



# CERTIFICATE OF ACCREDITATION

**The ANSI National Accreditation Board**

Hereby attests that

**Calibration Laboratory Arab Engineers for  
Engineering Services Co.**

**113 El Thawra St.  
Heliopolis, Cairo, Egypt**

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](http://www.anab.org).

A handwritten signature in black ink, appearing to be 'J. Stine', is positioned above a horizontal line.

Jason Stine, Vice President

Expiry Date: 06 June 2025

Certificate Number: AC-3214



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

### Calibration Laboratory Arab Engineers for Engineering Services Co.

113 El Thawra St.

Heliopolis, Cairo, Egypt

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### CALIBRATION

Valid to: **June 6, 2025**

Certificate Number: **AC-3214**

#### Acoustics and Vibration

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Sound Level Meters <sup>1</sup>	1 kHz 94 dB 114 dB	0.4 dB 0.4 dB	In-house calibration Procedure AEES-CAL-ACO-01; Sound Calibrator

#### Chemical Quantities

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
pH Measuring Equipment <sup>1,4</sup>	4 pH 7 pH 10 pH	0.5 % of reading 0.3 % of reading 0.3 % of reading	In-house calibration Procedure AEES-CAL-Chemical-02; Accredited Buffer Solutions
Conductivity Measuring Equipment <sup>1,4</sup>	84 µS/cm 1 413 µS/cm 12 800 µS/cm	1.4 % of reading 0.08 % of reading 0.01 % of reading	In-house calibration Procedure AEES-CAL-Chemical-01; Accredited Conductivity Solutions
TDS Measuring Equipment <sup>1,4</sup>	(42,4 to 7 447) mg/l	1,4 % of reading	In-house calibration Procedure AEES-CAL-Chemical-03; Accredited TDS Solutions

**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage – Generate <sup>1,2</sup>	(0 to 330) mV (0 to 3.3) V (0 to 33) V (30 to 300) V (300 to 1 020) V	6 $\mu$ V 10 $\mu$ V 0.11 mV 0.84 mV 15 mV	In-house calibration Procedure AEES-CAL-ELE-02; Fluke 5522A Multiproduct Calibrator
AC Voltage – Generate <sup>1,2</sup>	(1 to 33) mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (33 to 330) mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (0.33 to 3.3) V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	5.2 $\mu$ V 8.2 $\mu$ V 8.5 $\mu$ V 9.6 $\mu$ V 28 $\mu$ V 10 $\mu$ V 40 $\mu$ V 44 $\mu$ V 47 $\mu$ V 89 $\mu$ V 0.19 mV 0.4 mV 0.43 mV 0.52 mV 0.76 mV	In-house calibration Procedure AEES-CAL-ELE-03; Fluke 5522A Multiproduct Calibrator
AC Voltage – Generate <sup>1,2</sup>	(3.3 to 33) V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (33 to 330) V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (330 to 1020) V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz	0.87 mV 4 mV 4.5 mV 6.4 mV 8.9 mV 6.8 mV 46 mV 55 mV 67 mV 76 mV 87 mV 0.2 V 0.24 V	In-house calibration Procedure AEES-CAL-ELE-04; Fluke 5522A Multiproduct Calibrator

