Schedule of Accreditation

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

UKAS CALIBRATION **30612** **Accredited to ISO/IEC 17025:2017**	**AstraZeneca UK Limited** **Issue No:** 002 **Issue date:** 22 January 2026	
	1 Francis Crick Avenue **Cambridge Biomedical Campus** **Cambridge** **CB2 0AA**	**Contact: Mr Carl Halliwell** **Tel: +44(0) 1625 510350** **E-Mail: Carl.halliwel@astrazeneca.com**

Calibration performed by the Organisation at the location specified below

Laboratory locations:

Location details		Activity	Location code
Address B5 Gawsworth AstraZeneca Macclesfield Cheshire SK10 2NA	**Local contact** Mr Carl Halliwell Tel: +44(0) 01625 510350 Email: Carl.halliwel@astrazeneca.com	Electrical / Pressure / Temperature Humidity / Mass / Dimensional / Vacuum	Lab

Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
ELECTRICAL			
Electrical measurement and sourcing capabilities listed below follow the method of direct comparison against laboratory references or established ratio technique unless otherwise stated in the remarks column. This includes Time, Frequency and Temperature Simulation.			
DC Voltage	0 mV to 200 mV	4.7 µV/V + 0.84 µV	
	200 mV to 2 V	3.3 µV/V + 0.43 µV	
	2 V to 20 V	3.3 µV/V + 11.2 µV	
	20 V to 200 V	3.3 µV/V + 11.2 µV	
	200 V to 1 kV	3.3 µV/V + 11.2 µV	
DC Resistance	10 Ω	1.58 µΩ/Ω + 0.0012 mΩ	
	25 Ω	0.58 µΩ/Ω + 0.12 mΩ	
	100 Ω	0.58 µΩ/Ω + 0.23 mΩ	
	400 Ω	0.59 µΩ/Ω + 3.46 mΩ	
	0 Ω to 2 Ω	13 µΩ/Ω	
	2 Ω to 20 Ω	6 µΩ/Ω	
	20 Ω to 200 Ω	5.5 µΩ/Ω	
	200 Ω to 2 kΩ	5.3 µΩ/Ω	
	2 kΩ to 10 kΩ	5.2 µΩ/Ω	
	10 kΩ to 200 kΩ	7.9 µΩ/Ω + 1 Ω	
	200 kΩ to 2 MΩ	8.8 µΩ/Ω + 3 Ω	
	2 MΩ to 20 MΩ	15.2 µΩ/Ω + 100 Ω	
	20 MΩ to 100 MΩ	60 µΩ/Ω + 15 kΩ	
DC Current			
	0 µA to 10 µA	24 µA/A + 0.006 µA	
	10 µA to 200 µA	8.3 µA/A + 0.005 µA	
	200 µA to 2 mA	7.7 µA/A + 0.03 µA	
	2 mA to 20 mA	9 µA/A + 0.1 µA	
	20 mA to 200 mA	33 µA/A + 2 µA	
	200 mA to 2 A	170 µA/A + 35 µA	
	2 A to 20 A	174 µA/A + 600 µA	
AC Voltage	0 mV to 10 mV		
	1Hz to 2 kHz	255 µV/V + 23 µV	
	2 kHz to 10 kHz	334 µV/V + 23 µV	
	10 kHz to 30kHz	344 µV/V + 23 µV	
	30 kHz to 100 kHz	0.3 % + 30 µV	
	100 kHz to 300 kHz	1.0 % + 30 µV	
	300 kHz to 1 MHz	2.0 % + 118 µV	
	10 mV to 200 mV		
	1 Hz to 100 Hz	85 µV/V + 24 µV	
	100 Hz to 2 kHz	105 µV/V + 6 µV	
	2 kHz to 10 kHz	105 µV/V + 9 µV	
	10 kHz to 30 kHz	305 µV/V + 10 µV	
	30 kHz to 100 kHz	512 µV/V + 38 µV	
