

# LEVEL II THERMOGRAPHY CERTIFICATION TRAINING

If you're a Level I thermographer who is ready to take a deeper dive into the world of infrared imaging and inspections, Level II certification will give you the practical inspection tools you need to level up your thermography game.

This Level II certification course will take you deeper into the science that influences how infrared images look and how to get more accurate measurements than ever. You'll also learn the practical tools of the trade that will allow you to analyze your images and understand what they're telling you, given the equipment you're inspecting and the conditions you're working in.

## LEVEL II TOPICS INCLUDE:

- A thorough review of the concepts taught in the Level I certification course that will bring you up to date with the latest IR cameras and imaging techniques used by thermography professionals
- Advanced, practical image analysis and reporting by using advanced camera operations and temperature measurement concepts
- Expanded understanding of heat transfer theory to give you the knowledge you need to analyze the thermal anomalies you'll see under a variety of applications and conditions
- Advanced radiometric concepts of emissivity and reflectivity that will hone your temperature measurement skills
- Real-world lessons learned that will help you approach inspections in a safe, professional manner
- Practical, hands-on camera exercises that will enhance your ability to measure temperatures and diagnose critical issues

## ACCREDITATION

The learning objectives, contact hours, and written exam of ITC's courses are based on the requirements outlined by ANSI/ASNT CP-105 of the American Society for Non-Destructive Testing.

- 32 hours (24 ITC certification renewal credits)
- This course is eligible for 32 NETA Continuing Technical Development Credits (CTDs).

## INSTRUCTORS

Infrared courses are developed and taught by ITC's Level III, ASNT Level III, or EPRI Level III Instructors. ITC's domestic and international training staff includes several Level III thermographers certified by ASNT and BINDT with over 100 years combined infrared thermography applications experience. The Level II infrared training courses are taught by certified instructors with extensive experience in a wide variety of infrared thermography and thermal imaging applications.

## SOFTWARE TRAINING

An overview of image analysis and reporting is provided for the latest FLIR software.

## CAMERA TRAINING

Our instructor led training classes cover basic camera operation. We highly recommend viewing one of our free on demand courses for your specific FLIR camera before coming to class. Please visit <http://www.infraredtraining.com> to view available courses.

Please note that on demand courses may not be available for some camera models. If a course is not offered for your camera type, please refer to your user's manual. All manuals and datasheets for FLIR cameras can be found at <http://support.flir.com>. For other vendors please visit the vendor's website.

## TOPICAL OUTLINE

1. Introductions
2. Certification Overview
3. Level I Self-Evaluation
4. Camera Features and Specifications
  - a. Describe the significance of different detector types, IR resolution and optics, sensitivity, and other key parameters
  - b. Discuss the advantages of using different lenses depending on the application
  - c. Review the importance of IFOV and MFOV when measuring temperatures
  - d. Review some important camera features and why they might be beneficial
5. Thermal Science
  - a. Discuss the concept of temperature
  - b. Identify some common energy units
  - c. Discuss heat capacity
  - d. Illustrate thermodynamic laws
  - e. Discuss the effects of temperature on material
  - f. Explain states of matter and energy conversion
6. Heat Transfer
  - a. Define heat transfer
  - b. Identify the direction of heat flow
  - c. Explain the three modes of heat transfer
  - d. Identify the variables involved with conduction heat transfer
  - e. Explain the difference between Steady State and Transient heat transfer
  - f. Identify a conduction and convection thermal pattern
  - g. Explain wind speed effects on temperature and differentials
  - h. Identify an evaporation thermal pattern
  - i. Identify a thermal capacitance application
7. Infrared Science
  - a. Discuss why it is necessary to understand IR science when using an infrared camera
  - b. Describe the electromagnetic spectrum
  - c. Identify infrared wave bands and their usefulness for different applications
  - d. Explain emission and background energy
  - e. Relate atmosphere and gases to camera parameters
  - f. Explain the importance of using IR windows and how to compensate for transmission loss
8. Overview of Inspection Report Creation
9. Review some important safety practices and considerations for thermal inspections
10. Applications Overview
  - a. Condition monitoring and safety
  - b. Mechanical systems and applications
  - c. Building inspections overview

## SYLLABUS

Time	Day 1	Day 2	Day 3	Day 4
0800 – 0830	Introductions	Thermal Science	Infrared Science	Applications
0830 – 0900	Support and Information Resources			
0900 – 0930	Goals and Certification			
0930 – 1000				
1000 – 1030	Level I Knowledge Check			Course Survey
1030 – 1100				Study Guide & Review
1100 – 1130				
1130 – 1200	<b>Lunch</b>	<b>Lunch</b>	<b>Lunch</b>	<b>Lunch</b>
1200 – 1230				
1230 – 1300	Camera Features and Specifications	Heat Transfer	Reporting	Study Guide & Review
1300 – 1330				
1330 – 1400			Safety	Final Exam
1400 – 1430				
1430 – 1500				
1500 – 1530				
1530 – 1600	Camera Labs	Camera Labs	Camera Labs	
1600 – 1630				
1630 – 1700				