Scope of Accreditation
For
OV Scale Corporation

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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 **OV Scale Corporation** for the following:

Accreditation granted through: **April 14, 2019**

Calibration

Electrical – Current

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
DC Current[1] Source	(0 to 202) µA (0.2 to 2.02) mA (2 to 20.2) mA (20 to 202) mA (0.2 to 2.02) A (2 to 30) A	0.013% of reading + 0.08 µA 0.012% of reading + 0.000 27 mA 0.006 7% of reading + 0.002 5 mA 0.008 4% of reading + 0.025 mA 0.013% of reading + 0.000 26 A 0.05% of reading + 0.002 6 A	
AC Current[1] Source	(0 to 202) µA (10 to 44) Hz (45 to 999) Hz (1 to 10) kHz (0.2 to 2.02) mA (10 to 44) Hz (45 to 999) Hz (1 to 10) kHz (2 to 20.2) mA (10 to 44) Hz (45 to 999) Hz (1 to 10) kHz (20 to 202) mA (10 to 44) Hz (45 to 999) Hz (1 to 10) kHz (0.2 to 2.02) A (10 to 44) Hz (45 to 999) Hz (1 to 10) kHz (2 to 30) A (30 to 44) Hz (45 to 99) Hz (100 to 1) kHz	 0.29% of reading + 0.45 µA 0.13% of reading + 0.45 µA 1.8% of reading + 0.45 µA 0.29% of reading + 0.000 9 mA 0.12% of reading + 0.000 69 mA 1% of reading + 0.001 2 mA 0.29% of reading + 0.01 mA 0.12% of reading + 0.008 7 mA 0.67% of reading + 0.015 mA 0.29% of reading + 0.1 mA 0.12% of reading + 0.087 mA 0.67% of reading + 0.15 mA 0.29% of reading + 0.000 9 A 0.13% of reading + 0.000 69 A 0.84% of reading + 0.001 2 A 0.25% of reading + 0.01 A 0.059% of reading + 0.006 2 A 0.42% of reading + 0.009 7 A	Transmille 3041A

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
DC Current[1] Measure	300 uA	240 nA	Hewlett Packard 3457A
	3 mA	2 uA	
	30 mA	20 uA	
	300 mA	65 uA	
	1 A	2.1 mA	
AC Current[1] Measure	(0 to 30) mA		
	(10 to 44) Hz	31 uA	
	(45 to 999) Hz	28 uA	
	(1 to 10) kHz	21 uA	
	(30 to 300) mA		
	(10 to 44) Hz	180 uA	
	(45 to 999) Hz	270 uA	
	(1 to 10) kHz	270 uA	
	(0.3 to 3) A		
	(10 to 44) Hz	1.6 mA	
	(45 to 999) Hz	20 mA	
	(1 to 10) kHz	20 mA	

Electrical – Resistance

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Resistance RTD Simulation 3 Wire Configuration[1]			Druck TRX-II; Electronic Calibration of Temperature Indicating Devices
Pt 50	(-200 to 850) °C	1.1 °C	
Pt 100	(-200 to 850) °C	0.8 °C	
Pt 200	(-200 to 850) °C	1 °C	
Pt 500	(-200 to 850) °C	0.8 °C	
Pt 1 000	(-200 to 400) °C	0.7 °C	
D 100	(-200 to 510) °C	0.7 °C	
D 100	(510 to 645) °C	0.7 °C	
Ni 100	(-60 to 250) °C	0.7 °C	
Ni 120	(-80 to 260) °C	0.8 °C	
Cu 10	(-200 to 850) °C	2.4 °C	
Resistance RTD Simulation 4 Wire Configuration[1]			
Pt 50	(-200 to 850) °C	0.8 °C	
Pt 100	(-200 to 850) °C	0.7 °C	
Pt 200	(-200 to 850) °C	0.9 °C	
Pt 500	(-200 to 850) °C	0.8 °C	
Pt 1 000	(-200 to 400) °C	0.6 °C	
D 100	(-200 to 510) °C	0.7 °C	
D 100	(510 to 645) °C	0.7 °C	
Ni 100	(-60 to 250) °C	0.6 °C	
Ni 120	(-80 to 260) °C	0.6 °C	
Cu 10	(-200 to 850) °C	2.4 °C	

