






## Food Thermometers: Types and Calibration

One of the critical factors in controlling pathogens in food is controlling temperatures. Disease-causing microbes such as bacteria grow very slowly at low temperatures, multiply rapidly in mid-range temperatures, and are killed at high temperatures. For safety, perishable foods must be held at proper cold temperatures to inhibit bacterial growth or cooked to temperatures high enough to kill harmful microbes.

It is essential to use a food thermometer when cooking meat, poultry, and egg products to prevent undercooking, and consequently, prevent foodborne illness. Many food handlers believe that visible indicators, such as colour changes, can be used to determine if foods are cooked to a point where pathogens are killed. However, recent research has shown that colour and texture indicators are unreliable.

### Food Thermometer Types

Types	Speed	Placement	Usage Considerations
Thermocouple 	2–5 seconds	1 cm or deeper in the food, as needed	<ul style="list-style-type: none"> <li>- Gives fastest reading</li> <li>- Good for measuring temperatures of thick &amp; thin foods</li> <li>- Not designed to remain in food while it's cooking</li> <li>- Check internal temperature of food near the end of cooking time</li> <li>- Can be calibrated</li> <li>- More costly; may be difficult for consumers to find in stores</li> </ul>
Thermistor 	10 seconds	At least 1.5 cm deep in the food	<ul style="list-style-type: none"> <li>- Gives a fast reading</li> <li>- Can measure temperature in thin &amp; thick foods</li> <li>- Not designed to remain in food while it's cooking</li> <li>- Check internal temperature of food near the end of cooking time</li> <li>- Some models can be calibrated; check manufacturer's instructions</li> <li>- Available in "kitchen" stores</li> </ul>
Thermometer Fork Combination 	2–10 seconds	5–7 cm deep in the thickest part of the food	<ul style="list-style-type: none"> <li>- Can be used in most foods</li> <li>- Not designed to remain in food while it's cooking</li> <li>- Sensor in time of fork must be fully inserted</li> <li>- Check internal temperature of food near the end of cooking time</li> <li>- Cannot be calibrated</li> <li>- Convenient for grilling</li> </ul>
Oven-Safe, Bimetal 	1–2 minutes	5–7 cm deep in the thickest part of the food	<ul style="list-style-type: none"> <li>- Can be used in roasts, casseroles, and soups</li> <li>- Not appropriate for thin foods</li> <li>- Can remain in food while it's cooking</li> <li>- Heat conduction of metal stem can cause false high reading</li> <li>- Some models can be calibrated; check manufacturer's instructions</li> </ul>
Instant-Read, Bimetal 	15–20 seconds	5–7 cm deep in the thickest part of the food	<ul style="list-style-type: none"> <li>- Can be used in roasts, casseroles, and soups</li> <li>- Temperature is averaged along probe, from tip to 5-8 cm up the stem</li> <li>- Cannot measure thin foods unless inserted sideways</li> <li>- Not designed to remain in food while it is cooking</li> <li>- Use to check the internal temperature of a food at the end of cooking time</li> <li>- Some models can be calibrated; check manufacturer's instructions</li> <li>- Readily available in stores</li> </ul>

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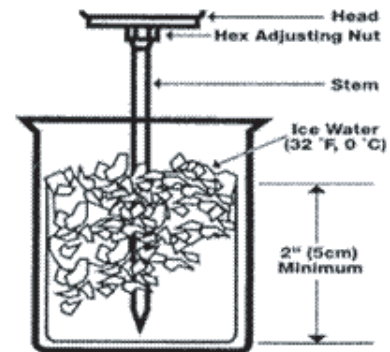
## Calibrating a Thermometer

There are two ways to check the accuracy of a food thermometer: using ice water or using boiling water. Many food thermometers have a calibration nut under the dial that can be adjusted. Check the package for instructions.

### Ice Water

To use the ice water method, fill a large glass with finely crushed ice. Add clean tap water to the top of the ice and stir well. Immerse the food thermometer stem a minimum of 5 cm into the mixture, touching neither the sides nor the bottom of the glass. Wait a minimum of 30 seconds before adjusting.

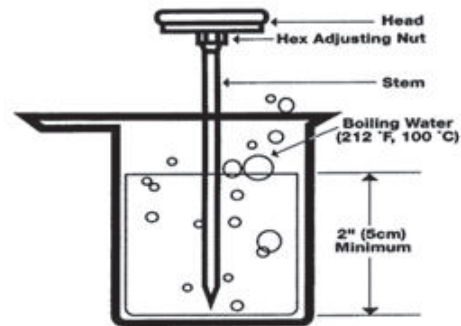
Without removing the stem from the ice, hold the adjusting nut under the head of the thermometer with a suitable tool and turn the head so the pointer reads 0°C (32°F).



### Boiling Water

To use the boiling water method, bring a pot of clean tap water to a full rolling boil. Immerse the stem of a food thermometer in boiling water a minimum of 5 cm and wait at least 30 seconds. (For ease in handling, the stem of the food thermometer can be placed through the clip section of the stem sheath and, holding the sheath horizontally, lowered into the boiling water.)

Without removing the stem from the pan, hold the adjusting nut under the head of the food thermometer with a suitable tool and turn the head so the thermometer reads 100°C (212°F).



For true accuracy, distilled water must be used and the atmospheric pressure must be one atmosphere (76 cm of mercury). A consumer using tap water in unknown atmospheric conditions would probably not measure water boiling at 100°C (212°F). Most likely it would boil as much as 3°C (5°F), lower. Remember water boils at a lower temperature in a high altitude area, so it is best to add a couple of degrees for a margin of safety.

Even if the food thermometer cannot be calibrated, it should still be checked for accuracy using either method. Any inaccuracies can be taken into consideration when using the food thermometer or the food thermometer can be replaced. For example, water boils at 100°C (212°F). If the food thermometer reads 101°C (214°F) in boiling water, it is reading one degree too high. Therefore one degree must be subtracted from the temperature displayed when taking a reading in food to find out the true temperature. In another example, for safety, ground beef patties must reach 71°C (160°F). If the thermometer is reading one degree too high, one degree would be added to the desired temperature, meaning hamburger patties must be cooked to 72°C (162°F).