



CERTIFICATE OF ACCREDITATION

ANSI National Accreditation Board

11617 Coldwater Road, Fort Wayne, IN 46845 USA

This is to certify that

FCx Services

**10525-C Granite Street
Charlotte, NC 28273**

has been assessed by ANAB and meets the requirements of international standard

ISO/IEC 17025:2017

while demonstrating technical competence in the field of

CALIBRATION

Refer to the accompanying Scope of Accreditation for information regarding the types of activities to which this accreditation applies

AC-2611

Certificate Number


ANAB Approval

Certificate Valid Through: 12/18/2021
Version No. 003 Issued: 12/18/2019



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

FCx Services
 10525-C Granite Street
 Charlotte, NC 28273
 Tony Hagwood 800-532-0415

CALIBRATION

Valid to: **December 18, 2021**

Certificate Number: **AC-2611**

Chemical Quantities

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
pH Meters / Transmitters	4 pH	0.05 pH	Comparison with Standard Aqueous Solutions
	7 pH	0.05 pH	
	10 pH	0.05 pH	
Conductivity Meters	10 μ S/cm	0.64 μ S/cm	Comparison with Standard Aqueous Solutions
	100 μ S/cm	2.2 μ S/cm	
	1 413 μ S/cm	4.8 μ S/cm	
	1 500 μ S/cm	4.6 μ S/cm	
	10 000 μ S/cm	40 μ S/cm	
Gas Meters	100 ppm H ₂ S	2.5 ppm H ₂ S	Comparison to Certified Gasses
	500 ppm CO	5.9 ppm CO	
	100 % LEL	5.7 % LEL	
	40 % O ₂	1.1 % O ₂	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Current	(0 to 30) mA	0.004 mA	Comparison with Fluke Process Calibrator
	(0 to 110) mA	0.04 mA	
Resistance Measure	(0 to 10) Ω	0.09 Ω	Comparison with Fluke Process Calibrator
	(0 to 100) Ω	0.12 Ω	
	(0 to 1.0) k Ω	1.2 Ω	
	(0 to 10) k Ω	23 Ω	
Resistance Source	(0 to 10) Ω	0.09 Ω	Comparison with Fluke Process Calibrator
	(0 to 100) Ω	0.12 Ω	
	(0 to 1.0) k Ω	1.2 Ω	
	(0 to 10) k Ω	23 Ω	



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
RTD Resistance Measure	100 Ω Pt (3926) (-200 to 0) °C	0.66 °C	Comparison with Fluke Process Calibrator
	(0 to 630) °C	0.54 °C	
	100 Ω Pt (385) (-200 to -100) °C	0.69 °C	
	(-100 to 800) °C	0.53 °C	
	120 Ω Ni (672) (-200 to 260) °C	0.56 °C	
	200 Ω Pt (385) (-200 to 100) °C	0.53 °C	
	(100 to 630) °C	0.65 °C	
	500 Ω Pt (385) (-200 to 100) °C	0.53 °C	
	(100 to 630) °C	0.65 °C	
	1 000 Ω Pt (385) (-200 to 100) °C	0.53 °C	
	(100 to 630) °C	0.65 °C	
	10 Ω Cu (427) (-100 to 260) °C	0.68 °C	
	100 Ω Pt (3916) (-200 to 100) °C	0.65 °C	
	(100 to 630) °C	0.65 °C	
RTD Resistance Simulation	100 Ω Pt (3926) (-200 to 100) °C	0.06 °C	Comparison with Fluke Process Calibrator
	(0 to 630) °C	0.31 °C	
	100 Ω Pt (385) (-200 to 100) °C	0.06 °C	
	(0 to 400) °C	0.31 °C	
	(400 to 800) °C	0.05 °C	
	(100 to 800) °C	0.16 °C	
	120 Ω Ni (672) (-200 to 260) °C	0.24 °C	
	(-80 to 260) °C	0.05 °C	
	200 Ω Pt (385) (-200 to 100) °C	0.07 °C	
	(100 to 630) °C	0.18 °C	
	(0 to 400) °C	0.31 °C	
	500 Ω Pt (385) (-200 to 100) °C	0.07 °C	
	(100 to 630) °C	0.18 °C	
	(0 to 400) °C	0.31 °C	