**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Current – Generate <sup>1,2</sup>	(0 to 330) $\mu$ A	38 nA	In-house calibration Procedure AEES-CAL-ELE-04; Fluke 5522A Multiproduct Calibrator
	(0 to 3.3) mA	0.3 $\mu$ A	
	(0 to 33) mA	1.7 $\mu$ A	
	(0 to 330) mA	17 $\mu$ A	
	(0 to 1.1) A	0.2 mA	
	(1.1 to 3) A	1 mA	
	(3 to 10) A	4.3 mA	
AC Current – Generate <sup>1,2</sup>	(29.00 to 330) $\mu$ A		In-house calibration Procedure AEES-CAL-ELE-05; Fluke 5522A Multiproduct Calibrator
	(10 to 45) Hz	0.4 $\mu$ A	
	45 Hz to 1 kHz	0.4 $\mu$ A	
	(1 to 5) kHz	0.88 $\mu$ A	
	(5 to 10) kHz	2.2 $\mu$ A	
	(0.33 to 3.3) mA		
	(10 to 45) Hz	2.7 $\mu$ A	
	45 Hz to 1 kHz	2.7 $\mu$ A	
	(1 to 5) kHz	5.3 $\mu$ A	
	(5 to 10) kHz	13 $\mu$ A	
	(3.3 to 33) mA		
	(10 to 45) Hz	13 $\mu$ A	
	45 Hz to 1 kHz	13 $\mu$ A	
	(1 to 5) kHz	23 $\mu$ A	
(5 to 10) kHz	54 $\mu$ A		
AC Current – Generate <sup>1,2</sup>	(33 to 330) mA		In-house calibration Procedure AEES-CAL-ELE-05; Fluke 5522A Multiproduct Calibrator
	(10 to 45) Hz	0.13 mA	
	45 Hz to 1 kHz	0.13 mA	
	(1 to 5) kHz	0.3 mA	
	(5 to 10) kHz	0.59 mA	
	(0.33 to 1.1) A		
	(10 to 45) Hz	0.5 mA	
	45 Hz to 1 kHz	0.5 mA	
	(1 to 5) kHz	5.8 mA	
	(5 to 10) kHz	25 mA	
	(1.1 to 3) A		
	(10 to 45) Hz	1.6 mA	
	45 Hz to 1 kHz	1.6 mA	
	(1 to 5) kHz	15 mA	
	(5 to 10) kHz	62 mA	
	(3 to 11) A		
	(10 to 45) Hz	3.1 mA	
45 Hz to 1 kHz	4.1 mA		
(1 to 5) kHz	78 mA		



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Resistance – Generate <sup>1,2</sup> (Simulated)	(0 to 11) Ω	0.84 mΩ	In-house calibration Procedure AEES-CAL-ELE-06; Fluke 5522A Multiproduct Calibrator
	(11 to 33) Ω	1.6 mΩ	
	(33 to 110) Ω	1.8 mΩ	
	(110 to 330) Ω	4.1 mΩ	
	330 Ω to 1.1 kΩ	8.8 mΩ	
	(1.1 to 3.3) kΩ	42 mΩ	
	(3.3 to 11) kΩ	89 mΩ	
	(11 to 33) kΩ	0.45 Ω	
	(33 to 110) kΩ	0.9 Ω	
	(110 to 330) kΩ	9.3 Ω	
	330 kΩ to 1.1 MΩ	11 Ω	
	(1.1 to 3.3) MΩ	0.23 kΩ	
	(3.3 to 11) MΩ	0.38 kΩ	
	(11 to 33) MΩ	12 kΩ	
	(33 to 110) MΩ	63 kΩ	
(110 to 330) MΩ	0.76 MΩ		
(330 to 1 100) MΩ	12 MΩ		
DC Voltage – Measure <sup>1,2</sup>	100 mV	3.5 μV	In-house calibration Procedure AEES-CAL- ELE-09; Fluke 8558A 8.5 Digit Multimeter
	1 V	22 μV	
	10 V	0.22 mV	
	100 V	3.4 mV	
	1 000 V	92 mV	
AC Voltage – Measure <sup>1,2</sup>	10 mV		In-house calibration Procedure AEES-CAL-ELE-10; Fluke 8558A 8.5 Digit Multimeter
	1 Hz to 2 kHz	0.14 μV	
	(2 to 10) kHz	7.4 μV	
	(10 to 30) kHz	7.5 μV	
	(30 to 100) kHz	50 μV	
	(100 to 300) kHz	0.23 mV	
	300 kHz to 1 MHz	0.38 mV	
	100 mV		
	1 Hz to 2 kHz	5 μV	
	(2 to 10) kHz	18 μV	
	(10 to 30) kHz	23 μV	
	(30 to 100) kHz	0.12 mV	
	(100 to 300) kHz	0.52 mV	
	300 kHz to 1 MHz	1.9 mV	