	200 mV to 2 V		
	1 Hz to 100 Hz	81 µV/V + 125 µV	
	100 Hz to 2 KHz	65 µV/V + 30 µV	
	2 kHz to 10 kHz	85 µV/V + 30 µV	
	10 kHz to 30 kHz	205 µV/V + 60 µV	
	30 kHz to 100 kHz	505 µV/V + 213 µV	
	100 kHz to 300 kHz	0.2 % + 1.2 mV	
	300 kHz to 1 MHz	1 % + 5.9 mV	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
AC Voltage (continued)	2 V to 20 V		
	1 Hz to 100 Hz	81 µV/V + 689 µV	
	100 Hz to 2 kHz	65 µV/V + 240 µV	
	2 kHkz to 10 kHz	85 µV/V + 350 µV	
	10 kHz to 30 kHz	205 µV/V + 2 mV	
	30 kHz to 100 kHz	235 µV /V + 1.5 mV	
	100 kHz to 300 kHz	0.2 % + 12.1 mV	
	300 kHz to 1 MHz	1.0 % + 59 mV	
	20 V to 200 V		
	1 Hz to 100 Hz	86 µV/V +4.3 mV	
	100 Hz to 2 kHz	65 µV/V + 3,5 mV	
	2 kHz to 10 kHz	85 µV/V + 3.5 mV	
	10 kHz to 30 kHz	205 µV/V + 13 mV	
	30kHz to 100kHz	513 µV/V + 31.8 mV	
	200 V to 1000 V		
	1 Hz to 40 Hz	103 µV/V + 60 mV	
	40 Hz to 10 kHz	95 µV/V + 30 mV	
	10 kHz to 30 kHz	205 µV/V + 50 mV	
AC Current	0 µA to 20 µA		
	1 Hz to 2 kHz	0.2 % + 0.0 3 µA	
	2 kHz to 10 kHz	0.2 % + 0.03 µA	
	20 µA to 200 µA		
	1 Hz to 2 kHz	260 µA/A + 0.05 µA	
	2 kHz to 10 kHz	510 µA/A + 0.05 µA	
	200 µA to 2 mA		
	1 Hz to 2 kHz	260 µA/A + 0.5 µA	
	2 kHz to 10 kHz	510 µA/A + 0.5 µA	
	2 mA to 20 mA		
	1 Hz to 2 kHz	260 µA/A + 2 µA	
	2 kHz to 10kHz	510 µA/A + 3 µA	
	20 mA to 200 mA		
	40 Hz to 100 Hz	250 µA/A + 4 µA	
	100 Hz to 2 kHz	250 µA/A + 4 µA	
	2 kHz to 10 kHz	600 µA/A + 6 µA	
	200 mA to 2 A		
	1 Hz to 2 kHz	260 µA/A + 189 µA	
	2 kHz to 10 kHz	510 µA/A + 316 µA	
	2 A to 20 A		
	1 Hz to 2 kHz	800 µA/A + 3 mA	
	2 kHz to 10 kHz	800 µA/A + 4.7 mA	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
CALIBRATION OF 16TH/17TH EDITION TEST EQUIPMENT 5322A system			Using a dedicated calibrator that covers all relevant functions.
DC Voltage	0.3 V to 3 V 3 V to 30 V 30 V to 150 V 150 V to 600 V	0.4 % + 0.0043 V 0.24 % + 0.0043 V 0.078 % + 0.065 V 0.078 % + 0.62 V	
AC Voltage	0.3 V to 3 V 3 V to 30 V 30 V to 100 V 100 V to 300 V 300 V to 600 V	0.24 % + 0.0043 V 0.078 % + 0.010 V 0.078 % + 0.14 V 0.078 % + 0.32 V 0.078 % + 0.66 V	
Frequency	40 Hz to 400 Hz	0.052 % + 0.16 Hz	
Low Resistance	0.1 Ω to 0.199 Ω 0.2 Ω to 0.499 Ω 0.5 Ω to 1.999 Ω 2 Ω to 4.99 Ω 5 Ω to 29.9 Ω 30 Ω to 199.9 Ω 200 Ω to 499 Ω 500 Ω to 1.999 kΩ 2 kΩ to 4.99 kΩ 5 kΩ to 10 kΩ	1.0 % + 0.050 Ω 0.83 % + 0.050Ω 0.46 % + 0.050 Ω 0.28 % + 0.060 Ω 0.16 % + 0.050 Ω 0.16 % + 0.14 Ω 0.16 % + 1.2 Ω 0.16 % + 1.6 Ω 0.16 % + 12 Ω 0.16 % + 12 Ω	
