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 imager 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 imager 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.

Required Equipment

Participants MUST supply their own infrared imager. It is highly recommended to bring your own reporting software and personal computer.

Certification Requirements

After course completion, the student will be required to demonstrate ability by submitting a complete infrared report within sixty (60) days of course completion to receive a certification.

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 grade of 80%. Upon completion of this course and lab practice, the participant will demonstrate that he/she is able to:

- Describe more in depth concepts of heat transfer, infrared theory, and spatial resolution.
- Outline and practice thermal imaging survey and measurement techniques.
- Describe radiosity concepts.
- Explain the basics of a predictive maintenance thermography and inspection program.
- Summarize the different applications of thermography.

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 (con'td) (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

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STANDARD EQUIPMENT LIST

Infrared Thermography Level 1

REVISED: Feb 2024 Course No. 240 BY: M. Bringold DAYS: 4.5

TEXT (PER 1 STUDENT)	
1	INFRARED THERMOGRAPHY LEVEL I, COURSE #240A, REV2, JAN 2017

MATERIALS NEEDED (PER CLASSROOM)	
QUANTITY	**ITEM**
*1	PROJECTOR OR TV WITH PROJECTION CAPABILITIES
*1	DRY ERASE BOARD WITH MARKERS AND ERASERS
*10	STUDENT TABLES
*10	STUDENT CHAIRS

EQUIPMENT (PER INSTRUCTOR)	
1	INFRARED CAMERA FLIR T400 SERIES* W/ACCESSORIES AND REPORTING SOFTWARE**

EQUIPMENT (PER CLASS)	
1	PROP BOX (PREPARED BY INSTRUCTOR)
1	Roll of aluminum foil
1	Roll of aluminum tape
1	25-foot extension cord with 3 receptacles
1	Roof section (per pictures)
1	Assortment of big paper clips (per pictures)
1	Steam iron
1	Tripod for camera
1	18 x 18" drywall (sheetrock)
1	18 x 18" half inch plywood
2	Drywall sponges
1	Box one gallon zip bags
1	Assorted 55-gallon trash bags
1	Heat lamp (bulb and portable fixture)
1	Hot plate
1	Anemometer (must measure ind speed, ambient temp and humidity)
1	25 foot tape measure
1	2 gallon plastic bucket
2	Spot radiometer (IR thermometer)
1	8" table top fan
1	2" pvc pipe with cap for pipe all anomaly
1	Magnetic engine block heater
1	8" non stick skillet
1	Heating pad
1	Minimum of 2 IR windows of different sizes and brands
1	6 x 4" metal plate with 3 different size holes

1	18 x 24" piece of carpet
1	Various test items of different emissivity
1	Frame with 4 different conductive items (1 wood 1 steel pipe, 1 PVC pipe and 1 copper pipe)

FOR VIRTUAL CLASSES:

CONTENT MATERIAL WILL BE PROVIDED IN DIGITAL FORMAT

NOTE: All items indicated with an asterisk (*) must be supplied by the client on On-Site courses