ACCREDITATION CERTIFICATE

LB-CAL-079

Emirates **I**nternational **A**ccreditation **C**entre

has accredited

VITAL Equipments CALIBRATION LLC

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

Abu Dhabi | United Arab Emirates

In accordance with the requirements of

ISO/IEC 17025:2017

General requirements for the competence of testing and calibration laboratories

to undertake the calibration in the attached accreditation scope

This Accreditation is invalid without the attached accreditation scope and shall remain in force within the validity period printed below, subject to continuing compliance with the requirements of the accreditation criteria.

Validity: 19-04-2023 to 07-01-2026

Initial Accreditation Date: 08-01-2020

for/CHIEF EXECUTIVE OFFICER
APPROVAL

مـركـز الإمـارات الـعـالـمـي لـلاعـتـمـاد
Emirates International Accreditation Centre

Accreditation Scope

LB-CAL-079

Vital Equipments Calibration LLC

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

Abu Dhabi | United Arab Emirates

Date: 13-01-2025

Accreditation History			
Scope	**Issue No.**	**Details**	**Date**
Pressure	06	Modification in Expanded Measurement Uncertainty Values	13-01-2025
Speed		Modification in Calibration Method	
Temperature & Humidity	06	Modification in Measured Quantity/ Calibration Instrument	22-05-2024
Electrical	06	Modification in Expanded Measurement Uncertainty values	
Temperature & Humidity, Mass, Pressure, Speed, Volume, Electrical	05	Modification in Scope's presentation	07-05-2024
Temperature & Humidity, Speed, Volume	04	Renewal of the accreditation	19-04-2023
Mass		Renewal of the accreditation, modification in Range and Specification and CMC Values	
Pressure		Renewal of the accreditation, modification in Range and Specification	
Electrical		Renewal of the accreditation, modification in CMC Values	
Temperature & Humidity, Mass, Pressure, Speed, Volume, Electrical	03	Certificate validity was extended for 6 months from 08-01-2023 up to 07-07-2023	07-01-2023
Temperature & Humidity, Mass, Pressure, Speed, Volume, Electrical	02	Transition to ISO 17025:2017 and comply with the new accreditation number format	06-05-2021
Temperature & Humidity, Mass, Pressure, Speed, Volume, Electrical	01	Granted accreditation from Emirates International Accreditation Centre	08-01-2020

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Emirates International Accreditation Centre

Accreditation Scope

Temperature Humidity Calibration

LB-CAL-079

Vital Equipments Calibration LLC

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

Abu Dhabi | United Arab Emirates

Issue no.: 06 **Date: 22-05-2024** **Valid to: 07-01-2026**

Calibration and Measurement Capability (CMC)				
Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of RTD's, Thermocouples, Thermistors etc. with and without indicator	Comparison method using Standard SPRT and 6 1/2 digits DMM Procedures: 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 SPRT and 6 1/2 digits DMM. Procedure: VEC/CAL/TH-05.	.-40 °C to 25 °C	0.2 °C	Laboratory
		25 °C to 200 °C	0.4 °C	
		200 °C to 650 °C	0.8 °C	
Liquid Temperature Calibrator / Bath	Comparison method using Standard SPRT and 6 1/2 digits DMM.	.-40 °C to 25 °C	0.2 °C	Laboratory
		25 °C to 250 °C	0.4 °C	
Calibration of Liquid in Glass Thermometers (Partial Immersion Type)	Comparison method using Standard SPRT and a 6 1/2 digits DMM. Procedure: VEC/CAL/TH-04.	.-40 °C to 25 °C	0.2 °C	Laboratory
		25 °C to 100 °C	0.3 °C	
		100 °C to 250 °C	0.4 °C	

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Temperature Humidity Calibration

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Issue no.: 06 **Date: 22-05-2024** **Valid to: 07-01-2026**

Calibration and Measurement Capability (CMC)				
Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Non-Contact Pyrometer / IR Thermometer	Comparison method using Standard PRT, Standard Thermocouple and DBB-650 black body radiator. Procedure: VEC/CAL/TH-09.	.-30 ℃ to 100 ℃	2 ℃	Laboratory
		100 ℃ to 250 ℃	3 ℃	
		250 ℃ to 650 ℃	5 ℃	
Calibration of Temperature and Humidity Meters and Dataloggers	Comparison method using Standard Temperature & Humidity Indicator with Sensor. Procedure: VEC/CAL/TH-12	5 ℃ to 50 ℃	0.4 ℃	Laboratory
		15 %RH to 90 %RH	3 %RH	
Calibration of RTD's, Thermocouples, Thermistors etc. with and without indicator	Comparison method using Standard SPRT and 6 1/2 digits DMM Procedures: VEC/CAL/TH-01, VEC/CAL/TH-02, VEC/CAL/TH-03.	.-40 ℃ to 25 ℃	0.3 ℃	Customer Premises
		25 ℃ to 200 ℃	0.4 ℃	
		200 ℃ to 400 ℃	1.0 ℃	

