Level II Electrical Thermography Certification Training

The Level II Electrical infrared thermography training course is designed for the practicing Level I and Level I Electrical thermographers who is interested in more advanced infrared training This infrared training course focuses on strengthening and improving thermography skills for condition monitoring and predictive maintenance applications with a specific emphasis upon Indoor and Outdoor Electrical Applications.

Level II Electrical 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.

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 16 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 and Review
4. Camera Features and Specifications
    a. Describe the significance of different detector types, IR resolution and optics, sensitivity, and other key camera 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. Criteria
    a. Discuss severity criteria as it applies to thermographic electrical inspections.
    b. Review several industry criteria examples and considerations when evaluating images.
9. Electrical Applications
    a. Facility inspections: where to begin and what to look for.
    b. Discuss complementary technologies for data collection and analysis.
    c. Review indoor and outdoor electrical applications:
        i. Busbar and stab connections
        ii. Contactors
        iii. Neutral conductors
        iv. Breakers
        v. Fused disconnects
        vi. Enclosed bus ducts
        vii. Conductors/cables
        viii. Liquid filled and dry transformers
        ix. Motors
        x. Solar panels
        xi. Outdoor utilities
10. General and Electrical Safety Advice

INFRARED TRAINING CENTER

SYLLABUS

Time	Day 1	Day 2	Day 3	Day 4
0800 – 0830	Introductions	Thermal Science	Infrared Science Infrared Windows	Electrical Applications
0830 – 0900	Support Center			
0900 – 0930				
0930 – 1000	Certification			
1000 – 1030				
1030 – 1100	Level I Review			Study Guide
1100 – 1130				
1130 – 1200	**Lunch**	**Lunch**	**Lunch**	**Lunch**
1200 – 1230				
1230 – 1300	Level 1 Review (Cont.)	Heat Transfer	Criteria	Conclusion & Survey
1300 – 1330				Review
1330 – 1400	Camera Features & Specifications			Exam
1400 – 1430				
1430 – 1500				
1500 – 1530			Practical Exam Review	
1530 – 1600	Lab Workbook	Lab Workbook	Lab Workbook	
1600 – 1630				
1630 – 1700	Study Guide	Study Guide	Study Guide	