

MashMaster Bi-Metal Thermometer CALIBRATION INSTRUCTIONS

Every home brewer should have one good thermometer, a laboratory grade mercury thermometer or a quality digital thermometer to check and adjust their working thermometers, because even the most expensive thermometers require calibration. Always calibrate a thermometer before using it!

BOILING POINT

Use this method for accurate readings at the higher end of the scale. For example starch conversion mashing temperatures.

Water boils at 100 °C at sea level, at standard barometric pressure. If you are not at sea level and standard barometric pressure refer to Table 1 for an adjustment factor for boiling water at various altitudes and Table 2 for barometric pressure corrections.

If you wish to take barometric pressure into account, you can find your local barometric pressure at the weather channel (www.weather.com). See Table 2 for the correction due to barometric pressure. Add or subtract the value for the correction from the boiling point obtained from Table 1. Adjustments for altitude and barometric pressure can be calculate online at www.csgnetwork.com/h2oboilcalc.html

1. Boil some water, preferably distilled water, and take its temperature. Do not try to check your thermometer next time you boil some wort.
2. Once a good rolling boil is achieved adjust the needle by turning the reset screw on the back to read boiling temperature.

ICE METHOD

Use this method to ensure accurate readings at the lower end of the scale. For example accurate readings for pitching temperatures, acid rest, and protein rest. Do not use this method for calibration for starch conversion.

Pure water freezes at 0°C. If you can make a solution of ice and water right at that point, you can check if your thermometer reads right at freezing. To make a 0 °C solution, you need a few hours to do the following:

1. Take a Styrofoam cup and fill it with crushed ice. Technically, the ice should be made from distilled water, however using tap water will not affect your result enough to matter. Do NOT add any water to the ice.

2. Place the cup in your refrigerator and wait until enough of the ice melts to submerge your thermometer to a depth of at least 10cm. The solution must consist of much more ice than water. You could use a blender and some ice cubes but do not add water.
3. Take the temperature of the solution. Note that the thermometer will be warmer than the ice water and will warm the local area it is inserted into, you should swirl the tip of the thermometer to take the reading. You may want to consider putting the thermometer in the fridge whilst the ice is melting. Keep the thermometer in the slush until it gives a steady reading.
4. Adjust the reset dial on the back to ensure that the need now reads 0°C.

WORKING TEMPERATURE CALIBRATION

If you have a calibrated thermometer you can use it to calibrate your bi-metal thermometer at a value around the range that you use most. For example, when calibrating a dial thermometer on your mash tun, you could calibrate it for a value between 60 °C and 71 °C - the span of the starch conversion range.

For example if you mash at 67 °C frequently calibrate your bi-metal thermometer to this temperature. Heat some water until your calibrated thermometer indicates the actual temperature is 67 °C. Simultaneously, take the temperature of the water with your dial thermometer and adjust the screw until it reads 67 °C. Your thermometer will provide the most accurate reading close to this point.

All bi-metal thermometers need to be checked occasionally because they can “drift” over time.

Table 1 Boiling Point of Water at Different Elevations Altitude (ft) Boiling Point

Elevation (ft)	Boiling Point
0	100 °C
500	99.5 °C
1000	99 °C
2000	98 °C
2500	97.5 °C
3000	97 °C
3500	96.5 °C
4000	96 °C
4500	95.5 °C

Table 2 Effect of Barometric Pressure on Boiling Point

Pressure (in. Hg)	Change in Boiling Point °C
28.8	-1.04 °C
29.0	-0.85 °C
29.2	-0.66 °C
29.4	-0.47 °C
29.6	-0.29 °C
29.8	-0.11 °C
29.9	0 °C
30.0	-0.08 °C
30.2	-0.26 °C
30.4	-0.44 °C
30.6	-0.62 °C
30.8	-0.79 °C