**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Measure <sup>1,2</sup>	1 V		In-house calibration Procedure AEES-CAL-ELE-10; Fluke 8558A 8.5 Digit Multimeter
	1 Hz to 2 kHz	71 $\mu$ V	
	(2 to 10) kHz	0.22 mV	
	(10 to 30) kHz	0.43 mV	
	(30 to 100) kHz	1.2 mV	
	(100 to 300) kHz	5.2 mV	
	300 kHz to 1 MHz	19 mV	
	10 V		
	1 Hz to 2 kHz	1.9 mV	
	(2 to 10) kHz	2.2 mV	
	(10 to 30) kHz	4.3 mV	
	(30 to 100) kHz	12 mV	
	(100 to 300) kHz	52 mV	
	100 V		
	1 Hz to 2 kHz	17 mV	
(2 to 10) kHz	23 mV		
(10 to 30) kHz	43 mV		
(30 to 100) kHz	0.13 V		
(100 to 300) kHz	0.59 V		
1 000 V			
1 Hz to 2 kHz	54 mV		
(2 to 10) kHz	0.27 V		
(10 to 30) kHz	0.56 V		
DC Current – Measure <sup>1,2</sup>	Up to 10 $\mu$ A	1.5 nA	In-house calibration Procedure AEES-CAL-ELE-11; Fluke 8558A 8.5 Digit Multimeter
	(10 to 100) $\mu$ A	4.6 nA	
	100 $\mu$ A up to 1 mA	43 nA	
	(1 to 10) mA	0.44 $\mu$ A	
	(10 to 100) mA	4.4 $\mu$ A	
(0.1 to 2) A	0.95 mA		
AC Current – Measure <sup>1,2</sup>	100 $\mu$ A		In-house calibration Procedure AEES-CAL-ELE-12; Fluke 8558A 8.5 Digit Multimeter
	1 Hz to 2 kHz	55 nA	
	(2 to 10) kHz	96 nA	
	(10 to 30) kHz	0.15 $\mu$ A	
	1 mA		
	1 Hz to 2 kHz	23 $\mu$ A	
(2 to 10) kHz	25 $\mu$ A		
(10 to 30) kHz	21 $\mu$ A		

**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Measure <sup>1,2</sup>	10 mA		In-house calibration Procedure AEES-CAL-ELE-12; Fluke 8558A 8.5 Digit Multimeter
	1 Hz to 2 kHz	5.4 $\mu$ A	
	(2 to 10) kHz	9.9 $\mu$ A	
	(10 to 30) kHz	13 $\mu$ A	
	100 mA		
	1 Hz to 2 kHz	54 $\mu$ A	
	(2 to 10) kHz	96 $\mu$ A	
	(10 to 30) kHz	0.12 mA	
	2 A		
1 Hz to 2 kHz	0.62 mA		
(2 to 10) kHz	35 mA		
(10 to 30) kHz	28 mA		
DC Resistance – Measure <sup>1,2</sup>	Up to 2 $\Omega$	68 $\mu\Omega$	In-house calibration Procedure AEES-CAL-ELE-13; Fluke 8558A 8.5 Digit Multimeter
	(2 to 10) $\Omega$	0.45 m $\Omega$	
	(10 to 100) $\Omega$	4.4 m $\Omega$	
	(0.1 to 1) k $\Omega$	35 m $\Omega$	
	(1 to 10) k $\Omega$	0.35 $\Omega$	
	(10 to 100) k $\Omega$	3.6 $\Omega$	
	(0.1 to 1) M $\Omega$	41 $\Omega$	
	(1 to 10) M $\Omega$	1 k $\Omega$	
(10 to 100) M $\Omega$	35 k $\Omega$		
DC Clamp-on Meters <sup>1,2</sup>	(10 to 100) A	0.8 % of reading	In-house calibration Procedure AEES-CAL-ELE-07; Fluke 5522A Multiproduct Calibrator with Coil 5500A
	(100 to 1 000) A	0.6 % of reading	
AC Clamp-on Meters <sup>1,2</sup>	(45 to 65) Hz		In-house calibration Procedure AEES-CAL-ELE-07; Fluke 5522A Multiproduct Calibrator, Fluke 5500-COIL 50-turn Coil
	(10 to 100) A	0.8 % of reading	
	(100 to 1 000) A	0.6 % of reading	



