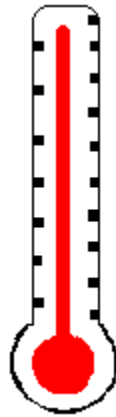


Instrument Validation Report

Vernier SS Thermometer Probe

Model #: TMP-BTA
Manufactured by Vernier



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Abstract

Validated in: What condition it takes to change from one stable temperature to another. How accurately the probe will measure the temperature of ice water when the thermometer is submerged most of the way (right below the black plastic handle) in the ice water. How different the temperature it is to a lab (alcohol) thermometer.

Resolution: $\pm 0.05^{\circ}\text{C}$. Precision: $\pm 0.05^{\circ}\text{C}$. Accuracy: $\pm 0.7^{\circ}\text{C}$

Purpose

For our Instrument Validation Report, we chose the stainless steel thermometer probe. We plan to experiment with it by comparing it with an alcohol lab thermometer. This experiment will be used to see if the SS thermometer probe is reliable enough for it to be used for the balloon festival. We will also do another experiment where we will put the thermometers in a container filled with ice water to test the accuracy of our instrument. The purpose of these experiments are to validate our instrument, the stainless steel thermometer, and its resolution, precision, and accuracy as well as possible sources of error.

Method

Experiment 1

1. Set up the Lab Pro with the Thermometer Probe, and let it run until it cuts off at 180 seconds, look at the temperature it reads, that is the temperature inside. At the same time take the temperature of a glass thermometer too.

2. Take it outside and repeat running it, also take the reading of the glass thermometer.

3. Then move the thermometers in the shade and take both readings like the previous readings.

4. Repeat once.

Experiment 2

1. Set up the Lab Pro like in the first experiment.

2. Get a cup of ice water and put the SS thermometer in the water stirring frequently. The ice water should read 0°C .

3. Take out the thermometer

4. Repeat the experiment a couple times.

Data Tables

Experiment 1 Data Table-Accuracy

	SS Thermometer Probe		Glass Thermometer	
	Trial1	Trial2	Trial1	Trial2
Temp. inside	23.3*c	23.8*c	25.0*c	24.4*c
Temp. sun w/w ind	22.1*c	21.2*c	21.8*c	21.8*c
Temp. shade	19.1*c	20.0*c	19.8*c	19.9*c

Experiment 2 Data Table-Precision

Trials	SS Thermometer Probe
1	0.2°C
2	0.2°C
3	0.2°C
4	0.2°C
5	0.2°C

Conclusion

The Stainless Steel Thermometer Probe is a pretty accurate thermometer. We concluded that its accuracy was $\pm 0.7^{\circ}\text{C}$, because it is the average of the differences in the temperature between the two different thermometers. The precision of the thermometer is $\pm 0.05^{\circ}\text{C}$. Because the measurements repeated in the ice water were the same every time, but it cannot be less than the resolution. The resolution is $\pm 0.05^{\circ}\text{C}$, because the temperature it shows you is only to the tenths. For a man made instrument, the SS Thermometer Probe is pretty accurate.