

Temperature Measurements in Food Research Microwave Cooking

Application Note

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This application is best done with a Neoptix 4-channel Reflex model. It consists in measuring temperature on the food while it is cooking inside a microwave oven. This is usually a research type market, with the following goals:

- Optimal food distribution inside the container
- Optimal aluminum foil positioning, acting as antennas inside the oven, to particularly optimize the browning of the food
- Optimal food cooking uniformity inside the container.

Typically, the 4 probes will be positioned inside the frozen food as follows¹:

- Probe # 1: This channel will measure the temperature presents near the bottom of the container (bottom layer).
- Probe # 2: The second channel is used to measure the temperature approximately in the middle (middle layer) of the food included in the container, but with a slight offset towards one side to accommodate probe # 3 on the other side.
- Probe # 3: This probe is used to get a second reading of the temperature also presents in the middle of the food, as for probe # 2, but slightly offset towards the other side. This second reading improves the statistics of the reading obtained with Probe # 2.
- Probe # 4: The last channel is typically used to measure the temperature at the surface of the food (surface layer). It is thus only very slightly introduced in the top pastry or equivalent.

Probes are inserted inside the frozen food by drilling small holes at pre-defined positions and depths; care must be exercised to avoid damaging the probes. Readings are typically done for time periods ranging from 5 to 15 minutes, at 10 second time interval; the Neoptix NeoLink software package is the ideal tool for performing temperature logging, including easy saving and graphing in Microsoft Excel. The required temperature range is -30 to +200°C.

¹ Exercise care when inserting the probes in frozen material: it is better to use a small drill, a small screwdriver, or equivalent, to make a small hole for the probe. Never push the probe hard in a solid material, you may damage it.