

Accreditation Scope

079-LB-CAL

Vital Equipments Calibration LLC

Building No: 74, Shop No. 7 & 8, Mussafah M-13

Abu Dhabi - United Arab Emirates

Date: 08-01-2020

Valid to: 07-01-2023

Accreditation History			
Scope	Issue No.	Details	Date
Temperature & Humidity	1	Granted accreditation from EIAC	08/01/2020
Speed			
Pressure			
Mass			
Volume			
Electrical			

Accreditation Scope

Temperature & Humidity Calibration

079-LB-CAL

Vital Equipments Calibration LLC

Building No: 74, Shop No. 7 & 8, Mussafah M-13

Abu Dhabi - United Arab Emirates

Issue no.: 01

Date: 08-01-2020

Valid to: 07-01-2023

Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Calibration of RTD's, Thermocouple, Thermistor etc., with and without Indicator	Comparison method using Standard SSPRT and 6 ½ DMM (VEC/CAL/TH-01, VEC/CAL/TH-02, VEC/CAL/TH-03)	-40 °C to 25 °C	0.3 °C	Laboratory
		25 °C to 100 °C	0.4 °C	
		100 °C to 400 °C	0.6 °C	
		400 °C to 650 °C	1.2 °C	
Calibration of Dry Block Calibrator	Comparison method using Standard SSPRT and 6 ½ DMM (VEC/CAL/TH-05)	-40 °C to 25 °C	0.2 °C	
		25 °C to 200 °C	0.4 °C	
		200 °C to 650 °C	0.8 °C	
Liquid Temperature calibrator / Bath	Comparison method using Standard SSPRT and 6 ½ DMM	-40 °C to 25 °C	0.2 °C	
		25 °C to 250 °C	0.4 °C	
Calibration of Liquid in Glass Thermometers	Comparison method using Standard SSPRT and 6 ½ DMM (VEC/CAL/TH-04)	-40 °C to 25 °C	0.2 °C	
		25 °C to 100 °C	0.3 °C	
		100 °C to 250 °C	0.4 °C	
Calibration of Non-Contact Pyrometer / IR Thermometer	Comparison method using Standard PRT, Standard Thermocouple and DBB -650 (VEC/CAL/TH-09)	-30 °C to 100 °C	2 °C	
		100 °C to 250 °C	3 °C	
		250 °C to 650 °C	5 °C	

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Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Calibration of Temperature and Humidity Meters and Dataloggers	Comparison method Standard Temperature & Humidity Indicator with Sensor (VEC/CAL/TH-12)	5 °C to 50 °C	0.4 °C	Laboratory
		15 %RH to 90 %RH	3 %RH	
Calibration of RTD's, Thermocouple, Thermistor etc., with and without Indicator	Comparison method using Standard PRT and 6 ½ DMM (VEC/CAL/TH-01, VEC/CAL/TH-02, VEC/CAL/TH-03)	-40 °C to 25 °C	0.3 °C	Customer Premises
		25 °C to 200 °C	0.4 °C	
		200 °C to 400 °C	1.0 °C	
Calibration of Temperature Chambers, Freezers, Chillers, Refrigerators, Ovens	Placing 9 points calibration method using a datalogger with RTD sensors (VEC/CAL/TH-08)	-40 °C to 50 °C	0.5 °C	
		50 °C to 250 °C	0.7 °C	
Calibration of Environmental Chambers	Placing 9 points Calibration method using datalogger with RTD sensors and a relative humidity sensor (VEC/CAL/TH-11)	5 °C to 50 °C	0.5 °C	
		15 %RH to 90 %RH	3 %RH	

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Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Calibration of Autoclave	Placing 9 points calibration method using Brainchild datalogger with RTD sensors (VEC/CAL/TH-10)	115 °C to 134 °C	0.4 °C	Customer Premises

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Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
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Accreditation Scope

Speed Calibration

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Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Rotational Speed	VEC/CAL/ET/12	6 rpm to 599 rpm	1.3 rpm	Permanent laboratory/ Customer Premises
		600 rpm to 3999 rpm	0.77 rpm	
		4000 rpm to 9999 rpm	1.8 rpm	
		10000 rpm to 19999 rpm	2.5 rpm	
		20000 rpm-25000 rpm	3.4 rpm	
Tachometer (Non Contact)	VEC/CAL/ET/11	6 rpm to 9999 rpm	0.09 rpm	
		10000 rpm to 26999 rpm	0.58 rpm	
		27000 rpm to 99999 rpm	0.75 rpm	

