



ANSI National Accreditation Board

**Thermodynamic**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
<sup>1</sup> Temperature Controlled Chamber, Hot Air Oven, Incubator, Refrigerator, Low Temperature Incubator, Autoclave	(-40.0 to 0) °C	0.27 °C	Agilent 34970A Data logger and Thermocouple with RTD sensor
	(0 to 100) °C	0.19 °C	
	(100 to 200) °C	0.26 °C	
	(200 to 250) °C	0.31 °C	
<sup>1</sup> Temperature Gauge & Dial Thermometer	(-80 to 250) °C	0.07 °C	Hart Scientific 1575 PRT Standard
	(250 to 500) °C	0.7 °C	Fluke 1524 Thermocouple Standard
	(500 to 650) °C	2.6 °C	
<sup>1</sup> Thermocouple Sensor TC	(-80 to 250) °C	0.07 °C	Hart Scientific 1575 PRT Standard
	(250 to 500) °C	0.7 °C	Fluke 1524 Thermocouple Standard
	(500 to 1 200) °C	2.6 °C	
<sup>1</sup> Liquid Bath	(-40.0 to 0) °C	0.27 °C	Agilent 34970A Data logger and Thermocouple with RTD sensor
	(0 to 100) °C	0.19 °C	
	(100 to 200) °C	0.26 °C	
	(200 to 250) °C	0.31 °C	
<sup>1</sup> Digital Thermometer with Thermocouple Sensors Types K, J, E, T, N, R, S	(-80 to 250) °C	0.07 °C	Hart Scientific 1575 PRT Standard
	(250 to 500) °C	0.7 °C	Fluke 1524 Thermocouple Standard
	(500 to 1 200) °C	2.6 °C	
<sup>1</sup> Digital Thermometer with RTD or Thermistor Sensor	(-80 to 250) °C	0.07 °C	Hart Scientific 1575 PRT Standard
	(250 to 500) °C	0.7 °C	Fluke 1524 Thermocouple Standard
	(500 to 850) °C	2.6 °C	
<sup>1</sup> RTD Sensor	(-80 to 250) °C	0.07 °C	Hart Scientific 1575 PRT Standard
	(250 to 500) °C	0.7 °C	Fluke 1524 Thermocouple Standard
	(500 to 850) °C	2.6 °C	
Liquid-in-Glass Thermometers	(-80 to 250) °C	0.29 °C	Hart Scientific 1575 PRT Standard
Dry Block, Dry Well	Up to 250 °C	0.07 °C	Hart Scientific 1575 PRT Standard
	(250 to 450) °C	0.7 °C	Thermocouple Standard
	(450 to 1 200) °C	2.6 °C	
<sup>1</sup> Furnace	(300 to 600) °C	1.8 °C	Thermocouple Standard
	(600 to 900) °C	2.5 °C	
	(900 to 1 200) °C	2.6 °C	
Digital Thermometer with Surface Probe	(40 to 350) °C	2.4 °C	Digital Thermometer Fluke 714 with Surface Probe



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Infrared Thermometers	(-40 to 50) °C (> 50 to 100) °C (> 100 to 200) °C (> 200 to 400) °C	0.91 °C 0.92 °C 1.5 °C 2 °C	Comparison to Radiation Thermometer $E = 0.95, \lambda = (8 \text{ to } 14) \mu\text{m}$
Thermo Hygrometer Temperature	(15 to 40) °C	0.2 °C	Fluke 5020A Thermo-hygrometer, Temp/Humidity Chamber
Thermo Hygrometer Humidity	(30 to 50) %RH (50 to 70) %RH (70 to 90) %RH	0.84 %RH 1.1 %RH 1.6 %RH	Fluke 5020A Thermo-hygrometer, Temp/Humidity Chamber
<sup>1</sup> Thermo Hygrometer Temperature Chamber	(20 to 40) °C	0.11 °C	Agilent 34901A Datalogger with RTD Sensor
<sup>1</sup> Thermo Hygrometer Humidity Chamber	(30 to 70) %RH	3.3 %RH	Comparison to Data Logger CEM DT-172

### Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
<sup>1,2</sup> Digital Photo Tachometers	(2.5 to 999.9) rpm (> 999.9 to 9 999.9) rpm (> 9 999.9 to 99 999) rpm	0.01 rpm 0.06 rpm 0.58 rpm	Fluke 5502A Multiproduct Calibrator with LED
<sup>1,2</sup> Digital Contact Tachometers	(0.5 to 999.9) rpm (> 999.9 to 9 999.9) rpm (> 9 999.9 to 19 999) rpm	0.01 rpm 0.06 rpm 0.58 rpm	Fluke 5502A Multiproduct Calibrator
<sup>1,2</sup> Stroboscopes	Up to 120 rpm (> 120 to 1 020) rpm (> 1 020 to 5 040) rpm (> 5 040 to 10 020) rpm (> 10 020 to 20 040) rpm (> 20 040 to 50 040) rpm (> 50 040 to 99 960) rpm	0.1 rpm 0.1 rpm 0.22 rpm 0.36 rpm 0.65 rpm 1.52 rpm 2.96 rpm	Fluke PM6685 Universal Counter, High-Speed Photo Transistor Box (PT523C-B1-T363)
<sup>1</sup> Stopwatch Photo Totalize Method	10 s to 1 h	27 ms	Agilent 53132A Universal Frequency Counter, Fluke PM6685R Universal Frequency Counter,
Time Base Method	(1 to 86 400) s	0.58 ms	HP 8904A Multifunction Synthesizer