

ENVIROALERT®

Two-Point Accuracy Comparison

Introduction

Quite often, customers question the accuracy of a Winland device when comparing it against another reference. It's human nature to question differing, newer information. Unfortunately, there are several factors that influence a reading that may be responsible for the variation (see Winland white paper *Temperature Variation and Buffering Solutions*). Further, using an infrared (IR) temperature sensor – which seems to be quite common in the field – is not a good comparison, since it measures surface temperature rather than air temperature.

This test evaluates three devices on a level playing field. For the purpose of this test, we're using the EnviroAlert[®] EA800-ip, since it displays tenths. We're also using the Winland model TEMP-L-W thermistor probe. Under identical conditions, we hope to show you that the Winland temperature probes and EnviroAlert[®] devices “measure up” against two independent, calibrated references (pun intended; my apologies).

Two-Point Accuracy Comparison

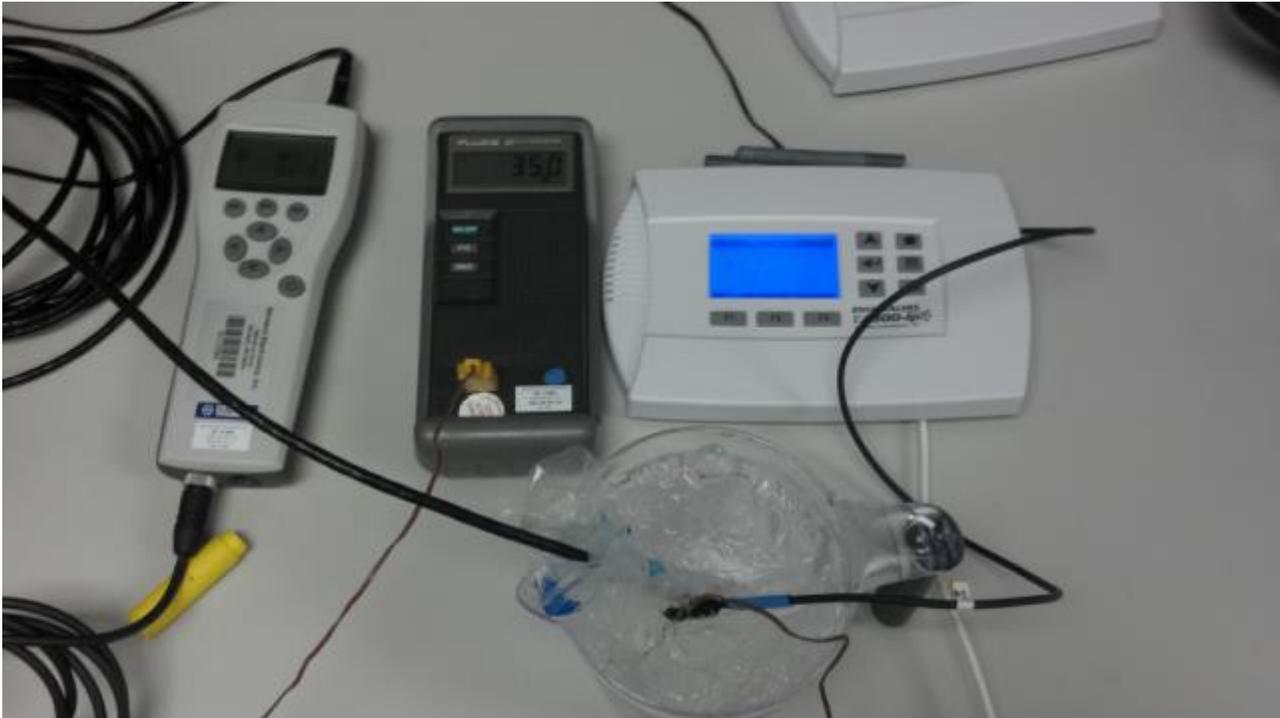
Objectives

- Compare EA800-ip reading against two independent, calibrated temperature measurement devices at room temperature. Results will be referenced to a combined average.
- Compare EA800-ip reading against two independent, calibrated temperature measurement devices in an ice bath. This ice-point measurement should register very near 0°C (32°F) with an estimated uncertainty of 0.01°C.

Reference Devices Used

- Vaisala MI70 with HMP77B temperature and relative humidity sensor (retail: \$2200)
 - Advantages: very accurate, NIST-traceable calibration, uses atmospheric pressure for RH readings, logs and graphs data on display
 - Disadvantages: large probe slows response time
- Fluke 51 thermometer with thermocouple probe (retail: \$250)
 - Advantages: fast response time due to exposed thermocouple junction, low cost
 - Disadvantages: only reads temperature – no other features

Test Setup



Comparison at Ambient



DEVICE	READING	DIFF. FROM AVG.
Vaisala HMP77B	74.5°F	0.13°F
Fluke 51	74.2°F	0.17°F
Winland EA800-ip	74.4°F	0.03°F
AVERAGE	74.37°F	

Ice Point Measurement (0°C/32°F)



Vaisala reading lagging in this image

DEVICE	READING	DIFF. FROM ICE PT.
Vaisala HMP77B	36.8°F	4.80°F (lagging)
Fluke 51	32.4°F	0.04°F
Winland EA800-ip	32.0°F	0.00°F



Ice bath losing equilibrium while Vaisala is still lagging

Conclusion

Due to the Vaisala probe being the largest in mass, it was slower to acclimate during the ice-point test. Therefore, it was noted that its reading was lagging. While it still had not reached temperature, the ice bath was losing equilibrium. Conversely, the Fluke thermocouple was the fastest to react to changing temperatures. For alarm use, this is not always a good thing as it represents more accurately air temperature rather than product temperature.

In both of the tests performed, the EA800-ip measurement accuracy meets or exceeds that of two industry-standard measurement devices. With probe tolerances of $\pm 0.2^{\circ}\text{C}$ from 0 to 70°C and a 24-bit A/D converter, the EA800-ip is capable of taking and logging extremely accurate readings.