

Recommendation for Digital Hygrometer Accuracy
Subtask 2.4

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2013 RESIDENTIAL BUILDING ENERGY EFFICIENCY STANDARDS

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By
Keith A. Temple, P.E.

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1. Background Information

1.1. Digital Hygrometers

- 1.1.1 Background: Most digital hygrometers measure air relative humidity and calculate wet-bulb temperature using a measured air dry-bulb temperature and the appropriate algorithms. Therefore, the instrument accuracy is usually specified as percent relative humidity.
- 1.1.2 Product Information: Several digital hygrometers were identified and investigated for accuracy and estimated cost. The data are presented in Table 1. The products have varying sensor accuracies. Of the products, identified only one specification provided an accuracy for wet-bulb temperature. All instruments had relative humidity accuracy of $\pm 3\%$ or better with estimated wet-bulb temperature accuracy of better than $\pm 2.0^\circ\text{F}$.

2. Recommendations

2.1. Instrument Accuracy

- 2.1.1 In addition to specifying an accuracy for wet-bulb temperature, it is recommended that the standard include an accuracy for measurement of relative humidity so that instrument compliance can be determined from the instrument specifications.
- 2.1.2 Proposed language: “Accuracy: $\pm 2.0^\circ\text{F}$ wet-bulb temperature or $\pm 3\%$ relative humidity”.
- 2.1.3 The proposed requirement for resolution of 0.2°F wet-bulb temperature is acceptable.

Table 1. Selected Digital Hygrometer Tools

Manufacturer	Model Number	Specified Accuracy	Specified (Dry-bulb) Temperature Accuracy	Estimated Wet-bulb Temperature Accuracy ¹	Approx. Cost
AEMC	CA846	±2.5% RH	±1.0°F	±1.1°F	\$159
Extech	EA 20, EA25	±3% RH	±0.9°F	±1.0°F	\$220
Extech	SDL500 (includes datalogger)	±3% RH	±1.8°F	±1.6°F	\$400
General	DTH3007SD	±1.5°F wet-bulb temperature		±1.5°F	\$360
Reed	C-314	±2.5% RH	±1.4°F	±1.4°F	\$329
Testo	605-H1	±3% RH	±0.5°C (±0.9°F)	±1.0°F	\$139

RH = relative humidity

¹ Based on 80°F dry-bulb temperature and 67°F wet-bulb temperature