

# Infrared Thermography - Level I

4.5 Days, 3.2 CEUs

Students who complete the training requirements and a thermography field assignment will receive an Infrared Thermography Level I certification. The course teaches the basics of infrared, how to operate the camera under different conditions, how to make a judgment of the measurement situation in the field and identify potential sources for error. The student will interpret thermograms and make informed decisions using heat transfer concepts to analyze thermal images and learn to distinguish between hot spots and reflections and direct versus indirect readings.

Infrared Thermography Level I training is designed around the entry level infrared camera user and will benefit the student who has a desire to learn the basics of infrared thermography.

The learning objectives, contact hours and written exam of AVO Training Institute are based on the requirements outlined by ANSI/ASNT CP-105 and CP-189 of the American Society for Non-Destructive Testing.

This course is suitable for the use by your employer to certify the student under ASNT's Recommended Practice No. SNT-TC-1A provided it is consistent with the employer's written practice.

## Pre-Requisites

Participants MUST provide their own infrared camera, reporting software, and personal computer.

## Certification Requirements

After completing the classroom portion of this course, the student will be required to submit a complete infrared survey report within sixty (60) days. The report will be graded and it will count as one third of the final grade.

## Lab and Classroom Attire

AVO is committed to the personal safety of each participant and requires long pants and ANSI rated "safety toe" work shoes for class and lab activities. Lecture courses may involve a tour of a work or shop area and for this reason open toe shoes and shorts are not considered appropriate attire for the classroom.

## Learning Objectives

To receive 3.2 CEUs, participants must attend 4.5 days of class (32 contact hours) and attain a minimum average grade of 80% (overall grade will consist of 50% lab practice and 50% final exam). Upon completion of this course and lab practice, the participant will demonstrate that he/she is able to:

- Summarize the history of Infrared Thermography and give examples of the practical applications afforded by this technology.
- Describe heat and its properties, contrasting it with temperature in terms of the properties each measures.
- Identify the three modes of heat transfer as they relate to the heating of a surface.
- Explain radiosity concepts and how they relate to the understanding of Infrared Thermography.
- Demonstrate the operation of infrared equipment.
- Perform an infrared survey and report the results of the survey.

## SCOPE

### Day 1\* (7 contact hours)

- I. Introduction (0.5 hour)
    - A. Schedule
    - B. Course Outline
  - II. Safety for Technicians (1.5 hrs)
    - A. Lab Safety Rules
    - B. On-the-Job Safety
- AM Break

- III. Introduction To Infrared Thermography (2 hrs)
  - A. Definition
  - B. History
  - C. Infrared Thermography Benefits

Lunch

- IV. Heat and Temperature (3 hrs)
  - A. Heat

PM Break

  - B. Temperature

### Day 2 (7 contact hours)

- V. Heat Transfer Modes (4 hrs)
  - A. Heat transfer
  - B. Heat conduction

AM Break

  - C. Convection
  - D. Radiation
  - E. Effects of wind

Lunch

\*Class scheduling times may vary based on discussions and size of class

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## SCOPE (continued)

- VI. Radiosity Concepts (3 hrs)
    - A. Electromagnetic spectrum
    - B. Reflectivity, transmissivity, absorptivity and emissivity
- PM Break
- C. Spatial resolution concepts

### Day 3 (7 contact hours)

- C. Spatial resolution concepts (cont'd) (2 hrs)

AM Break

- C. Spatial resolution concepts (cont'd) (2 hrs)

Lunch

- VII. Operating Infrared Equipment (3 hrs)
  - A. How infrared imagers work and their differences

PM Break

- B. Operation of an infrared thermal imager in regards to the quality of the image

### Day 4 (7 contact hours)

- VII. Operating Infrared Equipment (3 hrs) (cont'd)
  - C. Temperature range, level & span
  - D. Measurement tools
  - E. Color palettes
  - F. Object parameters

AM Break

- G. Finding the emissivity of a sample
- H. Get the best infrared image and documentation quality

Lunch

- VIII. Infrared Survey and Reporting (4 hrs)
  - A. Getting ready for the infrared survey

PM Break

- A. Getting ready for the infrared survey (cont'd)

### Day 5 (half day) (4 contact hours)

- VIII. Infrared Survey and Reporting ... (2 hrs) (cont'd)
  - B. Performing the infrared survey
  - C. Infrared survey reporting

AM Break

- IX. Applications of thermography (1 hr)
  - A. Basic concept of an electrical survey
  - B. Basic concept of a building survey
  - C. Basic concept of a mechanical survey

- X. Conclusion (1 hr)
  - A. Review
  - B. Final exam

# STANDARD EQUIPMENT LIST

## Infrared Thermography Level I

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REVISED 1-23-17 BY: MIKE CARTER/JJ  
COURSE NUMBER 240A REV2  
4.5 DAY

### **TEXT**

1 / STUDENT

*INFRARED THERMOGRAPHY LEVEL I,*  
COURSE #240A, REV2, JAN 2017

### **EQUIPMENT**

1 / INSTRUCTOR

INFRARED CAMERA FLIR T400 SERIES\*  
W/ACCESSORIES AND REPORTING SOFTWARE\*\*

1 / CLASS

PROP BOX (PREPARED BY INSTRUCTOR)

**NOTE: STUDENTS MUST MAKE PROVISION FOR THEIR OWN CAMERAS,  
SOFTWARE AND PERSONAL COMPUTERS.**

**IF MORE THAN ONE STUDENT ATTENDS FROM THE SAME CLIENT,  
EQUIPMENT CAN BE SHARED.**

(FLIR T420\* IS BEING RENTED FOR OUR FIRST CLASS)

### **Intellirent Company**

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<b>*1 AC Power Supply</b>	<b>1 Battery Charger</b>
<b>1 Bluetooth Head Set</b>	<b>1 SD Card</b>
<b>1 Shoulder Strap</b>	<b>1 Sun Shield</b>
<b>1 USB Power Supply</b>	<b>1 USB to Mini USB Cable 20"</b>
<b>1 USB to Mini USB Cable 6'</b>	<b>1 User Manual</b>
<b>1 Video Cable</b>	<b>2 Batteries</b>