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Accreditation Scope

Pressure Calibration

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Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Gas Pressure-(Gauge) Calibration of Pressure Indicating instruments and gauges. Calibration of pressure devices with an electrical output	Comparison method master pressure calibrator with a pneumatic hand pump (VEC/CAL/PR-01) DKD-R 6-1.	-85 kPa ≤ p ≤ 0 kPa	0.1 kPa	Laboratory
		0 kPa ≤ p ≤ 200 kPa	0.7 kPa	
		200 kPa ≤ p ≤ 1000 kPa	0.7 kPa	
		1000 kPa ≤ p ≤ 2000 kPa	0.8 kPa	
		2000 kPa ≤ p ≤ 3000 kPa	0.8 kPa	
		3000 kPa ≤ p ≤ 4000 kPa	1.3 kPa	
Hydraulic Pressure-(Gauge) Calibration of Pressure Indicating instruments and gauges. Calibration of pressure devices with an electrical output	Comparison method master pressure calibrator with hydraulic comparator (VEC/CAL/PR-01) DKD-R 6-1.	4000 kPa ≤ p ≤ 15000 kPa	1.3 kPa	Laboratory
		15000 kPa ≤ p ≤ 25000 kPa	14.6 kPa	
		25000 kPa ≤ p ≤ 50000 kPa	14.6 kPa	
		50000 kPa ≤ p ≤ 70000 kPa	16.1 kPa	

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Gas Pressure-(Gauge) Calibration of Pressure Indicating instruments and gauges; magnehelic gauges; U-Tube Manometers	Comparison method master Digital manometer with a pneumatic screw pump (VEC/CAL/PR-03) DKD-R 6-1, EURAMET-cg- 17.2.0	$\pm 300 \text{ mmH}_2\text{O}$	0.12 mmH ₂ O	Laboratory / Customer Premises
Gas Pressure-(Gauge) & Hydraulic Pressure -(Gauge) Calibration of Pressure Indicating instruments and gauges. Calibration of pressure devices with an elctrical output	Comparison method master pressure calibrator with pneumatic hand pump / Hydraulic comparator (VEC/CAL/PR-01) DKD-R 6-1	$-85 \text{ kPa} \leq p \leq 0 \text{ kPa}$	0.6 kPa	Customer Premises
		$0 \text{ kPa} > p \leq 200 \text{ kPa}$	0.7 kPa	
		$200 \text{ kPa} \leq p \leq 2000 \text{ kPa}$	0.7 kPa	
		$2000 \text{ kPa} \leq p \leq 4000 \text{ kPa}$	1.8 kPa	
		$4000 \text{ kPa} \leq p \leq 10000 \text{ kPa}$	1.8 kPa	
		$10000 \text{ kPa} \leq p \leq 20000 \text{ kPa}$	12.1 kPa	
		$20000 \text{ kPa} \leq p \leq 35000 \text{ kPa}$	12.1 kPa	
		$35000 \text{ kPa} \leq p \leq 70000 \text{ kPa}$	12.5 kPa	

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Accreditation Scope

Mass Calibration

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Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Mass/ Electronic Balances	In accordance to EURAMET cg 18-v4: 2015 Standard Weights: E2 class 1 mg to 1 kg F1 class 2 kg to 10 kg M1 class 20 kg to 320 kg (VEC/CAL/WB-01)	0.001 g to 200 g	1.0 mg	Customer Premises
		200 g to 600 g	2.9 mg	
		600 g to 1000 g	3.3 mg	
		1 kg to 2 kg	7.2 mg	
		2 kg to 5 kg	16 mg	
		5 kg to 10 kg	25 mg	
		10 kg to 20 kg	0.32 g	
		20 kg to 50 kg	1.2 g	
		50 kg to 300 kg	11 g	
Mass/ Mass standards	In acc. to OIML R111-1: 2004 (VEC/CAL/WT-01)	1 mg	0.17 mg	Laboratory
		2 mg	0.17 mg	
		5 mg	0.17 mg	
		10 mg	0.17 mg	
		20 mg	0.17 mg	
		50 mg	0.17 mg	
		100 mg	0.17 mg	
		200 mg	0.17 mg	

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Mass/ Mass standards	In acc. to OIML R111-1: 2004 (VEC/CAL/WT-01)	500 mg	0.17 mg	Laboratory
		1 g	0.17 mg	
		2 g	0.17 mg	
		5 g	0.17 mg	
		10 g	0.18 mg	
		20 g	0.18 mg	
		50 g	0.18 mg	
		100 g	0.20 mg	
		200 g	0.22 mg	
		500 g	2.2 mg	
		1 kg	2.2 mg	

Accreditation Scope

Volume Calibration

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Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Liquid Volume/ Piston operated pipettes	Gravimetric Method, ISO 8655-6 (VEC/CAL/VOL-01)	10 µl to 100 µl	0.34 µl	Laboratory
		>100 µl to 1 000µl	1.3 µl	
		>1 000µl to 10 000 µl	12 µl	
Liquid Volume/ flask	Gravimetric Method, ISO 4787 (VEC/CAL/VOL-03)	50 ml to 100 ml	0.10 ml	
		>100 ml to 2000 ml	0.37 ml	
Liquid Volume/ Measuring Cylinder	Gravimetric Method, ISO 4787 (VEC/CAL/VOL-04)	50 ml to 1000 ml	0.37ml	
		>1000 ml to 2000 ml	0.86 ml	