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Oscilloscopes <sup>1,2</sup> Voltage Amplitude – Square Wave into 1 M $\Omega$  Time Markers into 50 $\Omega$ load	10 Hz to 10 kHz (1 to 25) mVp-p (25 to 110) mVp-p 110 mV to 2.2 Vp-p (2.2 to 11) Vp-p (11 to 130) Vp-p  5 ns 10 ns 50 ns 100 ns 10 $\mu$ s 100 $\mu$ s 10 ms 100 ms 1 s 5 s	39 $\mu$ V 0.12 mV 0.42 mV 10 mV 100 mV  7.6 ps 8.2 ps 8.2 ps 82 ps 5.8 ns 58 ns 8.2 $\mu$ s 59 $\mu$ s 1.1 ms 19 ms	In-house calibration Procedure AEES-CAL-ELE-08; Fluke 5522A/SC600 Multiproduct Calibrator
DC Power Meter – Generate <sup>1,2</sup>	(1 to 1 000) V 1 mA to 20 A 10 W to 1 kW	0.5 % of reading	In-house calibration Procedure AEES-CAL-ELE-14; Fluke 5522A Multiproduct Calibrator
DC Power Meter – Generate <sup>1,2</sup>	(1 to 1 000) V 50 mA to 1 000 A 1 kW to 1 MW	0.8 % of reading	In-house calibration Procedure AEES-CAL-ELE-14; Fluke 5522A Multiproduct Calibrator, Fluke 5500-COIL 50-turn Coil
AC Power – Generate <sup>1,2</sup>	(1 to 1 000) V 1 mA to 20 A (45 to 65) Hz 10 W to 1 kW	0.9 % of reading	In-house calibration Procedure AEES-CAL-ELE-14; Fluke 5522A Multiproduct Calibrator



**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Power – Generate <sup>1,2</sup>	(1 to 1 000) V 50 mA to 1 000 A (45 to 65) Hz 1 kW to 1 MW	0.6 % of reading	In-house calibration Procedure AEES-CAL-ELE-14; Fluke 5522A Multiproduct Calibrator, Fluke 5500-COIL 50-turn Coil
Insulation Resistance Tester <sup>1,2</sup>	(10 to 40) kΩ (40 to 100) kΩ (100 to 200) kΩ (200 to 1 000) kΩ (1 to 10) MΩ (10 to 1 000) MΩ	0.58 kΩ 0.59 kΩ 0.6 kΩ 1.4 kΩ 20 kΩ 400 kΩ	In-house calibration Procedure AEES-CAL-ELE-15; Fluke 5320A Multifunction Calibrator
Earth/Ground Testers <sup>1,2</sup> (Fixed)	25 mΩ 50 mΩ 100 mΩ 330 mΩ 500 mΩ 1 Ω 1.8 Ω 5 Ω 10 Ω 18 Ω 50 Ω 100 Ω 180 Ω 500 Ω 1 kΩ 1.8 kΩ	3.9 mΩ 3.9 mΩ 7 mΩ 8 mΩ 8.5 mΩ 9.7 mΩ 15. mΩ 25 mΩ 47 mΩ 97 mΩ 0.24 Ω 0.4 Ω 1 Ω 2 Ω 4 Ω 8 Ω	In-house calibration Procedure AEES-CAL-ELE-16; Fluke 5320A Multifunction Calibrator with Ground Bond Resistance
Earth/Ground Testers <sup>1,2</sup> (Variable)	(0.1 to 5) Ω (5 to 30) Ω (30 to 200) Ω (200 to 500) Ω (0.5 to 2) kΩ (2 to 5) kΩ (5 to 10) kΩ	19 mΩ 90 mΩ 0.32 Ω 0.86 Ω 3.2 Ω 8.5 Ω 18 Ω	In-house calibration Procedure AEES-CAL-ELE-16; Fluke 5320A Multifunction Calibrator (Low Resistance mode)
Leakage Current Testers <sup>1,2</sup>	(0.1 to 1.5) mA (> 1.5 to 30) mA	7.9 μA 83 μA	In-house calibration Procedure AEES-CAL-ELE-17; Fluke 5320A Multifunction Calibrator