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Resistance 2 Wire Configuration[1] Source	0 Ω 0.1 Ω 1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 100 MΩ 1 000 MΩ	0.006 Ω 0.006 Ω 0.006 4 Ω 0.009 5 Ω 0.034 Ω 0.000 31 kΩ 0.003 1 kΩ 0.03 kΩ 0.000 4 MΩ 0.007 5 MΩ 0.71 MΩ 16 MΩ	Transmille 3041A
Resistance 4 Wire Configuration[1] Measure	30 Ω 300 Ω 3 kΩ 30 kΩ 300 kΩ 3 MΩ 30 MΩ	640 uΩ 1.9 mΩ 10 mΩ 91 mΩ 1.2 Ω 30 Ω 610 Ω	Hewlett Packard 3457A

Electrical – Voltage

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
DC Voltage[1] Source	(0 to 202) mV (0.2 to 2.02) V (2 to 20.2) V (20 to 202) V (200 to 1 025) V	0.003 6% of reading + 0.034 mV 0.003 6% of reading + 0.000 21 mV 0.003% of reading + 0.002 mV 0.003 6% of reading + 0.02 mV 0.003 6% of reading + 0.2 mV	Transmille 3041A
DC Voltage[1] Measure	(0 to 30) mV (0 to 300) mV (0 to 3) V (0 to 30) V (0 to 300) V	10 uV 3.3 uV 52 uV 300 uV 21 mV	Hewlett Packard 3457A
Thermocouple Millivolt Simulation[1] Type K Type J Type T Type B Type R Type S Type E Type C Type D	 (-270 to 1 370) °C (-210 to 1 200) °C (-270 to 400) °C (50 to 1 820) °C (-50 to 1 769) °C (-50 to 1 769) °C (-270 to 1 500) °C (-150 to 2 320) °C (0 to 2 495) °C	 1.3 °C 0.7 °C 0.8 °C 2.5 °C 1.9 °C 1.6 °C 0.8 °C 1.3 °C 2.2 °C	Druck TRX-II; Electronic Calibration of Temperature Indicating Devices

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
AC Voltage Source[1]	(20.2 to 202) mV		Transmille 3041A
	(10 to 45) Hz	0.28 % of reading + 0.074 mV	
	(45 to 1 000) Hz	0.04 % of reading + 0.048 mV	
	(1 to 20) kHz	0.11 % of reading + 0.057 mV	
	(20 to 100) kHz	0.28 % of reading + 0.65 mV	
	(100 to 500) kHz	0.86 % of reading + 0.76 mV	
	(0.202 to 2.02) V		
	(10 to 45) Hz	0.28 % of reading + 0.59 mV	
	(45 to 1 000) Hz	0.046 % of reading + 0.18 mV	
	(1 to 20) kHz	0.089 % of reading + 0.35 mV	
	(20 to 100) kHz	0.27 % of reading + 5.1 mV	
	(100 to 500) kHz	0.6 % of reading + 6.3 mV	
	(2.02 to 20.2) V		
	(10 to 45) Hz	0.29 % of reading + 4.4 mV	
	(45 to 1 000) Hz	0.041 % of reading + 2.3 mV	
	(1 to 20) kHz	0.073 % of reading + 3.7 mV	
	(20 to 100) kHz	0.25 % of reading + 55 mV	
	(20.2 to 202) V		
	(30 to 45) Hz	0.057 % of reading + 44 mV	
	(45 to 1 000) Hz	0.043 % of reading + 21 mV	
	(1 to 20) kHz	0.11 % of reading + 58 mV	
	(202 to 1 020) V		
	(30 to 45) Hz	0.06 % of reading + 310 mV	
	(45 to 1 000) Hz	0.048 % of reading + 93 mV	
	(1 to 10) kHz	0.19 % of reading + 480 mV	
AC Voltage Measure[1]	(0 to 30) mV		Hewlett Packard 3457A
	(20 to 45) Hz	32 uV	
	(46 to 100) Hz	97 uV	
	(101 to 20) kHz	5.6 uV	
	(0 to 300) mV		
	(20 to 45) Hz	130 uV	
	(46 to 100) Hz	90 uV	
	(101 to 20) kHz	130 uV	
	(0 to 3) V		
	(20 to 45) Hz	11 mV	
	(46 to 100) Hz	1.4 mV	
	(101 to 20) kHz	1.6 mV	
	(0 to 30) V		
	(20 to 45) Hz	14 mV	
	(46 to 100) Hz	9.9 mV	
	(101 to 20) kHz	14 mV	
	(0 to 300) V		
	(20 to 45) Hz	120 mV	
	(46 to 100) Hz	79 mV	
	(101 to 20) kHz	120 mV	

Length – Hand Tools and Precision Gages 1D

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Tape Measure[1]	(0 to 100) ft	0.149 in	Comparison with Standard

