



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Global Thermal Solutions, LLC.
José Maria Truchuelo No. 10, Col. Cimatarío
Querétaro, QRO. 76030, México
(and satellite site as shown on the scope)

Fulfills the requirements of

ISO/IEC 17025:2017

In the field of

CALIBRATION

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scope of accreditation can be verified at www.anab.org.

R. Douglas Leonard Jr., VP, PILR SBU

Expiry Date: 27 October 2024

Certificate Number: L2431



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory
quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

Global Thermal Solutions, LLC.

José Maria Truchuelo No. 10, Col. Cimatarío
Querétaro, QRO. 76030, México
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Services performed at satellite locations as indicated in the far-right column
Hugo Diaz Velazquez No. 200 Int. F, Ramos Arizpe, Coahuila, 25905, México

CALIBRATION

Valid to: **October 27, 2024**

Certificate Number: **L2431**

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Current – Measure ¹	Up to 20 mA	10 μ A	Multifunction Precision Bench Calibrator (used in Generate/Source mode) Querétaro, QRO Ramos Arizpe, Coahuila
DC Current – Source ¹	Up to 20 mA	8.9 μ A	Multifunction Precision Bench Calibrator (used in Measure mode) Querétaro, QRO Ramos Arizpe, Coahuila
DC Voltage – Measure ¹	Up to 0.1 V (0.1 to 10) V	0.58 mV 5.8 mV	Multifunction Precision Bench Calibrator (used in Generate/Source mode) Querétaro, QRO Ramos Arizpe, Coahuila
DC Voltage – Source ¹	Up to 10 V	4.3 mV	Multifunction Precision Bench Calibrator (used in Measure mode) Querétaro, QRO Ramos Arizpe, Coahuila

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance Simulation of RTD Temperature Indicating Devices and Calibrators ¹	Pt 385, 100 Ω		
	(-200 to < 0) $^{\circ}\text{C}$	0.08 $^{\circ}\text{C}$	Multifunction Precision Bench Calibrator (used in Measure and Source mode), Temperature Calibrator Querétaro, QRO Ramos Arizpe, Coahuila
	(0 to < 200) $^{\circ}\text{C}$	0.08 $^{\circ}\text{C}$	
	(200 to < 300) $^{\circ}\text{C}$	0.14 $^{\circ}\text{C}$	
	(300 to < 600) $^{\circ}\text{C}$	0.17 $^{\circ}\text{C}$	
	(600 to 800) $^{\circ}\text{C}$	0.18 $^{\circ}\text{C}$	
	Pt 385, 1 000 Ω		
	(-200 to < 0) $^{\circ}\text{C}$	0.08 $^{\circ}\text{C}$	
	(0 to < 200) $^{\circ}\text{C}$	0.08 $^{\circ}\text{C}$	
	(200 to < 300) $^{\circ}\text{C}$	0.14 $^{\circ}\text{C}$	
	(300 to 600) $^{\circ}\text{C}$	0.17 $^{\circ}\text{C}$	
Electrical Simulation of Thermocouple Indicating Devices – Measure ¹	Type B		Multifunction Precision Bench Calibrator (used in Generate/Source mode) Querétaro, QRO Ramos Arizpe, Coahuila
	(600 to < 900) $^{\circ}\text{C}$	0.48 $^{\circ}\text{C}$	
	(900 to < 1 200) $^{\circ}\text{C}$	0.39 $^{\circ}\text{C}$	
	(1 200 to < 1 800) $^{\circ}\text{C}$	0.36 $^{\circ}\text{C}$	
	1 800 $^{\circ}\text{C}$	0.39 $^{\circ}\text{C}$	
	Type J		
	(0 to < 300) $^{\circ}\text{C}$	0.24 $^{\circ}\text{C}$	
	(300 to < 600) $^{\circ}\text{C}$	0.26 $^{\circ}\text{C}$	
	(600 to 900) $^{\circ}\text{C}$	0.30 $^{\circ}\text{C}$	
	Type K		
	(-100 to < 0) $^{\circ}\text{C}$	0.32 $^{\circ}\text{C}$	
	(0 to < 300) $^{\circ}\text{C}$	0.25 $^{\circ}\text{C}$	
	(300 to 1 300) $^{\circ}\text{C}$	0.33 $^{\circ}\text{C}$	
	Type N		
	(-100 to < 0) $^{\circ}\text{C}$	0.29 $^{\circ}\text{C}$	
	(0 to < 300) $^{\circ}\text{C}$	0.27 $^{\circ}\text{C}$	
	(300 to < 800) $^{\circ}\text{C}$	0.28 $^{\circ}\text{C}$	
	(800 to 1 300) $^{\circ}\text{C}$	0.33 $^{\circ}\text{C}$	
	Type R		
	(0 to < 300) $^{\circ}\text{C}$	0.6 $^{\circ}\text{C}$	
	(300 to < 1300) $^{\circ}\text{C}$	0.39 $^{\circ}\text{C}$	
	(1 300 to 1 400) $^{\circ}\text{C}$	0.44 $^{\circ}\text{C}$	
	Type S		
	(0 to < 300) $^{\circ}\text{C}$	0.5 $^{\circ}\text{C}$	
	(300 to < 1 300) $^{\circ}\text{C}$	0.4 $^{\circ}\text{C}$	
	(1 300 to < 1 400) $^{\circ}\text{C}$	0.41 $^{\circ}\text{C}$	
	1 400 $^{\circ}\text{C}$	0.49 $^{\circ}\text{C}$	
	Type T		
	(-100 to < 0) $^{\circ}\text{C}$	0.31 $^{\circ}\text{C}$	
	(0 to < 200) $^{\circ}\text{C}$	0.25 $^{\circ}\text{C}$	
	(200 to 400) $^{\circ}\text{C}$	0.24 $^{\circ}\text{C}$	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Indicating Devices – Source ¹	Type B (600 to < 900) °C	0.47 °C	Multifunction Precision Bench Calibrator (used in Measure mode) Querétaro, QRO Ramos Arizpe, Coahuila
	(900 to < 1 200) °C	0.38 °C	
	(1200 to < 1 800) °C	0.35 °C	
	1 800 °C	0.38 °C	
	Type K (-100 to < 0) °C	0.31 °C	
	(0 to < 100) °C	0.24 °C	
	(100 to 1300) °C	0.32 °C	
	Type J (0 to < 300) °C	0.23 °C	
	(300 to < 900) °C	0.25 °C	
	900 °C	0.30 °C	
	Type N (-100 to < 0) °C	0.35 °C	
	(0 to < 800) °C	0.26 °C	
	(800 to 1 300) °C	0.33 °C	
	Type R (0 to < 300) °C	0.6 °C	
	(300 to < 600) °C	0.39 °C	
	(600 to < 1 300) °C	0.38 °C	
	(1 300 to 1 400) °C	0.44 °C	
	Type S (0 to < 300) °C	0.5 °C	
	(300 to < 1 300) °C	0.4 °C	
	1 300 °C	0.41 °C	
	Type T (-100 to < 0) °C	0.3 °C	
	(0 to < 50) °C	0.26 °C	
	(50 to < 200) °C	0.24 °C	
	(200 to < 400) °C	0.23 °C	
	400 °C	0.31 °C	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Temperature Indicators/Recorders – Measure ¹	Type B (600 to < 900) °C	0.84 °C	Thermocouple Temperature Simulator in accordance with SAE/AMS 2750, AIAG/CQI-9, AIAG/CQI-11, AIAG/CQI-12 and AIAG/ CQI-29. Querétaro, QRO Ramos Arizpe, Coahuila
	(900 to < 1 200) °C	0.79 °C	
	(1 200 to < 1 800) °C	0.78 °C	
	1 800 °C	0.79 °C	
	Type J (0 to < 300) °C	0.42 °C	
	(300 to < 900) °C	0.74 °C	
	900 °C	0.76 °C	
	Type K (-100 to < 0) °C	0.77 °C	
	(0 to < 100) °C	0.74 °C	
	(100 to 1 300) °C	0.77 °C	
	Type N (-100 to < 0) °C	0.78 °C	
	(0 to < 800) °C	0.74 °C	
	(800 to 1 300) °C	0.77 °C	
	Type R (0 to < 300) °C	0.7 °C	
	(300 to < 600) °C	0.8 °C	
	(600 to < 1 300) °C	0.79 °C	
	(1 300 to 1 400) °C	0.82 °C	
	Type S (0 to < 300) °C	0.61 °C	
	(300 to < 1 300) °C	0.8 °C	
	(1 300 to 1 400) °C	0.81 °C	
	Type T (-100 to < 0) °C	0.76 °C	
	(0 to < 50) °C	0.74 °C	
	(50 to < 200) °C	0.34 °C	
	(200 to < 400) °C	0.52 °C	
	400 °C	0.56 °C	