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Calibration and Measurement Capability (CMC)				
Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Temperature Chambers, Freezers, Chillers, Refrigerators, Ovens	Placing 9 points calibration method using a datalogger with RTD sensors. Procedure: VEC/CAL/TH-08	.-40 ℃ to 50 ℃	0.5 ℃	Customer Premises
		50 ℃ to 250 ℃	0.7 ℃	
Calibration of Environmental Chambers	Placing 9 points calibration method using a datalogger with RTD sensors and a relative humidity sensor. Procedure: VEC/CAL/TH-11	5 ℃ to 50 ℃	0.5 ℃	Customer Premises
		15 %RH to 90 %RH	3 %RH	
Calibration of Autoclave	Placing 9 points calibration method using a datalogger with RTD sensors. Procedure: VEC/CAL/TH-10	115 ℃ to 134 ℃	0.4 ℃	Customer Premises

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Accreditation Scope

Mass Calibration

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Issue no.: 05 **Date: 07-05-2024** **Valid to: 07-01-2026**

Calibration and Measurement Capability (CMC)				
Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Mass / Electronics 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 320kg (VEC/CAL/WB-01)	0 to 200 g	1.0 mg	Customer Premises
		> 200g to 600g	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 to300 kg	0.11 kg	
Mass / Mass Standards	In acc. to OIML R111-1 2004 (VEC/CAL/WT-01)	1 mg	0.12 mg	Laboratory
		2 mg	0.12 mg	
		5 mg	0.12 mg	
		10 mg	0.12 mg	
		20 mg	0.12 mg	
		50 mg	0.12 mg	
		100 mg	0.12 mg	

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Mass Calibration

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Issue no.: 05 **Date: 07-05-2024** **Valid to: 07-01-2026**

Calibration and Measurement Capability (CMC)				
Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Mass / Mass Standards	In acc. to OIML R111-1 2004 (VEC/CAL/WT-01)	200 mg	0.12 mg	Laboratory
		500 mg	0.12 mg	
		1 g	0.12 mg	
		2 g	0.12 mg	
		5 g	0.12 mg	
		10 g	0.12 mg	
		20 g	0.13 mg	
		50 g	0.13 mg	
		100 g	0.32 mg	
		200 g	0.32 mg	
		500 g	0.87 mg	
		1 kg	1.9 mg	

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Pressure Calibration

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Calibration and Measurement Capability (CMC)				
Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Gas Pressure-(Gauge) Calibration of Pressure Indicating instruments and gauges. Calibration of pressure devices with an elctrical output	Comparison method master pressure calibrator with a pneumatic hand pump (VEC/CAL/PR-01) DKD-R 6-1.	-85 kPa to 0 kPa	1.2 kPa	Laboratory
		> 0 kPa to 1 MPa	2.2 kPa	
		> 1 MPa to 3 MPa	2.8 kPa	
		> 3 MPa to 4 MPa	2 kPa	
Hydraulic Pressure-(Gauge) Calibration of Pressure Indicating instruments and gauges. Calibration of pressure devices with an elctrical output	Comparison method master pressure calibrator with hydraulic comparator (VEC/CAL/PR-01) DKD-R 6-1.	0 MPa to 15 MPa	1.3 kPa	Laboratory
		> 15 MPa to 50 MPa	15 kPa	
		> 50 MPa to 70 MPa	17 kPa	

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Pressure Calibration

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Calibration and Measurement Capability (CMC)				
Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
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	± 3000 Pa (±300 mmWc)	1.2 Pa (0.12 mmWc)	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 kPa to 0 kPa	0.6 kPa	Customer Premises
		> 0 kPa to 2 MPa	0.7 kPa	
		> 2 MPa to 10 MPa	1.8 kPa	
		> 10 MPa to 70 MPa	13 kPa	

