

INFRARED THERMOMETERS

Use and Care for Food Safety Applications

A) The Infrared Thermometer as a Screening Tool – Measuring Surface Temperatures- The IR thermometer only measures surface temperature. Therefore when used in food applications, critical temperatures must be verified with an internal temperature measuring device.

B) Proper Application and Operation - The IR thermometer can be used in any one of three basic measuring techniques:

1. To take a spot temperature measurement, aim the sensor at the desired target and activate the unit. The spot size measured is indicated on the instrument. For differential temperature measurements, refer to the manual for instructions.
2. To measure the temperature of a stationary or fixed surface, aim the sensor at the starting point and “sweep” it across the surface.
3. To take a moving surface temperature scan, aim the sensor at a fixed point and measure the temperature as the target moves past, or continually scan across the target as it moves past.

Additional application information:

- a) The IR thermometer cannot measure through transparent surfaces such as glass and plastic. It will measure the surface temperature instead.
- b) Steam, dust, smoke and/or vapors can prevent accurate measurement by obstructing the unit's optics.
- c) The IR thermometer is not recommended for use in measuring reflective surfaces such as stainless steel and/or aluminum wrapping. The temperature of a reflective object may be measured if the surface is coated with a matte material.

C) Temperature Scales - Often IR thermometers can provide temperature measurements in Celsius or Fahrenheit degrees. See the manual for instructions on how to switch between °C/°F.

D) Operating and Ambient Temperature Range (Thermal Shock)

1. Most IR thermometers are designed to work at ambient temperatures (As defined by the instructional manual)
2. For use in temperatures above or below ambient, IR Thermometers must be preconditioned to that temperature. To precondition the unit, place it in that environment for the time recommended in the instruction manual. Failure to precondition the instrument may result in thermal shock and/or inaccurate measurements.

E) Humidity - Infrared thermometers are not designed for use in high humidity-condensing environments.

F) Field of View

1. Field of view is the area or portion of food product that is being measured thermally. The distance the infrared thermometer is from the target determines the dimension of this area. The further away from the target, the larger is the area being measured; i.e. the field of view.
2. Refer to the spot size information on the instrument (and in the manual) for the target spot size being measured at a given distance.
3. Focal or focus point refers to the distance at which the IR resolution is greatest. This distance is generally given in the instructional manual.

G) Angle of measurement - For the most accurate temperature measurements, aim the infrared thermometer perpendicular to the target. If possible, the field of view should be an even, horizontal plane (the flattest surface of a food product being measured).

H) Emissivity - The infrared emissivity of a target is a function of the reflective properties of its surface; dark or matte surfaces are the least reflective, and therefore the best emitters of infrared. Food, other organic or painted surface are good infrared emitters. If the emissivity of the target material is questionable, determine its value by either referring to the emissivity table or methodology given in the instructional manual. Often the emissivity value of an infrared thermometer can be adjusted. See the manual for instructions on this adjustment.

I) Accuracy and Repeatability - Infrared thermometers are pre-calibrated for accuracy. The accuracy of the instrument is usually stated as a percentage or as an absolute deviation of the

temperature standard. Refer to the instrument's manual for its specific accuracy specifications. Repeatability is the ability of a thermometer to give the same temperature readings under similar ambient and target conditions. Refer to the instruction manual for its repeatability specifications.

J) Response Time - The response time is the amount of time in seconds or a fraction thereof, for the instrument to display an accurate reading of the target temperature after activation of the unit. Response times of infrared thermometers vary. Refer to the instruction manual for its response time specifications.

K) Storage Temperatures - Storage temperatures and conditions are critical for IR thermometers. Avoid storing the unit in extreme Temperature conditions. Do not store infrared thermometers below Freezing temperature, or where the radiant temperature may exceed 48.9°C (120°F).

L) Batteries - The battery life in hours of operation; access to The Battery compartment, and, voltage and type of replacement Battery are listed in the instruction manual. The proper positioning and polarity of the replacement battery are indicated on the unit.

M) Cleaning Instructions - To ensure an accurate temperature reading, The lens of the IR unit should be free of dirt, dust, moisture, fog, smoke and debris. See the instruction manual for lens cleaning instructions. In food applications, the IR thermometer should be clean to sight and touch. See the instruction manual for cleaning instructions.

N) Other Operational Considerations - Refer to the instructional manual for any other operational considerations such as, but not limited to mechanical shock, damage avoidance, and warranty information.

O) Laser Safety - All laser equipped infrared thermometers are FDA 21 CFR 1040.10, subchapter J compliant. Laser specifications of the IR unit are listed on the unit and in the instruction manual.

Warning:

1. Avoid direct exposure of human eyes to laser light. Eye damage may result.
2. Never point the laser light at another person.
3. Keep the laser-equipped unit out of the reach of children.
4. Avoid indirect exposure via reflective surfaces, such as glass and mirrors.

P) Field Verification of Accuracy - All IR thermometers are pre-calibrated. However, their accuracy can be verified in the field by using the following simple procedure. It is suggested that the accuracy of the instrument be verified on a regular basis. For food applications, the IR thermometer accuracy should be verified at the relevant critical food temperatures [5°C (41°F); 60/71.1°C (140°/165°F)]. A two-point verification is recommended.

Materials needed:

1. Aluminum container (beverage can).
2. Matte-black spray paint or matte-black self-adhering paper appliqué. Masking tape may also be used.
3. Temperature-standard thermometer.

Preparation: - Prepare container by painting or applying the matte material to the outer surface.

Verification Procedure:

1. Fill the aluminum container with refrigerated water, insert the temperature standard thermometer and allow the can and temperature-standard thermometer to come to equilibrium.
2. Take a reading with the IR thermometer. Do not exceed the spot size of the IR thermometer as indicated on the unit.
3. Compare the temperature reading of the IR unit with the temperature standard thermometer *.
4. Repeat this procedure using hot water.

* If the temperature deviation exceeds the manufacturers suggested accuracy limit, return the unit for repair.