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
RTD Resistance Simulation	1000 Ω Pt (385)		Comparison with Fluke Process Calibrator
	(-200 to 100) °C	0.07 °C	
	(100 to 630) °C	0.18 °C	
	(0 to 400) °C	0.31 °C	
	10 Ω Cu (427)		
	(-100 to 260) °C	0.24 °C	
	100 Ω Pt (3916)		
	(-200 to -190) °C	0.38 °C	
	(-190 to 0) °C	0.21 °C	
(0 to 630) °C	0.31 °C		
(100 to 630) °C	0.13 °C		
(-200 to 100) °C	0.06 °C		
DC Voltage	(0 to 110) mV	0.051 mV	Comparison with Fluke Process Calibrator
	(0 to 1.1) V	0.002 V	
	(0 to 11) V	0.004 V	
	(0 to 300) V	0.23 V	
Current Simulation of Fischer Porter Velocity Meters	(0 to 20) mA	0.19 ma	Mag X Flow Simulator
Current Simulation of Capacitance Level	(0 to 20) mA	0.048 ma	Drexelbrook Level Simulator
AC Voltage – Measure Only	(0 to 1.1) VAC		Comparison with Fluke Process Calibrator
	(20 to 40) Hz	0.026 V	
	(40 to 500) Hz	0.007 V	
	(0.5 to 1) kHz	0.026 V	
	(1 to 5) kHz	0.13 V	
	(1.1 to 11) VAC		
	(20 to 40) Hz	0.26 V	
	(40 to 500) Hz	0.068 V	
	(0.5 to 1) kHz	0.26 V	
	(1 to 5) kHz	0.27 V	
	(11 to 110) VAC		
	(20 to 40) Hz	2.6 V	
	(40 to 500) Hz	0.68 V	
	(0.5 to 1) kHz	2.6 V	
	(1 to 5) kHz	12 V	
(110 to 300) VAC			
(20 to 40) Hz	7.9 V		
(40 to 500) Hz	2.3 V		
(0.5 to 1) kHz	7.9 V		
(1 to 5) kHz	36 V		

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Thermocouple Millivolt Simulation	Type E		
	(-250 to -200) °C	0.9 °C	
	(-200 to -100) °C	0.6 °C	
	(-100 to 600) °C	0.5 °C	
	(600 to 1 000) °C	0.6 °C	
	Type N		
	(-200 to -100) °C	1.5 °C	
	(-100 to 900) °C	1.1 °C	
	(900 to 1 300) °C	1.4 °C	
	Type J		
	(-210 to -100) °C	0.48 °C	
	(-100 to 800) °C	0.37 °C	
	(800 to 1 200) °C	0.6 °C	
	Type K		
	(-200 to -100) °C	0.72 °C	
	(-100 to 400) °C	0.64 °C	
	(400 to 1 200) °C	0.7 °C	
	(1 200 to 1 372) °C	0.58 °C	
	Type T		
	(-250 to -200) °C	1.2 °C	
	(-200 to 0) °C	0.61 °C	
	(0 to 400) °C	0.51 °C	
	Type B		
	(600 to 800) °C	1.3 °C	
	(800 to 1 000) °C	1.2 °C	
	(1 000 to 1 820) °C	1.1 °C	
	Type R		
	(-20 to 0) °C	1.7 °C	
(0 to 100) °C	1.6 °C		
(100 to 1 767) °C	1.3 °C		
Type S			
(-20 to 0) °C	1.6 °C		
(0 to 200) °C	1.4 °C		
(200 to 1 400) °C	1.3 °C		
(1 400 to 1 767) °C	1.3 °C		
Type C			
(0 to 800) °C	0.9 °C		
(800 to 1 200) °C	1.2 °C		
(1 200 to 1 800) °C	1.4 °C		
(1 800 to 2 316) °C	2 °C		