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Speed Calibration

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Calibration and Measurement Capability (CMC)				
Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Rotational Speed	VEC/CAL/SP/02	6 rpm to 599 rpm	1.3 rpm	Permanent laboratory/ Customer Premises
		600 rpm to 3999 rpm	0.9 rpm	
		4000 rpm to 9999 rpm	1.8 rpm	
		10000 rpm to 19999 rpm	2.8 rpm	
		20000 rpm-25000 rpm	3.4 rpm	
Tachometer (Non Contact)	VEC/CAL/SP/01	6 rpm to 9999 rpm	0.092 rpm	
		10000 rpm to 26999 rpm	0.59 rpm	
		27000 rpm to 99999 rpm	0.75 rpm	

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Volume Calibration

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Calibration and Measurement Capability (CMC)				
Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**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 1000 µl	1.3 µl	
		>1000 µl to 10000 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	50 to 1000 ml	0.37 ml	
		>1000 ml to 2000 ml	0.86 ml	

Accreditation Scope

Electrical Calibration

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Calibration and Measurement Capability (CMC)				
Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Measuring Instruments				
DC Voltage	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) & (VEC/CAL/ET-01) *U: Measured voltage Value*	0.1 mV to 1 mV	$0.14\times10^{-3}\ U$ + 2.6 µV	Laboratory / Customer Premises
		>1 mV to 320 mV	$47\times10^{-6}\ U$ + 2.6 µV	
		>320 mV to 1 V	$39\times10^{-6}\ U$ + 4.1 µV	
		>1 V to 3.2 V	$39\times10^{-6}\ U$ + 7 µV	
		>3.2 V to 10 V	$39\times10^{-6}\ U$ + 39 µV	
		>10 V to 32 V	$39\times10^{-6}\ U$ + 39 µV	
		>32 V to 100 V	$43\times10^{-6}\ U$ + 0.39 mV	
		>100 V to 320 V	$44\times10^{-6}\ U$ + 1.3 mV	
		>320 V to 1000 V	$43\times10^{-6}\ U$ + 1.3 mV	

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Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Measuring Instruments				
DC Current	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) & (VEC/CAL/ET-01) *I: Measured current Value*	0 to 320 µA	0.12×10^{-3} / + 0.020 µA	Laboratory / Customer Premises
		>320 µA to 3.2 mA	87×10^{-6} / + 0.039 µA	
		>3.2 mA to 32 mA	0.11×10^{-3} / + 0.21 µA	
		>32 mA to 320 mA	0.11×10^{-3} / + 2.0 µA	
		>320 mA to 1 A	0.31×10^{-3} / + 35 µA	
		>1 A to 2.99 A	0.47×10^{-3} / + 0.39 mA	
		>3 A to 10 A	0.47×10^{-3} / + 0.39 mA	
		>10 A to 20.5 A	0.78×10^{-3} / + 5.8 mA	

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Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Measuring Instruments				
Resistance	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) & (VEC/CAL/ET-01) *R: Measured resistance Value*	0 to 1 Ω	$98\times10^{-6}\ R$ + 7.8 mΩ	Laboratory/ Customer Premises
		>1 to 10 Ω	$95\times10^{-6}\ R$ + 7.8 mΩ	
		>10 Ω to 30 Ω	$95\times10^{-6}\ R$ + 12 mΩ	
		>30 Ω to 100 Ω	$73\times10^{-6}\ R$ + 12 mΩ	
		>100 Ω to 3.2 kΩ	$73\times10^{-6}\ R$ + 0.16 Ω	
		>3.2 kΩ to 10 kΩ	$73\times10^{-6}\ R$ + 0.16 Ω	
		>10 kΩ to 32 kΩ	$73\times10^{-6}\ R$ + 0.78 Ω	
		>32 kΩ to 100 kΩ	$88\times10^{-6}\ R$ + 0.78 Ω	
		>100 kΩ to 320 kΩ	$95\times10^{-6}\ R$ + 7.8 Ω	
		>0.32 MΩ to 1 MΩ	$0.12\times10^{-3}\ R$ + 7.8 Ω	

