

Scope of Accreditation For Instrulab, Inc.

1205 Lamar Street
Dayton, OH 45404-0098
Stanley I. Tekamp
937-223-2241

In recognition of a successful assessment ISO/IEC 17025:2005, accreditation is granted to **Instrulab, Inc.** to perform the following **Calibrations**:

Accreditation granted through: **May 1, 2010**

Calibration

Thermodynamic – Thermocouples

Calibration Parameter/Equipment	Range	Best Measurement Capability (+/-) ²	Remarks
Thermocouple Simulation ³			
Type J	-150 °F to 750 °F 750 °F to 2000 °F	0.1 °F 0.2 °F	Precision Potentiometer with distilled water ice bath and appropriate thermocouple wire. Reference ASTM E230
Type K	-150 °F to 1500 °F 1500 °F to 2500 °F	0.3 °F 0.4 °F	
Type T	-320 °F to 750 °F	0.2 °F	
Type R	500 °F to 2500 °F 2500 °F to 3200 °F	0.6 °F 0.7 °F	
Type S	500 °F to 2500 °F 2500 °F to 3200 °F	0.6 °F 0.7 °F	
Type B	500 °F to 750 °F 750 °F to 1000 °F 1000 °F to 3300 °F	0.5 °F 0.4 °F 0.3 °F	

Calibration Parameter/Equipment	Range	Best Measurement Capability (+/-)²	Remarks
Thermocouple Simulation ³ Type N	-320 °F to -100 °F	0.3 °F	Precision Potentiometer with distilled water ice bath and appropriate thermocouple wire.
	-100 °F to 100 °F	0.2 °F	
	100 °F to 700 °F	0.2 °F	
	700 °F	0.3 °F	
	701 °F to 900 °F	0.8 °F	
	900 °F to 1100 °F	1.0 °F	
	1100 °F to 1300 °F	1.4 °F	
	1300 °F to 1700 °F	1.7 °F	
Type E	-150 °F to 1600 °F	0.2 °F	Reference ASTM E230
	1600 °F to 1830 °F	0.3 °F	
Type C 5/26	500 °F to 1000 °F	2.8 °F	
	1000 °F to 2500 °F	2.9 °F	
	2500 °F to 3500 °F	3.0 °F	
	3500 °F to 4000 °F	3.2 °F	
	4000 °F	3.4 °F	
Thermocouple Measure ³ Type J	-100 °F to 500 °F	0.2 °F	Comparison technique using 100Ω PRT in liquid bath or dry block calibrators and type “S” thermocouple in calibration furnace
	500 °F to 701 °F	0.3 °F	
	702 °F to 1300 °F	1.4 °F	
	1300 °F to 1500 °F	1.7 °F	
Type K	-100 °F to 100 °F	0.3 °F	
	100 °F to 500 °F	0.2 °F	
	500 °F to 701 °F	0.3 °F	
	702 °F to 1300 °F	1.4 °F	
	1300 °F to 1700 °F	1.7 °F	
Type N	1700 °F to 1900 °F	1.8 °F	
	-320 °F to 100 °F	0.2 °F	
	100 °F to 300 °F	0.1 °F	
	300 °F to 700 °F	0.3 °F	
Type T	700 °F to 1100 °F	1.4 °F	
	1100 °F to 1900 °F	1.8 °F	
	-320 °F to 100 °F	0.3 °F	
Type S/R	100 °F to 700 °F	0.2 °F	
	700 °F	0.3 °F	
	100 °F to 500 °F	0.2 °F	
	500 °F to 700 °F	0.3 °F	
	701 °F to 1300 °F	1.4 °F	
	1300 °F to 2000 °F	1.7 °F	

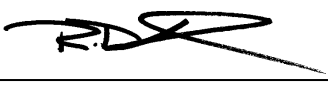
Calibration Parameter/Equipment	Range	Best Measurement Capability (+/-)²	Remarks
Thermocouple Simulate ⁴ or Measure			
Type E	-150 °F to 0 °F 0 °F to 1000 °F 1000 °F to 1500 °F 1500 °F to 1830 °F 1830 °F	1.1 °F 0.9 °F 1.1 °F 1.3 °F 1.5 °F	
Type J	-150 °F to 0 °F 0 °F to 250 °F 250 °F to 1000 °F 1000 °F to 1500 °F 1500 °F to 2000 °F 2000 °F	1.1 °F 0.6 °F 0.9 °F 1.1 °F 1.3 °F 1.5 °F	
Type K	-100 °F to 0 °F 0 °F to 750 °F 750 °F to 1500 °F 1500 °F to 2000 °F 2000 °F to 2500 °F 2500 °F	1.1 °F 0.9 °F 1.1 °F 1.3 °F 1.5 °F 1.7 °F	FGH Ezecal 5 Process Calibrator
Type T	-320 °F to -150 °F -150 °F to 0 °F 0 °F to 750 °F 750 °F	1.3 °F 1.1 °F 0.9 °F 1.1 °F	Reference ASTM E230
Type N	-320 °F to -150 °F -150 °F to 0 °F 0 °F to 1000 °F 1000 °F to 1500 °F 1500 °F to 2000 °F 2000 °F to 2370 °F 2370 °F	1.3 1.1 0.9 1.1 1.3 1.5 1.7	
Type R	0 °F to 1000 °F 1000 °F to 1500 °F 1500 °F to 2000 °F 2000 °F to 2500 °F 2500 °F to 3000 °F 3000 °F to 3200 °F 3200 °F	2.8 °F 3.0 °F 3.2 °F 3.4 °F 3.6 °F 3.7 °F 3.9 °F	
Type S	0 °F to 1000 °F 1000 °F to 1500 °F 1500 °F to 2000 °F 2000 °F to 2500 °F 2500 °F to 3000 °F 3000 °F to 3200 °F 3200 °F	2.8 °F 3.0 °F 3.2 °F 3.4 °F 3.6 °F 3.8 °F 3.9 °F	

