

# Definitions:

## **Absorption:**

The process in which incident radiated energy is taken in by a material without reflection or transmission.

## **Conduction:**

The transfer of heat energy through a substance or from one substance to another by direct contact of atoms or molecules.

## **Convection:**

Transfer of heat from one material to another by the movement of a fluid (liquid or gas).

## **Delta Temperature (Delta T):**

The difference of temperature between two temperature measurements.

## **Distance:**

A setting on many infrared cameras and in thermal image processing software that corrects for the transmission losses of infrared radiation passing through the atmosphere.

## **Emissivity:**

Recognizing that roof materials can't reflect all the solar energy and that they will be heated, it's important to look at a roof's ability to radiate back or emit absorbed energy back into its surroundings. A roof's ability to emit absorbed energy is called its emissivity. It also is reported as a decimal number less than one and represents the percentage of absorbed energy it will release to its surroundings.

## **FOV:**

Field of View. The angular extent of a given scene that is imaged by an infrared camera. Field of view is expressed in degrees or millimeters.

## **Focus:**

Maximum clarity or distinctness of an image rendered by an optical system “in focus”; “out of focus”. An “in focus” infrared image is when the infrared radiation coming from a target converges perfectly on the focal point, which is the detector.

**FoRD:**

Focus, Range and Distance. Parameters that cannot be adjusted in software, hence, must be correct before the image is saved.

**Heat Capacity (Thermal):**

The amount of heat energy needed to raise a materials temperature by one degree. A material with a high heat capacity is said to require more more energy to heat it up by one degree. Water has one of the highest heat capacities.

**Heat Transfer:**

The process of thermal energy flowing from a body of higher temperature to a body of lower temperature via conduction, convection and/ or radiation.

**Infrared:**

Infrared (IR) radiation is electromagnetic radiation of a wavelength longer than visible light, but shorter than microwave radiation. Infrared radiation spans three orders of magnitude and has wavelengths between 0.7um and 1000 um (1 mm).

**Isotherm:**

A measurement tool that highlights an area of equal apparent temperature or radiation with a color that is in contrast to the palette colors.

**Level:**

Thermal “brightness” adjustment on IR cameras or image processing software.

**NDT:**

Non-destructive testing. A wide group of analysis techniques used in science and industry to evaluate the properties of a material, component or system without causing damage. Infrared thermography is one of these techniques.

**NETD:**

Noise Equivalent Temperature Difference. A mathematical calculation of the thermal sensitivity of an IR sensor/ camera. The sensitivity is defined as the smallest thermal difference the camera can detect.

**Qualification:**

Demonstrated skill, knowledge, documented training and documented experience for thermography applications.

**Qualitative:**

Indicative only of relative magnitudes rather than their numerical values. A qualitative comparison would say whether one thing is hotter, cooler or the same temperature to another without specifying the magnitude of any difference (as opposed to quantitative).

**Quantitative:**

A quantitative property can be meaningfully measured using numbers; properties which aren't quantitative are called qualitative. Examples of quantitative properties include: the number of grains of sand on a beach, the temperature of a tire and the time it takes for a hammer to fall a certain distance.

**R value:**

A measure of resistance to the flow of heat through certain material. The greater the thermal insulating capability, the higher the value.

**Range:**

The lowest and highest temperatures that can be imaged and/ or measured with an IR camera's detector setting. Most IR cameras have several overlapping ranges.

**Reflected apparent temperature:**

The apparent temperature of objects whose radiant energy is reflected off the target onto the camera.

**Reflectivity:**

Roof materials are significantly heated by sunlight (solar energy) more so than by surrounding ambient air temperature. A roof's ability to reflect that energy greatly reduces the amount of heat being transferred to a building's interior and likewise reduces energy costs for conditioning and cooling. A roof's ability to reflect solar energy is called its reflectivity. Reflectivity is reported as a decimal number less than one and represents the percentage of solar energy reflected off the roof.

**Solar Loading:**

Heat added to objects by the radiation of the sun that is not self-generated due to a normal operation or a problem.

**Span:**

Thermal “contrast” adjustment on an IR camera. Adjusting the span will change the temperature span between black and white on an image.

**Thermal tuning:**

Adjusting the span and level of an IR image in order to optimize the image for analysis and/ or presentation.

**Written Practice:**

Provides information on training and certification of NDT personnel. The written practice also establishes the responsibilities of NDT personnel. Included shall be the minimum required education, training hours, examinations and experience for certification of NDT personnel. It should include the course outline that must be covered in the training program. The written practice is prepared on one of the following documents: ASNT’s SNT-TC-1A, CP-189 and Aerospace Industries Association’s Standard NAS 410.