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Electrical Calibration
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Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Calibration of Measuring Instruments				
DC Voltage	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) & (VEC/CAL/ET-01) <i>U: Measured voltage Value</i>	0.1 mV to 1 mV	$1.3 \times 10^{-3} U + 2.6 \mu V$	Laboratory / Customer Premises
		>1 mV to 320 mV	$50 \times 10^{-6} U + 2.6 \mu V$	
		>320 mV to 1 V	$40 \times 10^{-6} U + 4.0 \mu V$	
		>1 V to 3.2 V	$40 \times 10^{-6} U + 7.0 \mu V$	
		>3.2 V to 10 V	$40 \times 10^{-6} U + 39 \mu V$	
		>10 V to 32 V	$40 \times 10^{-6} U + 70 \mu V$	
		>32 V to 100 V	$40 \times 10^{-6} U + 0.40 mV$	
		>100 V to 320 V	$40 \times 10^{-3} U + 1.3 mV$	
		>320 V to 1000 V	$40 \times 10^{-3} U + 1.3 mV$	
DC Current	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) <i>I: Measured current Value</i>	0 to 320 μA	$0.13 \times 10^{-3} I + 0.016 \mu A$	
		>320 μA to 3.2 mA	$80 \times 10^{-6} I + 0.040 \mu A$	
		>3.2 mA to 32 mA	$0.10 \times 10^{-3} I + 0.20 \mu A$	
		>32 mA to 320 mA	$0.60 \times 10^{-3} I + 1.9 \mu A$	
		>320 mA to 1 A	$0.70 \times 10^{-3} I + 34 \mu A$	

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Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Calibration of Measuring Devices				
DC Current	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) <i>I: Measured current Value</i>	>1 A to 2.99 A	$0.75 \times 10^{-3} / + 0.40 \text{ mA}$	Laboratory/ Customer Premises
		>3 A to 10 A	$0.70 \times 10^{-3} / + 0.40 \text{ mA}$	
		>10 A to 20.5 A	$1.0 \times 10^{-3} / + 5.8 \text{ mA}$	
Resistance	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) <i>R: Measured resistance Value</i>	0 to 1 Ω	$0.10 \times 10^{-3} R + 0.010 \Omega$	Laboratory/ Customer Premises
		>1 to 10 Ω	$90 \times 10^{-6} R + 0.010 \Omega$	
		>10 Ω to 30 Ω	$90 \times 10^{-6} R + 0.012 \Omega$	
		>30 Ω to 100 Ω	$70 \times 10^{-6} R + 0.012 \Omega$	
		>100 Ω to 3.2 k Ω	$70 \times 10^{-6} R + 0.16 \Omega$	
		>3.2 k Ω to 10 k Ω	$70 \times 10^{-6} R + 0.078 \Omega$	
		>10 k Ω to 32 k Ω	$70 \times 10^{-6} R + 0.78 \Omega$	
		>32 k Ω to 100 k Ω	$90 \times 10^{-6} R + 0.78 \Omega$	
		>100 k Ω to 320 k Ω	$90 \times 10^{-6} R + 7.8 \Omega$	
		>0.32 M Ω to 1 M Ω	$0.12 \times 10^{-3} R + 7.8 \Omega$	
>1 M Ω to 3.2 M Ω	$0.12 \times 10^{-3} R + 0.12 \text{ k}\Omega$			

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Calibration of Measuring Devices				
Resistance	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) <i>R: Measured resistance Value</i>	>3.2 MΩ to 10 MΩ	$0.47 \times 10^{-3} R + 0.19 \text{ k}\Omega$	Laboratory / On Site
		>10 MΩ to 32 MΩ	$2.5 \times 10^{-3} R + 1.9 \text{ k}\Omega$	
		>32 MΩ to 100 MΩ	$4.6 \times 10^{-3} R + 2.3 \text{ k}\Omega$	
		>100 MΩ to 320 MΩ	$4.9 \times 10^{-3} R + 78 \text{ k}\Omega$	
		>320 MΩ to 1000 MΩ	$12 \times 10^{-3} R + 0.39 \text{ M}\Omega$	
AC Voltage	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) <i>U: Measured voltage Value</i>	1.0 to 32 mV		Laboratory/ Customer Premises
		10 Hz to 10 kHz	$7.3 \times 10^{-3} U + 16 \mu\text{V}$	
		>32 mV to 100 mV		
		10 Hz to 45 Hz	$0.48 \times 10^{-3} U + 16 \mu\text{V}$	
		>45 Hz to 10 kHz	$0.37 \times 10^{-3} U + 16 \mu\text{V}$	
		>100 mV to 320 mV		
		10 Hz to 45 Hz	$0.43 \times 10^{-3} U + 16 \mu\text{V}$	
		>45 Hz to 10 kHz	$0.29 \times 10^{-3} U + 16 \mu\text{V}$	
		>10 kHz to 20 kHz	$0.67 \times 10^{-3} U + 16 \mu\text{V}$	

