



# Level I Infrared Certification

## Level I Course Summary

AIRT's Infrared Certification courses are designed to meet and exceed SNT-TC-1A recommended practices. A theoretical background is a must for understanding the real-world problems that face thermographers in the field today. This *theoretical background training* will be combined with *hands-on operator training*. This combination will teach not only the basics of system operation, but also the finer points

of your specific thermal imager, in order to allow you maximum usage from your infrared instrument. The principles behind most industries' main applications will be taught. In addition, students will learn the techniques and reporting procedures necessary to put together an effective predictive maintenance program.

## Level I Infrared Certification Outline

### Thermal / Infrared Physics

#### The Nature of Heat and Temperature Heat Transfer Mode Familiarization

##### Conduction Fundamentals

- Fourier's Law (concept)
- Conductivity / Resistance Basics
- Convection Fundamentals
- Newton's Law of Cooling
- Film Coefficient / Film Resistance
- Radiation Fundamentals
- Stephan Boltzmann Law (concept)

#### Radiosity Concepts

- Reflectance, Transmittance, Absorptance, Emittance
- Radiometry and Imaging
- Spatial Resolution Concepts

#### Error Potential in Radiant Measurement

### Temperature Measurement

- Performing Accurate Temperature / Emissivity Measurement
- Compensating for Distance and Small Object Size
- Field Quantification
- Checking Equipment Calibration

### Infrared Equipment Operation

#### Introduction

- Thermography Defined
- How Imagers Work
- Equipment Overview / Features
- Operation of Equipment

- Select the Best Perspective
- Image Area and Lens Selection
- Use of Filters
- Optimizing the Image

#### Infrared Image and Documentation

- Clarity (spatial focus)
- Thermal Focus (level and span)
- Dynamic Range
- Recognizing and Dealing with Reflections
- Recognizing and Dealing with Convection

#### Support Data Collection

- Environmental Data Emittance
- Surface Modification
- Surface Reference Temperature
- Support Equipment for Infrared Inspection

### Report Generation

- IR Software Generic Overview
- Elements of a Good Report
- Page Layouts
- Database Programs
- Printing

### Infrared Application Overview

- Electrical Inspections
- Mechanical Inspections
- Furnace Inspections
- Detecting Thermal Anomalies Resulting from Differences in:

- Thermal Resistance – Insulation / Refractory
- Thermal Capacitance – Roof Moisture Surveys
- Physical State – Gas / Liquid, Liquid / Solid
- Fluid Flow – Tube Blockages
- Friction – Bearings, Gears
- Exothermic / Endothermic Conditions
- Electrical Resistance, Insulation Voids

### NETA CTD Program Recognized Course CTDCs: 38 hours

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