

Level I Training Outline (SNT-TC-1A)

Basic Physics Course

- Nature of heat – what is it and how is it measured/expressed
 - Scales and conversions
- Temperature – what is it and how is it measured/expressed
- Heat transfer modes
 - Fourier's law of heat conduction
 - Newton's law of cooling
 - Heat radiation fundamentals
 - Stefan-Boltzman law
 - Emissivity/absorptivity/reflectivity/transmissivity basics
- Radiosity Concepts
 - Reflectivity
 - Transmissivity
 - Absorptivity
 - Infrared radiometry and imaging
 - Spatial resolution concepts
 - Field of view (FOV)
 - Instantaneous field of view (IFOV)
 - Measurement Instantaneous field of view (MIFOV)

Basic Operating Course

- Introduction
- Thermography defined
- How infrared images work
- Differences among images
- Operation of infrared thermal imagers
- Operation of support equipment for infrared surveys
- Checking equipment calibration
- Infrared image and documentation quality
 - Elements of a good infrared image
 - Clarity
 - Dynamic range of the image
 - Recognizing and dealing with reflections
 - Recognizing and dealing with spurious convection and radiation
 - Recording information and types of...
- Support Data Collection
 - Environmental data
 - Emissivity
 - Measurement
 - Estimation
 - Surface modification
 - Surface reference temperatures
 - Identification and other

Basic Applications Course

- Detecting Thermal Anomalies resulting from differences in thermal resistance
- Detecting thermal anomalies using systems of environmental heat cycles
- Detecting thermal anomalies resulting from differences in physical state
- Detecting thermal anomalies resulting from fluid flow problems
- Detecting thermal anomalies resulting from friction
- Detecting thermal anomalies resulting from nonhomogeneous exothermic or endothermic conditions
- Field quantification of point temperatures
- Simple techniques for emissivity
- Typical (high emissivity) applications
- Special problem of low emissivity applications

Program Development

- Discussion/strategies of how to structure a sustainable thermography program
 - Methodologies for implementing – discussion of programs available
 - Gathering data
 - Route creation considerations
 - Sustainability

Testing

- Written Exam requirements
 - Each Level I candidate shall be given a general objective type of written examination addressed to cover the basic principles of the Thermal/Infrared NDT method and appropriate to the level for which certification is sought.
 - The content of the specific examination shall be constructed to evaluate the ability of the candidate to effectively use the applicable specifications, codes, etc. to perform the required test and/or evaluate the results to the degree necessitated by the anticipated qualification level.
- Practical Examination (Level I)
 - Each Level I candidate shall be given a practical “hands-on” examination that demonstrates the candidate’s familiarity with and ability to operate the necessary NDT equipment, record and analyze the resultant information, and specific evaluations for acceptance or rejection determination in accordance with detailed instructions and procedures.