Low Resistance Test Current	50 mA 120 mA 200 mA 400 mA	10 % + 3 mA 8.5 % + 3.2 mA 20 % + 3.7 mA 10 % + 4.3 mA	
High Reistance	10 kΩ to 19.9 kΩ 20 kΩ to 39.99 kΩ 40 kΩ to 99.99 kΩ 100 kΩ to 199.99 kΩ 200 kΩ to 999.99 kΩ 1 MΩ to 1.999 MΩ 2 MΩ to 9.999 MΩ 10 MΩ to 19.999 MΩ 20 MΩ to 199.99 MΩ 200 MΩ to 999.9 MΩ 1 GΩ to 1.9 GΩ 2 GΩ to 10 GΩ	0.16 % + 12 Ω 0.16 % + 16 Ω 0.16 % + 42 Ω 0.16 % + 70 Ω 0.16 % + 236 Ω 0.24 % + 200 Ω 0.24 % + 3 kΩ 0.4 % + 1.7 kΩ 0.4 % + 20 kΩ 0.4 % + 653 kΩ 0.9 % + 17 MΩ 0.9 % + 60 MΩ	
High Resistance Test Voltage	100 V @ 1 MΩ 250 V @ 1 MΩ 500 V @ 1 MΩ 1000 V @ 1 MΩ	1.0 % + 4 V 0.9 % + 4 V 0.7 % + 4.3 V 0.9 % + 7 V	
Impedance	20 mΩ 50 mΩ 100 mΩ 330 mΩ 500 m Ω	3.8 % + 20 mΩ 3.9 % + 20 mΩ 2.1 % + 20 mΩ 1.5 % + 20 mΩ 1.3 % + 20 mΩ	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
Impedance (cont'd)	900 m Ω	1.3 % + 20 mΩ	
	1.7 Ω	1.5 % + 21 mΩ	
	4.7 Ω	1.2 % + 33 mΩ	
	9 Ω	1.3 % + 46 mΩ	
	17 Ω	1.3 % + 75 mΩ	
	47 Ω	1.3 % + 0.22 Ω	
	90 Ω	1.3 % + 0.38 Ω	
	170 Ω	1.3 % + 0.83 Ω	
	470 Ω	1.3 % + 2.1 Ω	
	900 Ω	1.3 % + 4.1 Ω	
	1.7 kΩ	1.3 % + 8 Ω	
RCD TRIP TIMES	10 ms to 5000 ms	0.10 % + 0.32 ms	Suitable for RCD testers
RCD Current	30 mA Range		
	0.5 x I & 1 x I	0.8 % + 0.08 mA	
	1.4 x I & 2 x I	0.8 % + 0.08 mA	
	5 x I	0.8 % + 0.08 mA	
	300 mA Range		
	0.5 x I & 1 x I	0.8 % + 0.35 mA	
	1.4 x I & 2 x I	0.8 % + 0.35 mA	
	5 x I	0.8 % + 0.35 mA	
	3 A Range		
	0.5 x I & 1 x I	0.8 % + 5.9 mA	
	1.4 x I & 2 x I	0.8 % + 5.9 mA	
	5 x I	0.8 % + 5.9 mA	
Earth Bond Resistance	20 mΩ	3.6 % + 6.8 mΩ	
	50 mΩ	3.7 % + 6.8 mΩ	
	100 mΩ	1.8 % + 6.9 mΩ	
	350 mΩ	0.94 % + 7.0 mΩ	
	500 mΩ	0.6 % + 7.6 mΩ	
	900 mΩ	0.8 % + 9.0 mΩ	
	1.7 Ω	1.0 % + 11 mΩ	
	4.7 Ω	0.2 % + 30 mΩ	
	9 Ω	0.1 % + 42 mΩ	
	17 Ω	0.1 % + 77 mΩ	
	47 Ω	0.1 % + 222 mΩ	
	90 Ω	0.1 % + 381 mΩ	
	170 Ω	0.1 % + 834 mΩ	
	470 Ω	0.1 % + 2.1 Ω	
	900 Ω	0.1 % + 4.2 Ω	
	1.7 kΩ	0.1 % + 8.0 Ω	
Leakage current	0 µA to 300 µA	0.55 % + 11.9 µA	
	300 µA to 3 mA	0.38 % + 14 µA	
	3mA to 3 mA	0.38 % + 35 µA	
Frequency	10 MHz refernence	5 in 10^8	Electronically triggered
	1 mHz to 3 GHz	1.2 in 10^6	
Timers and time interval	5 s to 24 hours	0.1 s	
Speed	0 rpm to 99999 rpm	0.12 rpm	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
DIMENSIONAL			