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Calibration of Measuring Devices				
AC Voltage	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) <i>U: Measured voltage Value</i>	>100 mV to 320 mV		Laboratory/ Customer Premises
		>20 kHz to 50 kHz	$0.87 \times 10^{-3} U + 31 \mu V$	
		>50 kHz to 100 kHz	$2.3 \times 10^{-3} U + 0.14 mV$	
		>320 mV to 1 V		
		45 Hz to 10 kHz	$0.26 \times 10^{-3} U + 47 \mu V$	
		>10 kHz to 20 kHz	$0.67 \times 10^{-3} U + 47 \mu V$	
		>20 kHz to 50 kHz	$0.87 \times 10^{-3} U + 47 \mu V$	
		>50 kHz to 100 kHz	$1.6 \times 10^{-3} U + 47 \mu V$	
		>1 V to 3.2 V		
		45 Hz to 10 kHz	$0.29 \times 10^{-3} U + 47 \mu V$	
		>10 kHz to 20 kHz	$0.45 \times 10^{-3} U + 47 \mu V$	
		>20 kHz to 50 kHz	$0.87 \times 10^{-3} U + 47 \mu V$	
		>50 kHz to 100 kHz	$2.3 \times 10^{-3} U + 0.14 mV$	
		>3.2 V to 32 V		
		45 Hz to 10 kHz	$0.29 \times 10^{-3} U + 0.47 mV$	

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Calibration of Measuring Devices				
AC Voltage	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) <i>U: Measured voltage Value</i>	>10 V to 32 V		Laboratory/ Customer Premises
		45 Hz to 10 kHz	$0.29 \times 10^{-3} U + 0.47 \text{ mV}$	
		>32 V to 100 V		
		45 Hz to 1 kHz	$1.3 \times 10^{-3} U + 2.3 \text{ mV}$	
		>1 kHz to 10 kHz	$0.63 \times 10^{-3} U + 7.0 \text{ mV}$	
		>100 V to 320 V		
		45 Hz to 1 kHz	$0.43 \times 10^{-3} U + 2.4 \text{ mV}$	
		>1 kHz to 10 kHz	$0.65 \times 10^{-3} U + 7.0 \text{ mV}$	
		>320 V to 750 V		
		45 Hz to 1 kHz	$0.41 \times 10^{-3} U + 16 \text{ mV}$	
		>1 kHz to 5 kHz	$0.46 \times 10^{-3} U + 16 \text{ mV}$	
		>5 kHz to 10 kHz	$0.71 \times 10^{-3} U + 16 \text{ mV}$	
		>750 V to 1020 V		
		45 Hz to 1 kHz	$1.5 \times 10^{-3} U + 16 \text{ mV}$	
		>1 kHz to 5 kHz	$2.2 \times 10^{-3} U + 16 \text{ mV}$	
		>5 kHz to 10 kHz	$1.6 \times 10^{-3} U + 16 \text{ mV}$	

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079-LB-CAL

Vital Equipments Calibration LLC

Building No: 74, Shop No. 7 & 8, Mussafah M-13

Abu Dhabi - United Arab Emirates

Issue no.: 01

Date: 08-01-2020

Valid to: 07-01-2023

Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Calibration of Measuring Devices				
AC Current	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) <i>I: Measured current Value</i>	29 μA to 100 μA		Laboratory/ Customer Premises
		45 Hz to 1 kHz	$1.5 \times 10^{-3} / + 0.08 \mu\text{A}$	
		>100 μA to 320 μA		
		45 Hz to 1 kHz	$1.5 \times 10^{-3} / + 0.08 \mu\text{A}$	
		>1 kHz to 5 kHz	$2.6 \times 10^{-3} / + 0.12 \mu\text{A}$	
		>320 μA to 1 mA		
		45 Hz to 1 kHz	$0.93 \times 10^{-3} / + 0.12 \mu\text{A}$	
		>1 kHz to 5 kHz	$1.6 \times 10^{-3} / + 0.16 \mu\text{A}$	
		>1 mA to 3.2 mA		
		45 Hz to 1 kHz	$1.3 \times 10^{-3} / + 0.12 \mu\text{A}$	
		>1 kHz to 5 kHz	$1.6 \times 10^{-3} / + 0.16 \mu\text{A}$	
		>3.2 mA to 10 mA		
		45 Hz to 1 kHz	$1.1 \times 10^{-3} / + 1.6 \mu\text{A}$	
		>1 kHz to 5 kHz	$0.66 \times 10^{-3} / + 1.6 \mu\text{A}$	