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Thermocouple Millivolt Simulation	Type L (-200 to -100) °C (-100 to 800) °C (800 to 900) °C	0.6 °C 0.54 °C 0.67 °C	Comparison with Fluke Process Calibrator
	Type U (-200 to 0) °C (0 to 600) °C	0.72 °C 0.65 °C	

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
OD / ID Micrometer	(0 to 18) in	(54 + 31L) μin	Comparison with Gage Blocks
Caliper	(0 to 18) in	(188 + 29L) μin	
Dial Indicator	(0 to 4) in	(55 + 60L) μin	
Length/Distance Measurement	(0 to 192) in	0.038 in	Comparison with Certified Tape Measure

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Pressure Measure	(0 to 1) inH ₂ O @ 60 °F	0.02 inH ₂ O	Fluke 700P (series) Pressure Modules
	(0 to 10) inH ₂ O @ 60 °F	0.02 inH ₂ O	
Pressure Measure (psi Differential)	(0 to 5) psid	0.006 psi	
	(-5 to 5) psid	0.014 psi	
Pressure Measure (psi Gauge)	(0 to 1) psi	0.002 psi	
	(0 to 15) psi	0.012 psi	
	(0 to 30) psi	0.024 psi	
	(0 to 100) psi	0.08 psi	
	(0 to 300) psi	0.2 psi	
	(0 to 500) psi	0.3 psi	
	(0 to 1 000) psi	0.8 psi	
	(0 to 5 000) psi	4.2 psi	
(0 to 10 000) psi	7.5 psi		



Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Pressure Measure (psi Gauge)	(0 to 10 000) psi	7.9 psi	Druck DPI 104 Pressure Gauge
Vacuum Measure	(-10 to 0) psiv	0.086 psi	Fluke 700PV4 Pressure Module
	(-15 to 30) psiv	0.04 psi	Fluke 700PD5 Pressure Module
Weighing Systems Analytical Balance / Balance (0.000 1 g Resolution) (0.001 g Resolution)	(0 to 100) g (0 to 400) g	0.37 mg 1.5 mg	ASTM E617 Class 1 Masses
Weighing Systems Analytical Balance / Balance (0.1 g Resolution) (1 g Resolution)	(0 to 500) g (0 to 4) kg	58 mg 0.58 g	ASTM E617 Class 2 Masses

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Relative Humidity	(0 to 95) %RH	2.1 %RH	Comparison with a Reference Hygrometer and Probe
	(10 to 95) %RH	1.7 %RH	
Temperature – Measuring Equipment	(14 to 104) °F	0.6 °F	
Temperature	(-196 to 300) °C	1.1 °C	Comparison to SPRT with Fluke 754

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Rotational Speed	(0.1 to 999.9) RPM	0.08 RPM	Comparison with Tachometer
	(1 000 to 9 999.9) RPM	0.77 RPM	
	(10 000 to 25 000) RPM	2.4 RPM	

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency (Measure)	(1 to 109.99) Hz (110 to 1 100) Hz (1.1 to 11) kHz (11 to 50) kHz	0.058 Hz 0.58 Hz 0.006 kHz 0.057 kHz	Comparison with Fluke Process Calibrator
Frequency (Source)	(0 to 10.99) Hz (11 to 110) Hz (110 to 1 100) Hz (1.1 to 22) kHz (22 to 50) kHz	0.014 Hz 0.11 Hz 0.14 Hz 0.002 kHz 0.006 kHz	Comparison with Fluke Process Calibrator
Stopwatch / Timers	3 600 s	0.87 s	Comparison with Stopwatch

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. L = length in inches
3. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-2611



Vice President

