

Scope of Accreditation For T. E. Brown LLC d.b.a. Instrulab

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In recognition of a successful assessment to ISO/IEC 17025:2005 to the following Calibration and Measurement Capabilities, accreditation has been granted to **T. E. Brown LLC d.b.a. Instrulab** for the following:

Accreditation granted through: **November 11, 2019**

Calibration

Electrical – Resistance

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Resistance, Source	1 Ω	0.1 mΩ	Six Standard Resistors
	10 Ω	0.1 mΩ	
	25 Ω	0.1 mΩ	
	50 Ω	0.3 mΩ	
	75 Ω	0.4 mΩ	
	100 Ω	0.5 mΩ	
	(1 to 300) Ω	0.000 8 % of reading	Decade Resistance Box
Resistance, Measure	(1 to 16 000) Ω	0.000 4 % of reading	Agilent 3458A
100 Ω PRT 385 Simulate ¹	-150 °F	0.2 °F	FGH Ezecal 5 Process Calibrator Reference IEC 751
	0 °F	0.3 °F	
	250 °F	0.5 °F	
	500 °F	0.7 °F	
	750 °F	0.9 °F	
Thermistor, Simulate (YSI 400 Series 2252 Ω @ 25°C)	(0 to 80) °C	0.002 °C	Decade Resistance Box
	(80 to 100) °C	0.003 °C	

Electrical - Voltage

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Thermocouple millivolt Simulation In-House Type J	(-150 to 2 000) °F	0.2 °F	Precision Potentiometer with Distilled Water Ice Bath and Appropriate Thermocouple Wire Reference ASTM E230
Type K	(-150 to 1 500) °F (1 500 to 2 500) °F	0.3 °F 0.4 °F	Precision Potentiometer with Distilled Water Ice Bath and Appropriate Thermocouple Wire Reference ASTM E230
Type T	(-320 to 750) °F	0.2 °F	
Type R	(500 to 2 500) °F (2 500 to 3 200) °F	0.4 °F 0.5 °F	
Type S	(500 to 2 500) °F (2 500 to 3 200) °F	0.4 °F 0.5 °F	
Type B	(500 to 750) °F (750 to 3 300) °F	0.4 °F 0.3 °F	
Type N	(-320 to 1 500) °F (1 500 to 2 370) °F	0.3 °F 0.4 °F	
Type E	(-150 to 1 600) °F (1 600 to 1 830) °F	0.2 °F 0.3 °F	
Thermocouple millivolt Simulation ¹ On-site Type E	(-150 to 0) °F (0 to 1 000) °F (1 500 to 1 830) °F	1 °F 1.2 °F 1.5 °F	
Type J	(-150 to 0) °F (0 to 1 500) °F (1 500 to 2 000) °F	1 °F 1.2 °F 1.5 °F	
Type K	(-150 to 750) °F (750 to 1 500) °F (1 500 to 2 000) °F (2 000 to 2 500) °F	1 °F 1.3 °F 1.6 °F 2 °F	
Type T	(-320 to -150) °F (-150 to 750) °F	1.3 °F 0.9 °F	
Type N	(-320 to -150) °F (-150 to 0) °F (0 to 1 000) °F (1 000 to 1 500) °F (1 500 to 2 000) °F (2 000 to 2 370) °F	1.7 °F 0.9 °F 1.2 °F 1.4 °F 1.6 °F 1.9 °F	
Type R	(500 to 2 000) °F (2 000 to 3 000) °F (3 000 to 3 200) °F	2.1 °F 2.4 °F 2.6 °F	
Type S	(500 to 1 500) °F (1 500 to 2 000) °F (2 000 to 2 500) °F (2 500 to 3 000) °F (3 000 to 3 200) °F	2.1 °F 2.3 °F 2.5 °F 2.8 °F 3.1 °F	

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Type B	(500 to 1 000) °F	4.4 °F	FGH Ezecal 5 Process Calibrator Reference ASTM E230
	(1 000 to 1 500) °F	4.1 °F	
	(1 500 to 2 000) °F	3.7 °F	
	(2 000 to 2 500) °F	3.2 °F	
	(2 500 to 3 000) °F	2.7 °F	
	(3 000 to 3 300) °F	2.4 °F	

Mass – Pressure/Low Vacuum¹

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Low Pressure	(0 to 72) psi	0.6 psi	Druck DPI 611
Vacuum	(0 to 28) inHg	0.093 inHg	

Thermodynamics – Thermometers and Probes

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Thermocouples Type J	(-100 to 500) °F	0.2 °F	Comparison technique using 100 Ω PRT in liquid bath or dry block calibrators and type “S” thermocouple in calibration furnace.
	(500 to 701) °F	0.3 °F	
	(702 to 1 300) °F	1.4 °F	
	(1 300 to 1 500) °F	1.7 °F	
Type K	(-100 to 100) °F	0.3 °F	
	(100 to 500) °F	0.2 °F	
	(500 to 701) °F	0.3 °F	
	(702 to 1 300) °F	1.4 °F	
	(1 300 to 1 700) °F	1.7 °F	
Type N	(1 700 to 2 000) °F	1.8 °F	
	(-320 to 300) °F	0.2 °F	
	(300 to 701) °F	0.3 °F	
	(702 to 1 100) °F	1.4 °F	
Type T	(1 100 to 2 000) °F	1.8 °F	
	(-320 to 100) °F	0.3 °F	
Type S/R	(100 to 700) °F	0.2 °F	
	(100 to 500) °F	0.2 °F	
	(500 to 701) °F	0.3 °F	
	(702 to 1 300) °F	1.4 °F	
100 Ω Platinum RTDs	(1 300 to 2 000) °F	1.8 °F	
	(-196 °C	0.022 °C	
	(-70 to 0) °C	0.012 °C	
	0 °C	0.009 °C	
	(0 to 150) °C	0.014 °C	
	(150 to 200) °C	0.016 °C	
	(200 to 250) °C	0.018 °C	
	(250 to 300) °C	0.025 °C	
	(300 to 350) °C	0.026 °C	
	(350 to 400) °C	0.029 °C	
400 °C	0.037 °C		

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Thermistors (YSI 400 Series 2252 Ohms @ 25 °C)	0 °C	0.012 °C	Distilled Water Ice Bath and 100 Ω PRT in Liquid Bath
	(1 to 40) °C	0.025 °C	
	(40 to 60) °C	0.027 °C	
	(60 to 80) °C	0.031 °C	
	(80 to 100) °C	0.034 °C	

Time and Frequency – Frequency/Period¹

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Timer	(0 to 24) hr	2 sec / 24 hr	Chronometer

Calibration and Measurement Capability (CMC) is expressed in terms of the measurement parameter, measurement range, expanded uncertainty of measurement and remarks. The expanded uncertainty of measurement is expressed as the standard uncertainty of the measurement multiplied by a coverage factor of 2 (k=2), corresponding to a confidence level of approximately 95%.

Notes:

- 1) Laboratory offers calibration services at the laboratory's own facilities and at the client or other agreed upon facilities.

Approved by: 
 R. Douglas Leonard
 Chief Technical Officer

Date: August 24, 2016

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