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Calibration of Measuring Devices				
AC Current	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) <i>I: Measured current Value</i>	>10 mA to 32 mA		Laboratory/ Customer Premises
		45 Hz to 1 kHz	$1.1 \times 10^{-3} / + 1.6 \mu\text{A}$	
		>1 kHz to 5 kHz	$0.66 \times 10^{-3} / + 1.6 \mu\text{A}$	
		>32 mA to 320 mA		
		45 Hz to 1 kHz	$1.5 \times 10^{-3} / + 16 \mu\text{A}$	
		>1 kHz to 5 kHz	$0.81 \times 10^{-3} / + 39 \mu\text{A}$	
		>320 mA to 2.99 A		
		45 Hz to 1 kHz	$1.8 \times 10^{-3} / + 78 \mu\text{A}$	
		>1 kHz to 5 kHz	$4.7 \times 10^{-3} / + 0.78 \text{ mA}$	
		>2.99 A to 10 A		
		45 Hz to 100 Hz	$1.3 \times 10^{-3} / + 1.6 \text{ mA}$	
		>100 Hz to 1 kHz	$0.10 \times 10^{-3} / + 1.6 \text{ mA}$	
		>1 kHz to 5 kHz	$24 \times 10^{-3} / + 1.6 \text{ mA}$	
		>10 A to 20.5 A		
		45 Hz to 100 Hz	$1.4 \times 10^{-3} / + 7.0 \text{ mA}$	
		>100 Hz to 1 kHz	$1.3 \times 10^{-3} / + 7.0 \text{ mA}$	

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Calibration of Measuring Devices				
Frequency	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) <i>F: Measured frequency Value</i>	0.1 Hz to 10 Hz	$30 \times 10^{-6} F + 0.78 \text{ mHz}$	Laboratory/ Customer Premises
		>10 Hz to 50 Hz	$20 \times 10^{-6} F + 0.78 \text{ mHz}$	
		>50 Hz to 120 Hz	$20 \times 10^{-6} F + 0.97 \text{ mHz}$	
		>120 Hz to 11 kHz	$20 \times 10^{-6} F + 58 \text{ mHz}$	
		>11 kHz to 1 MHz	$20 \times 10^{-6} F + 0.58 \text{ Hz}$	
		>1 MHz to 2 MHz	$20 \times 10^{-6} F + 0.58 \text{ kHz}$	
Capacitance	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) <i>C: Measured capacitance Value</i>	220.0 to 399.9 pF	$8 \times 10^{-3} C + 7.9 \text{ pF}$	
		0.4 to 3 nF	$8 \times 10^{-3} C + 0.01 \text{ nF}$	
		>3 nF to 10 nF	$2.6 \times 10^{-3} C + 0.01 \text{ nF}$	
		>10 nF to 100 nF	$2.6 \times 10^{-3} C + 0.09 \text{ nF}$	
		>100 nF to 300 nF	$2.6 \times 10^{-3} C + 0.23 \text{ nF}$	
		>0.3 nF to 1 μF	$2.3 \times 10^{-3} C + 0.96 \text{ nF}$	
		>1 μF to 3.2 μF	$2.3 \times 10^{-3} C + 6.3 \text{ nF}$	
		>3.2 μF to 10 μF	$2.4 \times 10^{-3} C + 9.6 \text{ nF}$	
		>10 μF to 30 μF	$3.4 \times 10^{-3} C + 63 \text{ nF}$	

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Calibration of Measuring Devices				
Capacitance	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) <i>C: Measured capacitance Value</i>	>30 μ F to 100 μ F	$4.7 \times 10^{-3} C + 97$ nF	Laboratory/ Customer Premises
		>100 μ F to 300 μ F	$4.7 \times 10^{-3} C + 0.24$ μ F	
		>0.3 mF to 1 mF	$4.7 \times 10^{-3} C + 0.63$ μ F	
Thermocouple B-Type T/C	Direct Method Using Multi product calibrator (VEC/CAL/ET-04 & VEC/CAL/ET-09)	600°C to 800°C	0.40°C	
		>800°C to 1000°C	0.32°C	
		>1000°C to 1550°C	0.28°C	
		>1550°C to 1820°C	0.30°C	
Thermocouple C-Type T/C		0°C to 150°C	0.25°C	
		>150°C to 650°C	0.24°C	
		>650°C to 1000°C	0.26°C	
		>1000°C to 1800°C	0.41°C	
		>1800°C to 2316°C	0.67°C	
Thermocouple E-Type T/C		-250°C to -100°C	0.41°C	
		>-100°C to -25°C	0.39°C	
		>-25°C to 350°C	0.14°C	

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Calibration of Measuring Devices				
Thermocouple E-Type T/C	Direct Method Using Multi product calibrator (VEC/CAL/ET-04 & VEC/CAL/ET-09)	>350°C to 650°C	0.14°C	Laboratory/ Customer Premises
		>650°C to 1000°C	0.18°C	
Thermocouple J-Type T/C		-210°C to -100°C	0.23°C	
		>-100°C to -30°C	0.14°C	
		>-30°C to 150°C	0.13°C	
		>150°C to 760°C	0.15°C	
		>760°C to 1200°C	0.19°C	
Thermocouple K-Type T/C		-250°C to -100°C	0.28°C	
		>-100°C to -25°C	0.17°C	
		>-25°C to 120°C	0.16°C	
		>120°C to 1000°C	0.22°C	
		>1000°C to 1372°C	0.32°C	
Thermocouple L-Type T/C		-200°C to -100°C	0.30°C	
		>-100°C to 800°C	0.21°C	
	>800°C to 900°C	0.15°C		

