

Institute of Infrared Thermography

Level 1 Thermography Certification Course

This course is designed to meet and exceed ASNT SNT-TC-1A, BINDT CM/IRT, the European Standard and ISO

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Principles of Thermography

What is Infrared Thermography?

The Nature of Heat and Temperature

Heat Transfer Mode Familiarization

Conduction Fundamentals

- * Fourier's Law (concept only)
- * Conductivity / Resistance Basics

Convection Fundamentals

- * The effect on the IR Inspection
- * Recognizing and Dealing with Convection

Infrared Equipment Operation

Introduction

Selection criteria
Range span and level settings
How Infrared Instruments Work
IR Equipment Operation/Controls and Features:

- Select the Best Perspective
- IR wavebands and lens materials
- Use of Filters and Lenses
- Optimizing the Image

Infrared Application Overview

Condition Monitoring

- * Principles
- * Control Values
- * Support Equipment for Infrared Inspection

CM Applications Electrical Systems: Generation, distribution, in-plant

applications, theory and thermal signature examples, responsibilities of thermographer and end user

Mechanical Systems: rotating equipment, bearings, power transmission components, gears

Process Applications: petrochemical, power generation, steam systems, process vessels, furnaces, fluid flow, heat exchangers, cryogenics, insulation, refractory, tube/pipe blockages etc. Buildings

Thermography: theory and component construction, conduction losses by insufficient, missing, damaged or improperly-installed insulation, convection losses by uncontrolled air movement, moisture characteristics and detection.

Low Slope Roof Inspection: moisture intrusion, energy loss/gain

Reference and Standards

Thermal/Infrared Physics

Radiation Fundamentals

- Kirchhoff's Law
- Stephan Boltzmann Law

Radiosity Concepts

Radiometry and IR Imaging
Reflectance, Transmittance, Absorption, Emittance

Recognizing and Dealing with Reflections Spatial Resolution Concepts

Qualitative Thermography

- * Performance of infrared cameras

Imaging Concepts: Select the Best Perspective, Image/Spatial Focus
* Thermal Focus: Range, Level and Span

- * False, Real or Apparent Anomalies
- * Performing an Infrared inspection
- * Image Interpretation and documentation
- * Support Data collection and
- * Environmental Considerations

Quantitative Thermography

Temperature Measurement functions
Performing Accurate Temperature Measurements
Emissivity Determination
The effect of Distance and Target Size
Field Quantification
Checking Equipment Calibration
Error Potential in Remote Measurement
Atmospheric Attenuation
Alternate Technologies and Support Equipment for Infrared Inspections
Error Potential in Radiant Measurement

Health and Safety

Risk assessment
Methods statements
Personal Safety Gear
Safety practices

Reporting and Documentation

Elements of a Good Report
Properly document the findings
Report Presentation
Database Programs
IR Software Generic Overview