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Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Measuring Instruments				
Resistance	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) & (VEC/CAL/ET-01) *R: Measured resistance Value*	>1 MΩ to 3.2 MΩ	$0.12\times10^{-3}\ R$ + 0.12 kΩ	Laboratory/ Customer Premises
		>3.2 MΩ to 10 MΩ	$0.47\times10^{-3}\ R$ + 0.19 kΩ	
		>10 MΩ to 32 MΩ	$0.9\times10^{-3}\ R$ + 1.9 kΩ	
		>32 MΩ to 100 MΩ	$3.9\times10^{-3}\ R$ + 2.3 kΩ	
		>100 MΩ to 320 MΩ	$5.9\times10^{-3}\ R$ + 78 kΩ	
		>320 MΩ to 1000 MΩ	$12\times10^{-3}\ R$ + 3.9 MΩ	
AC Voltage	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) & (VEC/CAL/ET-01) *U: Measured voltage Value*	**1.0 to 32 mV**		Laboratory/ Customer Premises
		10 Hz to 10 kHz	0.87×10^{-3} U + 16 µV	
		>32 mV to 100 mV		
		10 Hz to 45 Hz	$0.43\times10^{-3}\ U$ + 16 µV	
		>45 Hz to 10 kHz	$0.30\times10^{-3}\ U$ + 16 µV	

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Calibration of Measuring Instruments				
AC Voltage	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) & (VEC/CAL/ET-01) *U: Measured voltage Value*	**>100 mV to 320 mV**		Laboratory/ Customer Premises
		10 Hz to 45 Hz	$0.42\times10^{-3}\ U$ + 16 µV	
		>45 Hz to 10 kHz	$0.28\times10^{-3}\ U$ + 16 µV	
		>10 kHz to 20 kHz	$0.74\times10^{-3}\ U$ + 16 µV	
		>20 kHz to 50 kHz	$0.92\times10^{-3}\ U$ + 31 µV	
		>50 kHz to 100 kHz	$1.9\times10^{-3}\ U$ + 0.13 mV	
		>320 mV to 1 V		
		45 Hz to 10 kHz	$0.25\times10^{-3}\ U$ + 47 µV	
		>10 kHz to 20 kHz	$0.56\times10^{-3}\ U$ + 47 µV	
		>20 kHz to 50 kHz	$0.79\times10^{-3}\ U$ + 47 µV	
		>50 kHz to 100 kHz	$0.79\times10^{-3}\ U$ + 0.16 mV	

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Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Measuring Instruments				
AC Voltage	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) & (VEC/CAL/ET-01) *U: Measured voltage Value*	**>1 V to 3.2 V**		Laboratory/ Customer Premises
		45 Hz to 10 kHz	$0.25\times10^{-3}\ U$ + 47 µV	
		>10 kHz to 20 kHz	$0.56\times10^{-3}\ U$ + 47 µV	
		>20 kHz to 50 kHz	$0.79\times10^{-3}\ U$ + 47 µV	
		>50 kHz to 100 kHz	$0.79\times10^{-3}\ U$ + 0.16 mV	
		>3.2 V to 32 V		
		45 Hz to 10 kHz	$0.25\times10^{-3}\ U$ + 0.47 mV	
		>10 V to 32 V		
		45 Hz to 10 kHz	$0.25\times10^{-3}\ U$ + 0.47 mV	
		>32 V to 100 V		
		45 Hz to 1 kHz	$0.42\times10^{-3}\ U$ + 2.3 mV	
		>1 kHz to 10 kHz	$0.64\times10^{-3}\ U$ + 7.0 mV	

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Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Measuring Instruments				
AC Voltage	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) & (VEC/CAL/ET-01) *U: Measured voltage Value*	**>100 V to 320 V**		Laboratory/ Customer Premises
		45 Hz to 1 kHz	$0.42\times10^{-3}\ U + 2.4$ mV	
		>1 kHz to 10 kHz	$0.64\times10^{-3}\ U + 7.0$ mV	
		>320 V to 750 V		
		45 Hz to 1 kHz	$0.42\times10^{-3}\ U + 16$ mV	
		>1 kHz to 5 kHz	$0.64\times10^{-3}\ U + 16$ mV	
		>5 kHz to 10 kHz	$0.72\times10^{-3}\ U + 16$ mV	
		>750 V to 1020 V		
		45 Hz to 1 kHz	$0.42\times10^{-3}\ U + 16$ mV	
		>1 kHz to 5 kHz	$0.64\times10^{-3}\ U + 16$ mV	
		>5 kHz to 10 kHz	$0.72\times10^{-3}\ U + 16$ mV	

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Abu Dhabi | United Arab Emirates