**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
RCD Trip Current Testers <sup>1,2</sup>	(1 to 10) mA (10 to 100) mA (0.1 to 0.6) A (0.6 to 3) A	79 $\mu$ A 0.78 mA 4.9 mA 7.8 mA	In-house calibration Procedure AEES-CAL-ELE-18; Fluke 5320A Multifunction Calibrator

**Length – Dimensional Metrology**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Dial Indicators	Up to 1 in (> 1 to 2) in	0.000 9 in 0.001 3 in	In-house calibration Procedure AEES-CAL- DIM-01; Gage Blocks
Micrometer	Up to 1 in	58 $\mu$ in	In-house calibration Procedure AEES-CAL- DIM-02; Gage Blocks
Calipers	Up to 10 in	0.000 4 in	In-house calibration Procedure AEES-CAL- DIM-03; Gage Blocks
Length	(2 to 10) in	0.001 in	In-house calibration Procedure AEES-CAL- DIM-04; Gage Blocks

**Mass and Mass Related**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Pneumatic Vacuum Gauges <sup>1</sup>	(-12 to 0) psiv	0.05 psi	In-house calibration Procedure AEES/CAL /PRS/01; Portable Pressure Calibrator

**Mass and Mass Related**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Pneumatic Pressure Gauges <sup>1</sup>	(0 to 300) psig	0.09 psi	In-house calibration Procedure AEES/CAL /PRS/02; Portable Pressure Calibrator
Hydraulic Pressure Gauges <sup>1</sup>	(0 to 1 000) psig	0.12 psi	In-house calibration Procedure AEES/CAL /PRS/02; Fluke 2700G-G20M Reference Pressure Gauge
Hydraulic Pressure Gauges <sup>1</sup>	(1 000 to 3 000) psig	0.48 psi	Comparison to Fluke 2700G-G20M Reference Pressure Gauge
Hydraulic Pressure Gauges <sup>1</sup>	(3 000 to 10 000) psig	2.8 psi	Comparison to Fluke 2700G-G70M Reference Pressure Gauge
Torque Wrenches <sup>1</sup> (CW & CCW)	(5 to 50) N·m (35 to 350) N·m (200 to 2 000) N·m	1.6 % of reading 1.9 % of reading 1.8 % of reading	In-house calibration Procedure AEES-CAL-TOR-01; Torque Tester

**Thermodynamic**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Temperature Sensor with Indicator <sup>1</sup>	(-30 to 125) °C	0.17 °C	In-house calibration Procedure AEES-CAL-TMP-01; Fluke 5628 PRT, Fluke 1524 Temperature Indicator, Fluke 7103 Micro-Bath

**Thermodynamic**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Temperature Sensor with Indicator <sup>1</sup>	(50 to 600) °C	0.64 °C	In-house calibration Procedure AEES-CAL-TMP-01; Fluke 5628 PRT, Fluke 1524 Temperature Indicator, Fluke 9144 Field Metrology Well
Temperature Drywell/Block <sup>1</sup>	(-30 to 100) °C (100 to 200) °C (200 to 660) °C	0.15 °C 0.29 °C 0.54 °C	In-house calibration Procedure AEES-CAL-TMP-03; Fluke 5628 Platinum Resistance Thermometer, Fluke 1524 Reference Thermometer Readout
Calibration of Liquid Bath <sup>1</sup>	(-30 to 250) °C	0.08 °C	In-house calibration Procedure AEES-CAL-TMP-06; Fluke 5628 Platinum Resistance Thermometer, Fluke 1524 Reference Thermometer Readout
Temp/Humidity Measuring System <sup>1</sup> Temperature Humidity	(5 to 50) °C (20 to 90) %RH	0.5 °C 1.9 %RH	In-house calibration Procedure AEES-CAL-TMP-02; Fluke 5128A RHapid-Cal® Humidity Generator
Liquid-in-Glass Thermometers <sup>1</sup>	((-30 to 150) °C	0.39 °C	In-house calibration Procedure AEES-CAL-TMP-08; PRT, Indicator, Fluke 7103 Micro-bath