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Calibration of Measuring Devices				
Thermocouple N-Type T/C	Direct Method Using Multi product calibrator (VEC/CAL/ET-04 & VEC/CAL/ET-09	-200°C to -100°C	0.34°C	Laboratory/ Customer Premises
		>-100°C to -25°C	0.19°C	
		>-25°C to 120°C	0.17°C	
		>120°C to 410°C	0.16°C	
		>410°C to 1300°C	0.22°C	
Thermocouple R-Type T/C		0°C to 250°C	0.52°C	
		>250°C to 400°C	0.31°C	
		>400°C to 1000°C	0.29°C	
		>1000°C to 1767°C	0.34°C	
Thermocouple S-Type T/C		0°C to 250°C	0.46°C	
	>250°C to 1000°C	0.32°C		
	>1000°C to 1400°C	0.32°C		
	>1400°C to 1767°C	0.39°C		
Thermocouple T-Type T/C	-250°C to -150°C	0.53°C		
	>-150°C to 0°C	0.20°C		

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Calibration of Measuring Devices				
Thermocouple T-Type T/C	Direct Method Using Multi product calibrator (VEC/CAL/ET-04 & VEC/CAL/ET-09	>0°C to 120°C	0.15°C	Laboratory/ Customer Premises
		>120°C to 400°C	0.13°C	
Thermocouple U-Type T/C		-200°C to 0°C	0.45°C	
		>0°C to 600°C	0.22°C	
Temperature Measurement (RTD/ PT-100 (385)	Direct Method Using DMM 8846A (VEC/CAL/ET-09)	-200°C to -100°C	0.028°C	
		>-100°C to 0°C	0.042°C	
		>0°C to 100°C	0.046°C	
		>100°C to 300°C	0.072°C	
		>300°C to 600°C	0.12°C	
		>600°C to 800°C	0.15°C	
DC Current Calibration of Current Clamps	Direct Method Using Multi product calibrator & clamp coil (VEC/CAL/ET-01) <i>I: Measured current Value</i>	>20 A to 400 A	$3.0 \times 10^{-3} / + 58 \text{ mA}$	
		>400 A to 1000 A	$3.1 \times 10^{-3} / + 0.58 \text{ A}$	

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Calibration of Measuring Devices				
Current Calibration of Current Clamps	Direct Method Using Multi product calibrator & clamp coil (VEC/CAL/ET-01) <i>I: Measured current Value</i>	>20 A to 150 A		Laboratory/ Customer Premises
		45 Hz to 100 Hz	$3.5 \times 10^{-3} / + 58 \text{ mA}$	
		>100 Hz to 440 Hz	$3.7 \times 10^{-3} / + 58 \text{ mA}$	
		>150 A to 400 A		
		45 Hz to 100 Hz	$3.3 \times 10^{-3} / + 58 \text{ mA}$	
		>100 Hz to 440 Hz	$8.3 \times 10^{-3} / + 58 \text{ mA}$	
		>400 A to 1000 A		
		45 Hz to 100 Hz	$3.2 \times 10^{-3} / + 0.58 \text{ A}$	
		>100 Hz to 440 Hz	$8.3 \times 10^{-3} / + 0.58 \text{ A}$	

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Calibration of Sources				
DC Voltage	Direct Method Using DMM 8846A (VEC/CAL/ET-03) <i>U: Measured voltage Value</i>	0 mV to 10 mV	$0.49 \times 10^{-3} U + 4.2 \mu\text{V}$	Laboratory/ Customer Premises
		>10 to 100 mV	$40 \times 10^{-6} U + 4.2 \mu\text{V}$	
		>100 mV to 1 V	$30 \times 10^{-6} U + 8.2 \mu\text{V}$	
		>1 V to 10 V	$30 \times 10^{-6} U + 58 \mu\text{V}$	
		>10 V to 100 V	$40 \times 10^{-6} U + 0.70 \text{ mV}$	
		>100 V to 1000 V	$50 \times 10^{-6} U + 12 \text{ mV}$	
AC Voltage	Direct Method Using DMM 8846A (VEC/CAL/ET-03) <i>U: Measured voltage Value</i>	1 mV to 32 mV		
		45 Hz – 1 kHz	$5.8 \times 10^{-3} U + 47 \mu\text{V}$	
		>32 mV to 100 mV		
		45 Hz – 1 kHz	$0.72 \times 10^{-3} U + 47 \mu\text{V}$	
		>100 mV to 1 V		
		45 Hz – 1 kHz	$0.70 \times 10^{-3} U + 0.35 \text{ mV}$	
		>1 V to 10 V		
		45 Hz – 1 kHz	$0.70 \times 10^{-3} U + 3.5 \text{ mV}$	
		>10 V to 100 V		
		45 Hz – 1 kHz	$0.70 \times 10^{-3} U + 35 \text{ mV}$	
		>100 V to 1000 V		
		45 Hz – 1 kHz	$0.70 \times 10^{-3} U + 0.35 \text{ V}$	

