Thermometer Calibration Guide

Accurate temperature measurement is critical for ensuring food safety and calibration of temperature measuring devices is essential for a food processing plant.

Important Considerations

- The calibration method used at your facility will depend on the types of temperature measuring device, monitoring frequency and intended use (e.g., product receiving, product storage tanks, cold storage areas, pasteurization).
- The frequency of calibration depends on the type of thermometer and its intended use.
- Thermometers should be calibrated: before use; if dropped; when going from one temperature range to another; and after a long storage time.
- In most applications, a thermometer should be within ±1°F or ±0.5°C when compared to the reference thermometer used for calibration.
- Accurate thermometers can be used as a reference thermometer (e.g., National Institute of Standards and Technology, NIST). In some critical applications calibration against a certified reference thermometer is required.

Calibration methods

There are three common calibration methods:

- boiling point
  - Bring clean tap water to a complete boil (i.e. rolling boil) in a deep container.
  - Put the thermometer stem or probe into the boiling water so that the sensing area is completely submerged. Do not let the stem or probe touch the bottom or sides of the container.
  - Wait at least two minutes or till the indicator stops moving.
  - Note the temperature. The temperature should be 100°C ±1.0°C.
  - If the temperature falls outside this range, make adjustments according to the thermometer's manual to achieve accuracy. If accuracy is unattainable, replace the thermometer.
- melting ice
- calibration against a reference thermometer

Manitoba

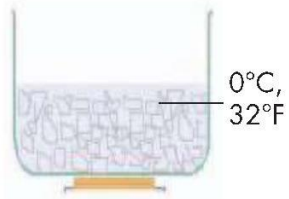
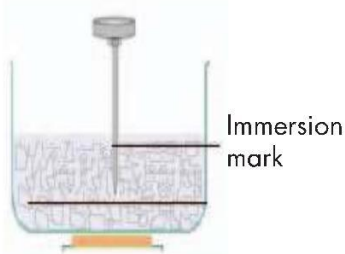
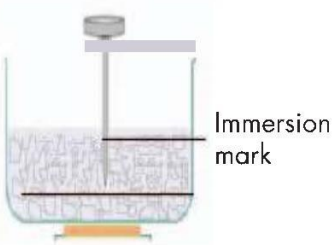
How to Calibrate a Dial Thermometer

Reference Thermometer

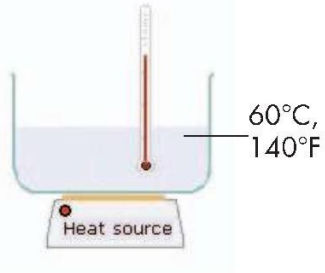
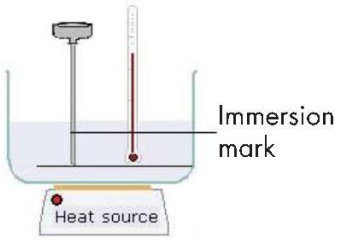
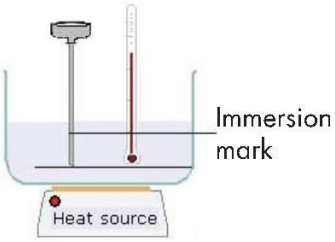
Melting Ice Calibration

(for low temperature application)

Thermometer to Calibrate

 Melting ice	 Min 30 seconds	 Adjust	 Recheck
Step 1 Fill a large glass with ice-water slurry. Stir well. Wait until it reaches the freezing/ melting temperature of fresh water, 0°C (32°F).	**Step 2** Place the thermometer to calibrate in the water. Wait at least 30 seconds or until the temperature is stable. Avoid touching the bottom of the container.	**Step 3** Use a wrench to turn the adjusting nut until the thermometer reads 0°C (32°F).	**Step 4** Recheck the temperature reading on the calibrated thermometer after adjustments. Repeat step 2. Record in the calibration log book.

Calibration Using a Reference Thermometer

	 Min 30 seconds	 Adjust	 Recheck
Step 1 Fill a large glass with clean water. Bring to the desired temperature (ex: 60°C or 140°F), then place the reference thermometer in the water. The entire thermometer sensing area must be immersed.	**Step 2** Place the thermometer to calibrate in the water. Wait at least 30 seconds or until the temperature is stable. Avoid touching the bottom of the container. Compare readings and keep record.	**Step 3** Use a wrench to turn the adjusting nut until the thermometer reads the desired temperature (ex: 60°C or 140°F).	**Step 4** Recheck the temperature reading on the calibrated thermometer after adjustments. Repeat step 2. Record in the calibration log book.

For more information on food safety please contact the Food Safety and Inspection Branch at foodsafety@gov.mb.ca.