Issue no.: 06 **Date: 22-05-2024** **Valid to: 07-01-2026**

Calibration and Measurement Capability (CMC)				
Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Measuring Instruments				
AC Current	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) & (VEC/CAL/ET-01) *I: Measured current Value*	**29 µA to 100 µA**		Laboratory/ Customer Premises
		45 Hz to 1 kHz	1.3×10^{-3} / + 0.08 µA	
		>100 µA to 320 µA		
		45 Hz to 1 kHz	0.99×10^{-3} / + 0.08 µA	
		>1 kHz to 5 kHz	2.3×10^{-3} / + 0.12 µA	
		>320 µA to 1 mA		
		45 Hz to 1 kHz	0.79×10^{-3} / + 0.12 µA	
		>1 kHz to 5 kHz	1.6×10^{-3} / + 0.16 µA	
		>1 mA to 3.2 mA		
		45 Hz to 1 kHz	0.79×10^{-3} / + 0.12 µA	
		>1 kHz to 5 kHz	1.6×10^{-3} / + 0.16 µA	

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Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Measuring Instruments				
AC Current	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) & (VEC/CAL/ET-01) *I: Measured current Value*	**>3.2 mA to 10 mA**		Laboratory/ Customer Premises
		45 Hz to 1 kHz	0.34×10^{-3} / + 1.6 µA	
		>1 kHz to 5 kHz	0.64×10^{-3} / + 1.6 µA	
		>10 mA to 32 mA		
		45 Hz to 1 kHz	0.34×10^{-3} / + 1.6 µA	
		>1 kHz to 5 kHz	0.64×10^{-3} / + 1.6 µA	
		>32 mA to 320 mA		
		45 Hz to 1 kHz	0.37×10^{-3} / + 16 µA	
		>1 kHz to 5 kHz	0.80×10^{-3} / + 39 µA	

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Calibration of Measuring Instruments				
AC Current	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) & (VEC/CAL/ET-01) *I: Measured current Value*	**>320 mA to 2.99 A**		Laboratory/ Customer Premises
		45 Hz to 1 kHz	0.52×10^{-3} / + 78 µA	
		>1 kHz to 5 kHz	4.7×10^{-3} / + 0.78 mA	
		>2.99 A to 10 A		
		45 Hz to 100 Hz	0.51×10^{-3} / + 1.6 mA	
		>100 Hz to 1 kHz	0.80×10^{-3} / + 1.6 mA	
		>1 kHz to 5 kHz	23×10^{-3} / + 1.6 mA	
		>10 A to 20.5 A		
		45 Hz to 100 Hz	0.99×10^{-3} / + 7.0 mA	
		>100 Hz to 1 kHz	1.2×10^{-3} / + 7.0 mA	

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Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Measuring Instruments				
Frequency	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) & (VEC/CAL/ET-01) *F: Measured frequency Value*	0.1 Hz to 10 Hz	19×10^{-6} *F* + 0.78 mHz	Laboratory/ Customer Premises
		>10 Hz to 50 Hz	19×10^{-6} *F* + 0.78 mHz	
		>50 Hz to 120 Hz	19×10^{-6} *F* + 0.97 mHz	
		>120 Hz to 11 kHz	19×10^{-6} *F* + 58mHz	
		>11 kHz to 1 MHz	19×10^{-6} *F* + 0.58 Hz	
		>1 MHz to 2 MHz	19×10^{-6} *F* + 0.58 kHz	
Capacitance	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) & (VEC/CAL/ET-01) *C: Measured capacitance Value*	220.0 pF to 399.9 pF	4.0×10^{-3} *C* + 7.9 pF	Laboratory/ Customer Premises
		0.4 nF to 3 nF	4.0×10^{-3} *C* + 9.7 pF	
		>3 nF to 10 nF	2.1×10^{-3} *C* + 9.7 pF	
		>10 nF to 100 nF	2.1×10^{-3} *C* + 0.10 nF	
		>100 nF to 300 nF	2.1×10^{-3} *C* + 0.23 nF	

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Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Measuring Instruments				
Capacitance	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) & (VEC/CAL/ET-01) *C: Measured capacitance Value*	>0.3 nF to 1 µF	$2.1\times10^{-3}\ C$ + 0.97 nF	Laboratory/ Customer Premises
		>1 µF to 3.2 µF	$2.3\times10^{-3}\ C$ + 6.2 nF	
		>3.2 µF to 10 µF	$2.3\times10^{-3}\ C$ + 10 nF	
		>10 µF to 30 µF	$3.4\times10^{-3}\ C$ + 62 nF	
		>30 µF to 100 µF	$3.7\times10^{-3}\ C$ + 97 nF	
Thermocouple B-Type T/C	Direct Method Using Multi product calibrator (VEC/CAL/ET-04 & VEC/CAL/ET-09)	600°C to 800°C	0.41°C	Laboratory/ Customer Premises
		>800°C to 1000°C	0.31°C	
		>1000°C to 1550°C	0.27°C	
		>1550°C to 1820°C	0.29°C	