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Steel Rules[1]	(0 to 72) in	0.011 in	Gage Blocks / Rule Standard
Dial / Digital Indicator[1]	(0 to 2) in	150 µin	Gage Blocks
Outside Micrometers[1]	(0 to 12) in (0 to 48) in	840 µin 0.003 4 in	Gage Blocks
Inside Micrometers[1]	(0 to 1) in (2 to 48) in	129 µin 740 µin	Ring Gages
Depth Micrometers[1]	(0 to 12) in	880 µin	Depth Master
Calipers[1]	(0 to 12) in (12 to 48) in	500 µin 0.001 7 in	Gage Blocks
Height Gages[1]	(0 to 24) in (24 to 48) in	240 µin 0.001 2 in	Gage Blocks and Surface Plate

Mass – Flow

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Air Speed[1]	(30 to 4 000) fpm	12.1 fpm + 5% of Reading	Hot Wire Anemometer
Airflow[1]	(0 to 200) ft^3/min	1.2 ft^3/min + 5% of Reading	
Oven Air Exchanges[1]	(0 to 1) m^3/min	0.055 m^3/min	ASTM E145

Mass – Pressure/Low Vacuum

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Pressure/Vacuum Gages[1]	(0 to 65) psia	0.002 5 % rdg + 0.000 78 psi	ASME B40.100 Mensor CPC 6000 Fluke P3114-PSI
	(0 to 1 000) psi	0.002 1 % rdg + 0.003 8 psi	
	(200 to 10 000) psi	0.008 % rdg + 0.061 psi	

Mass – Scale and Balances[1]

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Weighing System (0.1 µg Resolution)	(0 to 2) g	1.7 µg	ASTM E617 Class 1 Weights and NIST Handbook 44 utilized for the calibration of the Weighing System
(1 µg Resolution)	(0 to 5) g	6 µg	
(0.01 mg Resolution)	(0 to 20) g	0.02 mg	
(0.1 mg Resolution)	(0 to 400) g	0.13 mg	
(1 mg Resolution)	(0 to 2 000) g	2 mg	ASTM E617 Class 2 Weights and NIST Handbook 44 utilized for the calibration of the Weighing System
(0.01 g Resolution)	(0 to 1 000) g	0.02 g	
(0.1 g Resolution)	(0 to 60 000) g	0.1 g	

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
(1 g Resolution)	(0 to 120 000) g	1.25 g	ASTM E617 Class 4 Weights and NIST Handbook 44 utilized for the calibration of the Weighing System
(0.01 lb Resolution)	(0 to 300) lb	0.01 lb	NIST Handbook 105-1 Class F Weights and NIST Handbook 44 utilized for the calibration of the Weighing System
(0.1 lb Resolution)	(0 to 1 000) lb	0.12 lb	
(1 lb Resolution)	(0 to 30 000) lb	1.21 lb	
(10 lb Resolution)	(0 to 200 000) lb	12 lb	
(20 lb Resolution)	(0 to 400 000) lb	25 lb	
(100 lb Resolution)	(0 to 1 000 000) lb	123 lb	

Mass – Torque

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Torque Wrench[1]	(4 to 50) lbf·in	0.75 % of reading	CDI Torque Calibration System
	(30 to 400) lbf·in	0.75 % of reading	
	(80 to 1000) lbf·in	0.75 % of reading	
	(20 to 250) lbf·ft	0.75 % of reading	
	(60 to 600) lbf·ft	0.75 % of reading	

Thermodynamic – Humidity

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Humidity Indicators[1]	(10 to 90) % RH	3% RH	Thermohygrometer

Thermodynamic – Thermometers and Probes

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Temperature Measure[1]	(-77 to 550) °C	0.18 °C	SPRT Standards Venus Stirred Liquid Bath ASL Bath
Liquid in Glass Thermometers[1]	(0 to 140) °C	0.23 °C	Isotech TTI-7 Indicator SPRT Standards Venus Stirred Liquid Bath

Thermodynamic – Thermodynamic Sources

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Ovens, Furnaces, Freezers[1]	(0 to 250) °C	0.7 °C	ASTM E145

Time and Frequency – Frequency / Period

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Stopwatches	elapsed time up to 24 hours	0.07 sec	NIST WWVB signal
Oven Time Constant[1]	(0 to 1 200) sec	0.26 sec	ASTM E145
Frequency Sourcing	100 Hz 1 KHz 10 KHz 20 KHz 50 KHz 100 KHz	1 mHz 7 mHz 20 mHz 40 mHz 40 mHz 100 mHz	Transmille 3041A
Frequency Measure[1]	(10 to 400) Hz	5 mHz	Hewlett Packard 3457A
	400 Hz to 1.5 MHz	48 mHz	

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: _____ Date: August 8, 2017

R. Douglas Leonard
Chief Technical Officer

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