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Furnace Temperature System Accuracy Test (SAT) ¹	Type B (600 to < 900) °C	1.4 °C	TC Temperature Indicator, Reference Thermocouple Wire in accordance with SAE/AMS 2750, AIAG/CQI-9, AIAG/CQI-11, AIAG/CQI-12 and AIAG/CQI-29. Querétaro, QRO Ramos Arizpe, Coahuila
	(900 to < 1 200) °C	1.4 °C	
	(1 200 to 1 800) °C	2.1 °C	
	Type J (0 to < 300) °C	1.1 °C	
	(300 to 900) °C	1.3 °C	
	Type K (-100 to < 0) °C	1.3 °C	
	(0 to < 100) °C	1.1 °C	
	(100 to 1 300) °C	1.3 °C	
	Type N (-100 to < 0) °C	1.2 °C	
	(0 to < 800) °C	1.3 °C	
	(800 to 1 300) °C	2.1 °C	
	Type T (-100 to < 0) °C	1.2 °C	
	(0 to < 200) °C	1.1 °C	
	(200 to 400) °C	1.2 °C	
Furnace Temperature Uniformity Surveys (TUS) ¹	Type J (0 to < 300) °C	1.2 °C	Thermocouple Temperature Datalogger and Reference Thermocouple Wire in accordance with SAE/AMS 2750, AIAG/CQI-9, AIAG/CQI-11, AIAG/CQI-12 and AIAG/CQI-29. Querétaro, QRO Ramos Arizpe, Coahuila
	(300 to 900) °C	1.3 °C	
	Type K (-100 to 1 300) °C	1.3 °C	
	Type N (-100 to < 0) °C	1.3 °C	
	(0 to < 300) °C	1.2 °C	
	(300 to < 800) °C	1.3 °C	
	(800 to 1 300) °C	2.1 °C	
	Type T (-100 to < 0) °C	1.6 °C	
	(0 to < 200) °C	1.1 °C	
	(200 to 400) °C	1.3 °C	

Calibration and Measurement Capability (CMC) is expressed in terms of the measurement parameter, measurement range, expanded uncertainty of measurement and reference standard, method, and/or equipment. 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. On-site calibration service is available for this parameter, since on-site conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected on-site than what is reported on the accredited scope.
2. This scope is formatted as part of a single document including Certificate of Accreditation No. L2431.



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