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Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Measuring Instruments				
Thermocouple E-Type T/C	Direct Method Using Multi product calibrator (VEC/CAL/ET-04 & VEC/CAL/ET-09)	-250°C to -100°C	0.41°C	Laboratory/ Customer Premises
		>-100°C to -25°C	0.39°C	
		>-25°C to 350°C	0.13°C	
		>350°C to 650°C	0.14°C	
		>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	

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Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Measuring Instruments				
Thermocouple K-Type T/C	Direct Method Using Multi product calibrator (VEC/CAL/ET-04 & VEC/CAL/ET-09)	-250°C to -100°C	0.27°C	Laboratory/ Customer Premises
		>-100°C to -25°C	0.16°C	
		>-25°C to 120°C	0.15°C	
		>120°C to 1000°C	0.22°C	
		>1000°C to 1372°C	0.32°C	
Thermocouple N-Type T/C		-200°C to -100°C	0.34°C	
		>-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	

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Calibration of Measuring Instruments				
Thermocouple R-Type T/C	Direct Method Using Multi product calibrator (VEC/CAL/ET-04 & VEC/CAL/ET-09)	0°C to 250°C	0.52°C	Laboratory/ Customer Premises
		>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	0.31°C	
		>1000°C to 1400°C	0.32°C	
		>1400°C to 1767°C	0.39°C	

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Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Measuring Instruments				
Thermocouple T-Type T/C	Direct Method Using Multi product calibrator (VEC/CAL/ET-04 & 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	0.14°C	
		>120°C to 400°C	0.13°C	
Temperature Measurement (RTD/ PT-100 (385)	Direct Method Using Multi product calibrator (VEC/CAL/ET-09)	-200°C to -100°C	0.044°C	Laboratory/ Customer Premises
		>-100°C to 0°C	0.044°C	
		>0°C to 100°C	0.063°C	
		>100°C to 300°C	0.077°C	
		>300°C to 600°C	0.12°C	
		>600°C to 800°C	0.19°C	

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Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Measuring Instruments				
DC Current Calibration of Current Clamps	Direct Method Using Multi product calibrator & clamp coil (VEC/CAL/ET-01)	>20 A to 400 A	3.0×10^{-3} / + 58 mA	Laboratory/ Customer Premises
		>400 A to 1000 A	3.1×10^{-3} / + 0.58 A	
AC Current Calibration of Current Clamps	Direct Method Using Multi product calibrator & clamp coil (VEC/CAL/ET-01) *I: Measured current Value*	**>20 A to 150 A**		Laboratory/ Customer Premises
		45 Hz to 100 Hz	3.5×10^{-3} / + 58 mA	
		>100 Hz to 440 Hz	3.8×10^{-3} / + 58 mA	
		>150 A to 400 A		
		45 Hz to 100 Hz	3.5×10^{-3} / + 58 mA	
		>100 Hz to 440 Hz	8.3×10^{-3} / + 58 mA	
		>400 A to 1000 A		
		45 Hz to 100 Hz	3.2×10^{-3} / + 0.58 A	
		>100 Hz to 440 Hz	8.3×10^{-3} / + 0.58 A	

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Calibration and Measurement Capability (CMC)				
Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Sources				
DC Voltage	Direct Method Using DMM 8846A (VEC/CAL/ET-03) *U: Measured voltage Value*	0 mV to 10 mV	$82\times10^{-6}\ U + 4.2\ \mu V$	Laboratory/ Customer Premises
		>10 to 100 mV	$47\times10^{-6}\ U + 4.2\ \mu V$	
		>100 mV to 1 V	$31\times10^{-6}\ U + 8.2\ \mu V$	
		>1 V to 10 V	$30\times10^{-6}\ U + 58\ \mu V$	
		>10 V to 100 V	$45\times10^{-6}\ U + 0.70\ mV$	
		>100 V to 1000 V	$48\times10^{-6}\ U + 12\ mV$	
AC Voltage	Direct Method Using DMM 8846A (VEC/CAL/ET-03) *U: Measured voltage Value*	**1 mV to 32 mV**		Laboratory/ Customer Premises
		45 Hz – 1 kHz	$0.72\times10^{-3}\ U + 46\ \mu V$	
		>32 mV to 100 mV		
		45 Hz – 1 kHz	$0.72\times10^{-3}\ U + 46\ \mu V$	

