infrared thermography inspection, and why does it matter now?

Infrared thermography inspection is the measurement of surface heat patterns to find developing faults in plant equipment. It matters now because cameras are widespread but correct interpretation is not, so faults are missed or false alarms waste maintenance effort.

Which roles gain most from advanced infrared thermography inspection training?

Thermographers, reliability engineers and inspection technicians gain most. They capture thermal images, correct the readings, judge severity and decide which repairs come first.

How does advanced infrared thermography inspection differ from an introductory thermal imaging course?

It moves from taking pictures to measuring temperatures with defensible accuracy. Participants apply emissivity, reflection and load corrections, analyse refractory and process faults and rank severity quantitatively.

What do you bring back from infrared thermography inspection training?

You bring back an inspection report for a plant area you know. It contains a survey plan, corrected measurements, interpreted anomalies, heat loss estimates and a prioritised repair list.

Infrared Thermography Inspection: The Way Forward

The thermographic inspection report first informs which electrical, mechanical or refractory faults enter the next maintenance window. Reliability engineers, planners and thermographers use it to agree repair urgency. After its first use, revisit the severity criteria and survey frequencies, because trend data from repeat surveys will show whether thresholds were set too tight or too loose.