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Calibration of Sources				
Resistance	Direct Method Using DMM 8846A (VEC/CAL/ET-03) <i>R: Measured resistance Value</i>	0 to 10 Ω	$0.17 \times 10^{-3} R + 3.5 \text{ m}\Omega$	Laboratory/ Customer Premises
		>10 to 100 Ω	$0.12 \times 10^{-3} R + 4.7 \text{ m}\Omega$	
		>100 Ω to 1 kΩ	$0.12 \times 10^{-3} R + 13 \text{ m}\Omega$	
		>1 kΩ to 3.2 kΩ	$0.12 \times 10^{-3} R + 0.12 \Omega$	
		>3.2 kΩ to 10 kΩ	$0.12 \times 10^{-3} R + 0.13 \Omega$	
		>10 kΩ to 32 kΩ	$0.12 \times 10^{-3} R + 1.2 \Omega$	
		>32 kΩ to 100 kΩ	$0.12 \times 10^{-3} R + 1.3 \Omega$	
		>100 kΩ to 0.32 MΩ	$0.12 \times 10^{-3} R + 12 \Omega$	
		>0.32 MΩ to 1 MΩ	$0.12 \times 10^{-3} R + 13 \Omega$	
		>1 MΩ to 3.2 MΩ	$0.46 \times 10^{-3} R + 0.12 \text{ k}\Omega$	
		>3 MΩ to 10 MΩ	$0.46 \times 10^{-3} R + 0.13 \text{ k}\Omega$	
>10 MΩ to 100 MΩ	$9.3 \times 10^{-3} R + 12 \text{ k}\Omega$			
DC Current	Direct Method Using DMM 8846A (VEC/CAL/ET-03) <i>I: Measured current Value</i>	0 μA to 50 μA	$1.1 \times 10^{-3} / + 0.03 \mu\text{A}$	
		>50 to 100 μA	$0.59 \times 10^{-3} / + 0.03 \mu\text{A}$	
		>100 μA to 1 mA	$0.58 \times 10^{-3} / + 0.06 \mu\text{A}$	

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Calibration of Sources				
DC Current	Direct Method Using DMM 8846A (VEC/CAL/ET-03) <i>I: Measured current Value</i>	>1 mA to 10 mA	$0.58 \times 10^{-3} / + 2.3 \mu\text{A}$	Laboratory/ Customer Premises
		>10 mA to 100 mA	$0.58 \times 10^{-3} / + 5.8 \mu\text{A}$	
		>100 mA to 1 A	$0.59 \times 10^{-3} / + 0.23 \text{ mA}$	
		>1 A to 1.5 A	$1.2 \times 10^{-3} / + 0.69 \text{ mA}$	
		>1.5 A to 2.9 A	$1.3 \times 10^{-3} / + 0.69 \text{ mA}$	
		>2.9 A to 10 A	$1.9 \times 10^{-3} / + 0.93 \text{ mA}$	
AC Current	Direct Method Using DMM 8846A (VEC/CAL/ET-03) <i>I: Measured current Value</i>	10 μA to 50 μA		
		45 Hz – 1 kHz	$1.6 \times 10^{-3} / + 0.05 \mu\text{A}$	
		>50 μA to 100 μA		
		45 Hz – 1 kHz	$1.3 \times 10^{-3} / + 0.05 \mu\text{A}$	
		>100 μA to 1 mA		
		45 Hz – 1 kHz	$1.3 \times 10^{-3} / + 0.47 \mu\text{A}$	
		>1 mA to 10 mA		
		45 Hz – 1 kHz	$1.3 \times 10^{-3} / + 4.7 \mu\text{A}$	
		>10 mA to 100 mA		
		45 Hz – 1 kHz	$1.3 \times 10^{-3} / + 47 \mu\text{A}$	

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Calibration of Sources				
AC Current	Direct Method Using DMM 8846A (VEC/CAL/ET-03) <i>I: Measured current Value</i>	>100 mA to 400 mA		Laboratory/ Customer Premises
		45 Hz – 1 kHz	$1.3 \times 10^{-3} / + 0.19 \text{ mA}$	
		>400 mA to 1 A		
		45 Hz – 1 kHz	$1.3 \times 10^{-3} / + 0.47 \text{ mA}$	
		>1 A to 3 A		
		45 Hz – 1 kHz	$2.0 \times 10^{-3} / + 0.70 \text{ mA}$	
		>3 A to 10 A		
Frequency (100 mV to 1000V)	Direct Method Using DMM 8846A (VEC/CAL/ET-03) <i>F: Measured frequency Value</i>	10 Hz – 40 Hz	$0.69 \times 10^{-3} F + 0.01 \text{ Hz}$	
		>40 Hz – 300 kHz	$0.13 \times 10^{-3} F + 58 \text{ Hz}$	
		>300 kHz – 1 MHz	$0.13 \times 10^{-3} F + 0.58 \text{ kHz}$	
Capacitance	Direct Method Using DMM 8846A (VEC/CAL/ET-03) <i>C: Measured capacitance Value</i>	0.1 nF to 0.5 nF	$74 \times 10^{-3} C + 29 \text{ pF}$	
		>0.5 nF to 1 nF	$30 \times 10^{-3} C + 29 \text{ pF}$	
		>1 nF to 10 nF	$17 \times 10^{-3} C + 58 \text{ pF}$	
		>10 nF to 100 nF	$23 \times 10^{-3} C + 0.58 \text{ nF}$	
		>100 nF to 1 μ F	$24 \times 10^{-3} C + 5.8 \text{ nF}$	

