

Infrared Training Course Details

No.	Topics Covered	Technique	Day
1	Introduction	Slides	1 & 2
2	IR Camera Introduction	Slides, Hands On	
3	Basic Thermal Science	Slides	
4	Basic Heat Transfer		
5	The Electromagnetic Spectrum		
6	Radiation Energy Exchange		
7	Thermal Image Interpretation	Slides, PC, Hands On	3
8	Thermal Image Analysis Technique		
9	Qualitative and Quantitative		
10	Infrared Measurement Techniques		4
11	Hands on practice within your factory	Hands On	5



Infrared Course Benefits

- Introduction to thermal imaging systems for electrical inspection applications
- Collect quality data, and account for effects such as distance and emissivity using infrared cameras.
- Interpret thermographs and make informed decisions using heat transfer concepts to analyze images.
- Learn how to report your findings with infrared analysis and IR reporting software.
- Avoid costly mistakes - distinguish between hot spots and reflections and direct vs indirect readings
- Acquire good electrical and mechanical inspection safety procedures.
- A wide variety of thermography applications are covered in these courses.

Who Should Attend

Electrical Engineers, Mechanical Engineers, Highly qualified Foremen and Technicians.

Course Objectives

Module 1

- Know how to define infrared thermography.
- Understand the subtopics that make up infrared thermography.
- Understand the importance of temperature as a control parameter.
- Understand what makes thermography unique as useful.
- Be able to recall some examples of applications for infrared thermography.

Module 2

- Insert the battery and memory unit
- Switch the camera on and off
- Focus automatically and manually





- Know and operate the menu system
- Auto adjust the image
- Manually adjust the image (level\Span)
- Use measurement function
- Preview (freeze) and save an IR image

Module 3

- Practice how to use the basic functions of your camera

Module 4

- Know the difference between heat and temperature.
- Understand the difference between absolute and relative temperature scale.
- Know how to convert temperature between different scales.
- Understand the concept of conservation of energy.
- Understand the concept of direction of heat flow.

Module 5

- Understand heat transfer
 - Conduction
 - Understand what four factors affect conduction, and how they do that.
 - Convection
 - Natural versus forced convection
 - Radiation
 - Emission
 - Absorption

Module 6

- Know how different types of radiation are classified





- Different wave lengths
- Know how visible light relates to infrared
- Understand what Mid waves and long waves mean
 - Know the approximate wavelength of the two
 - Understand the reason why we have MW and LW

Module 7

- Understand incident and exitant radiation
 - Know the components of each
 - Understand the relationships
 - Understand how properties of an object will affect incident and exitant radiation
- Know what a black body is
 - What its properties are.

Module 8

- Understand what the infrared image represents
- Know the meaning of the term “ apparent temperature”
- Understand how high and low emissivity can change the way the image appears

Module 9

- Understand what a thermal gradient is
- Be able to use thermal tuning for pattern enhancement
- Be able to use the isotherm for pattern enhancement
- Be able to use palates for pattern enhancement.
- Be able to identify spot reflections and emissivity differences causing false or misleading thermal patterns



Module 10

- Be able to explain the difference between Qualitative and Quantitative methods.
- Know under which conditions you would use qualitative and quantitative methods.
- Be able to apply given classification criteria to a quantitative Result
- Understand the purpose of baseline data
- Calibration of the camera
- Compensation for effects of the surroundings
- Compensation for emissivity, and temperature conversion
- Selecting camera measurement tools
- Emissivity – influencing factors
- Error potential in measurement
- Delta T and avoiding the “wishful thinking syndrome”
- Estimating emissivity and reflected apparent temperature
- Spatial resolution and target size
- Understand how the atmosphere affects temperature measurement
- Know which camera settings are related to the atmosphere
- Understand what reflected apparent temperature is
- Understand where reflected apparent temperature comes from
- Know which camera setting is related to reflected apparent temperature
- Understand how the radiation intensity from an object will change with its temperature
- Understand what emissivity means
- Understand how entering a wrong emissivity value changes the temperature measurement.
- Know which tools can be available in your camera, and how they work.
- Know which tool to use for what purpose



- Know which factors affect emissivity and how
- Know which factors are most important to consider
- We will use the camera as a calculator
- We will assume certain values to be correct
- We will simulate “ guessing wrong” and see what happens
 - When the emissivity is high
 - When the emissivity is low
- Understand that there is no shortcut available, just because you measure a temperature difference!
- Understand the procedures of measuring reflected apparent temperature and emissivity
- Learn the practical craft of measuring reflected apparent temperature, and emissivity, by doing it!
- Understand that one pixel is not enough to measure, and why
- Understand how to deal with small targets at long distances

