



Technical note on Infra-Red temperature measurement Versus contact measurement

Advantages of Infra-Red Thermometers

1. Speed
2. Ease of use

Disadvantages

1. Accuracy
2. Dependency upon environmental conditions
3. Misuse of Infra-Red thermometers may result In misleading information

Questions To Consider When Deciding Whether To Use Infra-red Thermometer

1. What accuracy will I achieve?

Be careful of accuracy specifications!

With a contact thermometer, so long as you have good thermal contact you may be sure that the measurement accuracy specified will be achieved independently of any other environmental conditions.

Manufacturer's specifications for Infra-Red thermometers are written for the measurement of a body of fixed emissivity and stable ambient conditions. In practice this is rarely the case. There is no easy way to determine the full accuracy that will be achieved. As a general rule the more diverse the targets and the more variable the ambient conditions the greater the variation in temperature result.



2. What am I measuring?

- a. Always bear in mind that Infra-Red can only ever measure the outer surface of your target. i.e if you are measuring a cardboard box wrapped in plastic film, then you will be measuring the temperature of the outer surface of the plastic film.
- b. Always be sure that your target is completely within the measurement area of the thermometer. This is specified as the 'field of view'. If in doubt put the thermometer as close as possible to the target; some manufacturers recommend 5mm.

Conclusions

Infra-Red thermometers can be a useful tool for quick and easy repetitive measurement. They are at their most useful in stable ambient conditions, when measuring the temperature of very similar targets and when the surface temperature of the target is required.



Temperature measurement of delivered food stuffs.

Guidelines in the use of Infra-Red thermometers to measure the temperature of food products upon delivery.

Points to consider :

1. Accuracy - if measurement of chilled products between 0 and 5°C is required, then guidelines for the enforcement of the food hygiene regulations recommend temperature systems with an accuracy of $\pm 0.5^{\circ}\text{C}$ should be used. Typical accuracies for current Infra-Red thermometers for fixed emissivity targets and stable ambient conditions are $\pm 2.0^{\circ}\text{C}$.
2. For frozen goods Infra-Red may be used to better effect as accuracy limits are wider. I would recommend that the following points are taken into consideration :
 - a. Any measurement is of the surface of the packaging only, once open to the environment the surface temperature will start to rise and therefore any measurement should be made as soon as possible.
 - b. If the measurement is to be made in cold ambient conditions this will affect the result and the thermometer should be allowed to stabilise.
 - c. Allowances for any change in the targets emissivity must be made.
3. If the measurement is in doubt then always back up firstly with a between pack measurement, then if still in doubt a product temperature can be taken using a penetration probe.

Further information

For further details on the above or comments on the article above please contact us at:

T.M. Electronics (UK) Limited, Unit 12, Martlets Way, Goring-by-Sea, Worthing, West Sussex BN12 4HF Tel. +44 (0)1903 700651 Fax. +44 (0)1903 244307 Email. sales@tmelectronics.co.uk