**Thermodynamic**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Infrared Thermometers <sup>1</sup>	(-15 to 120) °C (120 to 300) °C (300 to 500) °C	1 °C 1.4 °C 2 °C	In-house calibration Procedure AEES-CAL-TMP-04; Fluke 4180 Infrared calibrator; Fluke 4181 Infrared calibrator
System Accuracy Tests <sup>1</sup> (Controllers, Ovens, Furnaces, Freezers, Refrigerators, Incubators, Autoclaves, Stability Chambers, Water Baths)	(-25 to 140) °C	0.2 °C	In-house calibration Procedure AEES-CAL-TMP-07; Set of Data Loggers DKD-R 5-7
Thermal Mapping <sup>1</sup> (Ovens, Furnaces, Freezers, Refrigerators, Incubators, Autoclaves, Environmental Chambers, Storage Areas)	(-25 to 140) °C	0.4 °C	IEC 60068-3-5, IEC 60068-3-11; WHO Standards, Set of Data Loggers
Temperature Probe, Monitor, and Data Logger <sup>1</sup>	(5 to 50) °C	0.3 °C	In-house calibration Procedure AEES-CAL-TMP-02; Fluke 5628 Platinum Resistance Thermometer, Fluke 1524 Reference Thermometer Readout
Data Logger, Digital or Analog Thermometer, RTD, Thermistor, Digital or Mechanical Temperature Sensor, Bimetallic Thermometer <sup>1</sup>	(-20 to 140) °C (50 to 140) °C	0.08 °C 0.8 °C	In-house calibration Procedure AEES-CAL-TMP-05; PRT, Indicator, Fluke 7103 Oil Bath, Fluke 9144 Metrology Well

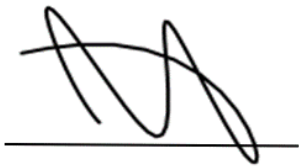
**Time and Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency Measuring Equipment <sup>1,2</sup>	10 Hz to 1 kHz (1 to 10) kHz (10 to 100) kHz 100 kHz to 1 MHz (1 to 100) MHz	0.1 Hz 0.85 Hz 1.2 Hz 0.58 kHz 5.8 kHz	In-house calibration Procedure AEES-CAL-FR-02; Fluke 5522A/SC600 Multiproduct Calibrator
Frequency – Measure <sup>1,2</sup>	10 Hz to 1 kHz (1 to 10) kHz (10 to 100) kHz 100 kHz to 1 MHz (1 to 100) MHz	0.1 Hz 0.85 Hz 1.2 Hz 0.58 kHz 5.8 kHz	In-house calibration Procedure AEES-CAL-FR-03; Fluke 8558A 8.5 Digit Multimeter
Stopwatches, Timers <sup>1</sup>	(1 to 86 400) s	0.2 s	In-house calibration Procedure AEES-CAL-FR-01; Digital Stopwatch
Optical Rotational Speed Measuring Equipment <sup>1,5</sup>	Up to 600 rpm (> 600 to 6 000) rpm (> 6 000 to 48 000) rpm (48 000 to 96 000) rpm	0.08 rpm 0.83 rpm 4.8 rpm 56 rpm	In-house calibration Procedure AEES-CAL-FR-03; Fluke 5522A Multiproduct Calibrator, LED
Rotational Speed – Measure <sup>1,5</sup> (Optical)	Up to 500 rpm (> 500 to 5 000) rpm (> 5 000 to 10 000) rpm (> 10 000 to 90 000) rpm	3.2 rpm 12.2 rpm 56.1 rpm 405 rpm	In-house calibration Procedure AEES-CAL-FR-05; Standard Tachometer

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. Both manual and automatic calibration processes are available.
3. Arab Engineers for Calibration Laboratory is the legal entity for Arab Engineers for Engineering Services Co.
4. The values presented here are nominal. The actual values will be recorded at the time of calibration, with the appropriate measurement uncertainty.
5. rpm = revolutions per minute.
6. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-3214.



Jason Stine, Vice President