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Calibration and Measurement Capability (CMC)				
Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Sources				
AC Voltage	Direct Method Using DMM 8846A (VEC/CAL/ET-03) *U: Measured voltage Value*	**>100 mV to 1 V**		Laboratory/ Customer Premises
		45 Hz – 1 kHz	$0.70\times10^{-3}\ U$ + 0.35 mV	
		>1 V to 10 V		
		45 Hz – 1 kHz	$0.70\times10^{-3}\ U$ + 3.5 mV	
		>10 V to 100 V		
		45 Hz – 1 kHz	$0.70\times10^{-3}\ U$ + 35 mV	
		>100 V to 1000 V		
		45 Hz – 1 kHz	$0.71\times10^{-3}\ U$ + 0.35 V	

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Calibration of Sources				
Resistance	Direct Method Using DMM 8846A (VEC/CAL/ET-03) *R: Measured resistance Value*	0 to 10 Ω	$0.17\times10^{-3}\ R$ + 3.5 mΩ	Laboratory/ Customer Premises
		>10 to 100 Ω	$0.12\times10^{-3}\ R$ + 4.7 mΩ	
		>100 Ω to 1 kΩ	$0.12\times10^{-3}\ R$ + 13 mΩ	
		>1 kΩ to 3.2 kΩ	$0.12\times10^{-3}\ R$ + 0.12 Ω	
		>3.2 kΩ to 10 kΩ	$0.12\times10^{-3}\ R$ + 0.13 Ω	
		>10 kΩ to 32 kΩ	$0.12\times10^{-3}\ R$ + 1.2 Ω	
		>32 kΩ to 100 kΩ	$0.12\times10^{-3}\ R$ + 1.3 Ω	
		>100 kΩ to 0.32 MΩ	$0.12\times10^{-3}\ R$ + 12 Ω	
		>0.32 MΩ to 1 MΩ	$0.12\times10^{-3}\ R$ + 13 Ω	
		>1 MΩ to 3.2 MΩ	$0.46\times10^{-3}\ R$ + 0.12 kΩ	
		>3 MΩ to 10 MΩ	$0.46\times10^{-3}\ R$ + 0.13 kΩ	
		>10 MΩ to 100 MΩ	$9.2\times10^{-3}\ R$ + 12 kΩ	

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Calibration of Sources				
DC Current	Direct Method Using DMM 8846A (VEC/CAL/ET-03) *I: Measured current Value*	0 µA to 50 µA	0.95×10^{-3} / + 0.029 µA	Laboratory/ Customer Premises
		>50 to 100 µA	0.59×10^{-3} / + 0.029 µA	
		>100 µA to 1 mA	0.58×10^{-3} / + 0.058 µA	
		>1 mA to 10 mA	0.58×10^{-3} / + 2.3 µA	
		>10 mA to 100 mA	0.58×10^{-3} / + 5.8 µA	
		>100 mA to 1 A	0.59×10^{-3} / + 0.23 mA	
		>1 A to 1.5 A	1.2×10^{-3} / + 0.69 mA	
		>1.5 A to 2.9 A	1.4×10^{-3} / + 0.69 mA	
		>2.9 A to 10 A	1.8×10^{-3} / + 0.93 mA	

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Calibration of Sources				
AC Current	Direct Method Using DMM 8846A (VEC/CAL/ET-03) *I: Measured current Value*	**10 µA to 50 µA**		Laboratory/ Customer Premises
		45 Hz – 1 kHz	1.7×10^{-3} / + 0.047 µA	
		>50 µA to 100 µA		
		45 Hz – 1 kHz	1.2×10^{-3} / + 0.047 µA	
		>100 µA to 1 mA		
		45 Hz – 1 kHz	1.2×10^{-3} / + 0.46 µA	
		>1 mA to 10 mA		
		45 Hz – 1 kHz	1.2×10^{-3} / + 4.6 µA	
		>10 mA to 100 mA		
		45 Hz – 1 kHz	1.2×10^{-3} / + 46 µA	