Calibration Parameter/Equipment	Range	Best Measurement Capability (+/-) ²	Remarks
Type B	500 °F to 1000 °F 1000 °F to 1500 °F 1500 °F to 2000 °F 2000 °F to 2500 °F 2500 °F to 3000 °F 3000 °F to 3300 °F 3300 °F	2.9 °F 3.1 °F 3.3 °F 3.5 °F 3.7 °F 3.9 °F 4.1 °F	FGH Ezecal 5 Process Calibrator Reference ASTM E230
Type C	500 °F to 1000 °F 1000 °F to 1500 °F 1500 °F to 2000 °F 2000 °F to 2500 °F 2500 °F to 3000 °F 3000 °F to 3500 °F 3500 °F to 4000 °F 4000 °F	6.7 °F 7.1 °F 7.4 °F 7.8 °F 8.2 °F 8.5 °F 8.9 °F 9.3 °F	
100Ω PRT 385 Simulate ⁴	-150 °F to +750 °F	0.4 °F	FGH Ezecal 5 Process Calibrator Reference IEC 751
100Ω Platinum RTD Measure ³	-200 °C to -100 °C -100 °C to -70 °C -70 °C to 0 °C 0 °C >0°C to 150 °C 150 °C to 200 °C 200 °C to 250 °C 250 °C to 300 °C 300 °C to 350 °C 350 °C to 400 °C 400 °C	0.028 °F 0.036 °F 0.029 °F 0.009 °F 0.017 °F 0.020 °F 0.023 °F 0.029 °F 0.032 °F 0.035 °F 0.043 °F	Distilled water ice bath and comparison technique using a 100 ohm PRT in liquid baths and dry block calibrators
Resistance, Source ³	1 Ω 10 Ω 25 Ω 50 Ω 75 Ω 100 Ω	0.0001 Ω 0.0001 Ω 0.0001 Ω 0.0002 Ω 0.0004 Ω 0.0005 Ω	Six standard resistors
	0 to 300 Ω	0.0008 % of setting or 0.0006 Ω whichever is greater	Decade resistance boxes
Resistance, Measure ³	0 to 16 000 Ω	0.0004 % of reading or 2 LSD whichever is greater	L & N 8079 Bridge

Calibration Parameter/Equipment	Range	Best Measurement Capability (+/-) ²	Remarks
Temperature Source ³	-196 °C	0.022 °C	Liquid Nitrogen, Methanol, Dry Ice, Distilled water ice bath and 100Ω PRT in Dry Block Calibrator
	-70 °C to 0 °C	0.012 °C	
	0 °C	0.003 °C	
	>0°C to 100 °C	0.013 °C	
	100 °C to 150 °C	0.014 °C	
	150 °C to 200 °C	0.016 °C	
	200 °C to 250 °C	0.018 °C	
	250 °C to 300 °C	0.025 °C	
	300 °C to 350 °C	0.026 °C	
	350 °C to 400 °C	0.029 °C	
	400 °C	0.037 °C	
	700 °F to 1300 °F	1.4 °F	Calibration furnace using type "S" thermocouple
	1300 °F to 2000 °F	1.7 °F	
Thermistor, Measure (YSI 400 Series 2252 Ohms@ 25 °C) ³	0 °C	0.012 °C	Distilled water ice bath and 100 ohm PRT in liquid bath
	1 °C to 40 °C	0.025 °C	
	40 °C to 60 °C	0.027 °C	
	60 °C to 80 °C	0.031 °C	
	80 °C to 100 °C	0.034 °C	
Thermistor, Simulate (YSI 400 Series 2252 Ohms @ 25°C) ³	0 °C to 80 °C	0.002 °C	Decade resistance box
	80 °C to 100 °C	0.003 °C	
Low Pressure	0 psi to 72 psi	0.20 % of reading + 1 LSD	Meriam Pressure Calibrator
Vacuum	0 inHg to 30 inHg	0.20 % of reading + 1 LSD	
Timer	0 hr to 24 hr	2.0 sec/24 hr	Robic Chronometer

Notes:

- 1) Laboratory offers calibration services at the laboratory's own facilities and at the client or other agreed upon facilities.
- 2) Best uncertainties expressed as a percentage of the applied test load, represent expanded uncertainties at approximately the 95% confidence level using a coverage factor of k=2.
- 3) Parameters that are to be calibrated in house.
- 4) Parameters that can be calibrated on-site.

 Approved by: 

 R. Douglas Leonard Jr.
 Chief Technical Officer

 Date: April 20, 2009