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Electrical Calibration
079-LB-CAL

Vital Equipments Calibration LLC

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Abu Dhabi - United Arab Emirates

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Date: 08-01-2020

Valid to: 07-01-2023

Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Calibration of Sources				
Capacitance	Direct Method Using DMM 8846A (VEC/CAL/ET-03) <i>C: Measured capacitance Value</i>	>1 μ F to 10 μ F	$17 \times 10^{-3} C + 58$ nF	Laboratory/ Customer Premises
		>10 μ F to 100 μ F	$17 \times 10^{-3} C + 0.58$ μ F	
		>100 μ F to 1 mF	$16 \times 10^{-3} C + 5.8$ μ F	
		>1 mF to 10 mF	$16 \times 10^{-3} C + 58$ μ F	
		600°C to 800°C	0.50°C	
		>800°C to 1000°C	0.43°C	
		>1000°C to 1550°C	0.40 °C	
		>1550°C to 1820°C	0.41°C	
Thermocouple B-Type T/C	Direct Method Using Multi product calibrator (VEC/CAL/ET-09)	600°C to 800°C	0.50°C	
		>800°C to 1000°C	0.43°C	
		>1000°C to 1550°C	0.40 °C	
		>1550°C to 1820°C	0.41°C	
Thermocouple C-Type T/C		0 °C to 150°C	0.26°C	
		>150°C to 650°C	0.23°C	
		>650°C to 1000°C	0.26°C	
		>1000°C to 1800°C	0.41°C	
		>1800°C to 2316°C	0.67°C	

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Calibration of Sources				
Thermocouple E-Type T/C	Direct Method Using Multi product calibrator (VEC/CAL/ET-09)	-250°C to -100°C	0.58°C	Laboratory/ Customer Premises
		>-100°C to -25°C	0.42°C	
		>-25°C to 350°C	0.42°C	
		>350°C to 650°C	0.42°C	
		>650°C to 1000°C	0.44°C	
Thermocouple J-Type T/C		-210°C to -100°C	0.22°C	
		>-100°C to -30°C	0.15°C	
		>-30°C to 150°C	0.13°C	
		>150°C to 760°C	0.15°C	
		>760°C to 1200°C	0.20°C	
Thermocouple K-Type T/C	-250°C to -100°C	0.28°C		
	>-100°C to -25°C	0.17°C		
	>-25°C to 120°C	0.16°C		
	>120°C to 1000°C	0.22°C		
	>1000°C to 1372°C	0.32°C		

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Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Calibration of Sources				
Thermocouple L-Type T/C	Direct Method Using Multi product calibrator (VEC/CAL/ET-09)	-200°C to -100°C	0.30°C	Laboratory/ Customer Premises
		>-100°C to 800°C	0.21°C	
		>800°C to 900°C	0.15°C	
Thermocouple N-Type T/C		-200°C to -100°C	0.35°C	
		>-100°C to -25°C	0.33°C	
		>-25°C to 120°C	0.20°C	
		>120°C to 410°C	0.18°C	
		>410°C to 1300°C	0.23°C	
Thermocouple R-Type T/C		0°C to 250°C	0.56°C	
		>250°C to 400°C	0.36°C	
	>400°C to 1000°C	0.34°C		
	>1000°C to 1767°C	0.39°C		
Thermocouple S-Type T/C	0°C to 250°C	0.50°C		
	>250°C to 1000°C	0.36°C		
	>1000°C to 1400°C	0.37°C		
	>1400°C to 1767°C	0.43°C		

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Calibration of Sources				
Thermocouple T-Type T/C	Direct Method Using Multi product calibrator (VEC/CAL/ET-09)	-250°C to -150°C	0.53°C	Laboratory/ Customer Premises
		>-150°C to 0°C	0.20°C	
		>0°C to 120°C	0.15°C	
		>120°C to 400°C	0.13°C	
Thermocouple U-Type T/C		-200°C to 0°C	0.45°C	
		>0°C to 600°C	0.22°C	
Temperature Measurement (RTD/ PT-100 (385))	Direct Method Using DMM 8846A (VEC/CAL/ET-09)	-200°C to -100°C	0.028°C	
		>-100°C to 0°C	0.042°C	
		>0°C to 100°C	0.046°C	
		>100°C to 300°C	0.072°C	
		>300°C to 600°C	0.12°C	
		>600°C to 800°C	0.15°C	

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