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Calibration of Sources				
AC Current	Direct Method Using DMM 8846A (VEC/CAL/ET-03) *I: Measured current Value*	**>100 mA to 400 mA**		Laboratory/ Customer Premises
		45 Hz – 1 kHz	1.2×10^{-3} / + 0.18 mA	
		>400 mA to 1 A		
		45 Hz – 1 kHz	1.2×10^{-3} / + 0.46 mA	
		>1 A to 3 A		
		45 Hz – 1 kHz	1.8×10^{-3} / + 0.70 mA	
		>3 A to 10 A		
		45 Hz – 1 kHz	1.8×10^{-3} / + 0.70 mA	

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Calibration of Sources				
Frequency (100 mV to 1000V)	Direct Method Using DMM 8846A (VEC/CAL/ET-03) *F: Measured frequency Value*	10 Hz – 40 Hz	0.35×10^{-3} *F* + 0.01 Hz	Laboratory/ Customer Premises
		>40 Hz – 300 kHz	0.12×10^{-3} *F* + 58 Hz	
		>300 kHz – 1 MHz	0.12×10^{-3} *F* + 0.58 kHz	
Capacitance	Direct Method Using DMM 8846A (VEC/CAL/ET-03) *C: Measured capacitance Value*	0.1 nF to 0.5 nF	23×10^{-3} *C* + 29 pF	Laboratory/ Customer Premises
		>0.5 nF to 1 nF	23×10^{-3} *C* + 29 pF	
		>1 nF to 10 nF	12×10^{-3} *C* + 58 pF	
		>10 nF to 100 nF	12×10^{-3} *C* + 0.58 nF	
		>100 nF to 1 µF	12×10^{-3} C + 5.8 nF	
		>1 µF to 10 µF	12×10^{-3} *C* + 58 nF	
		>10 µF to 100 µF	12×10^{-3} *C* + 0.58 µF	
		>100 µF to 1 mF	12×10^{-3} *C* + 5.8 µF	
		>1 mF to 10 mF	12×10^{-3} *C* + 58 µF	

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Calibration of Sources				
Thermocouple B-Type T/C	Direct Method Using Multi product calibrator (VEC/CAL/ET-09)	600°C to 800°C	0.44°C	Laboratory/ Customer Premises
		>800°C to 1000°C	0.34°C	
		>1000°C to 1550°C	0.30 °C	
		>1550°C to 1820°C	0.32°C	
Thermocouple E-Type T/C		-250°C to -100°C	0.42°C	
		>-100°C to -25°C	0.14°C	
		>-25°C to 350°C	0.13°C	
		>350°C to 650°C	0.14°C	
		>650°C to 1000°C	0.18°C	

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Abu Dhabi | United Arab Emirates

Issue no.: 06 **Date: 22-05-2024** **Valid to: 07-01-2026**

Calibration and Measurement Capability (CMC)				
Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Sources				
Thermocouple J-Type T/C	Direct Method Using Multi product calibrator (VEC/CAL/ET-09)	-210°C to -100°C	0.23°C	Laboratory/ Customer Premises
		>-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	0.27°C	
		>-100°C to -25°C	0.16°C	
		>-25°C to 120°C	0.15°C	
		>120°C to 1000°C	0.22°C	
		>1000°C to 1372°C	0.32°C	

مـركـز الإمـارات الـعـالـمـي لـلاعـتـمـاد
Emirates International Accreditation Centre

Accreditation Scope

Electrical Calibration

LB-CAL-079

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Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Sources				
Thermocouple N-Type T/C	Direct Method Using Multi product calibrator (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	

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Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Sources				
Thermocouple S-Type T/C	Direct Method Using Multi product calibrator (VEC/CAL/ET-09)	0°C to 250°C	0.46°C	Laboratory/ Customer Premises
		>250°C to 1000°C	0.31°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	
		>0°C to 120°C	0.14°C	
		>120°C to 400°C	0.13°C	

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Measured Quantity/ Calibration Instrument	**Calibration Method**	**Range and Specification**	**Expanded Measurement Uncertainty (U @ k=2)**	**Location**
Calibration of Sources				
Temperature Measurement (RTD/ PT-100 (385)	Direct Method Using DMM 8846A (VEC/CAL/ET-09)	-200°C to -100°C	0.13°C	Laboratory/ Customer Premises
		>-100°C to 0°C	0.12°C	
		>0°C to 100°C	0.13°C	
		>100°C to 300°C	0.18°C	
		>300°C to 600°C	0.22°C	
		>600°C to 800°C	0.31°C	