Micrometer	BS 870:2008 0 to 25 mm	0.002 mm	The stated uncertainty has been calculated in accordance With ISO 14253-5 and relates to the test value uncertainty.
Ancillary Measurements	Flatness Parallelism	0.002 mm 0.001 mm	
Caliper	ISO 13385-1 2019 Partial surface contact error (E) 0 to 300 mm	0.003 mm	
	Shift error (S) internal jaws 3 to 50 mm	0.003 mm	The uncertainty quoted excludes contributions relating the instrument under test
	Shift error (S) depth and step 3 to 50 mm	0.003 mm	
	Line contact error 10 mm	0.0009 mm	
	Shift error (S) – Crossed knife edge internal measuring faces 30 mm	0.0014 mm	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
MASS			
	20000 g 10000 g 5000 g 2000 g 1000 g 500 g 200 g 100 g 50 g 20 g 10 g 5 g 2 g 1 g 0.5 g 0.2 g 0.1 g 0.05 g 0.02 g 0.01 g 0.005 g 0.002 g 0.001 g	33.33 mg 16.67 mg 8.33 mg 3.33 mg 1.67 mg 0.833 mg 0.333 mg 0.166 mg 0.1 mg 0.083 mg 0.066 mg 0.053 mg 0.04 mg 0.033 mg 0.026 mg 0.02 mg 0.0107 mg 0.0133 mg 0.01 mg 0.0083 mg 0.0067 mg 0.0067 mg 0.0067 mg	Mass Comparators, E2 reference masses. Calibrations are performed using Borda's method of substitution
NON AUTOMATIC WEIGHING MACHINES See notes 1 to 3 From 1 mg to 5000 kg	200 mg 500 mg 1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g 500 g 1 kg 2 kg 5 kg 10 kg	0.015 mg 0.017 mg 0.017 mg 0.019 mg 0.024 mg 0.033 mg 0.045 mg 0.074 mg 0.15 mg 0.28 mg 0.96 mg 2.00 mg 3.88 mg 9.83 mg 19.28 mg	1. Weights are available in OIML Class: E2 from 1 mg to 10 kg, 2. Other loads within the overall listed range may also be used. 3. The method of calibration is based on EURAMET CG-18

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
PRESSURE			Methods consistent with EURAMET CG17
<u>Hydraulic pressure (gauge)</u>			
Calibration of pressure indicating instruments and gauges	0 MPa to 35 MPa 35 MPa to 70 MPa	Q [0.0065 %, 14 kPa] Q [0.0050 %, 22 kPa]	Pressure devices with an electrical output can be calibrated.
<u>Gas pressure (gauge)</u>			Absolute pressure calibrations can be undertaken using associated barometric pressure measurement correction. The uncertainties quoted will be increased by 10 Pa
Calibration of pressure indicating instruments and gauges	-100 kPa to -3.5 kPa -3.5 kPa to -2.5 kPa -2.5 kPa to -1.25 kPa -1.25 kPa to -500 Pa -500 Pa to -250 Pa -250 Pa to 250 Pa 250 Pa to 500 Pa 500 Pa to 1.25 kPa 1.25 kPa to 2.5 kPa 2.5 kPa to 3.5 kPa 3.5 kPa to 20 kPa 20 kPa to 24 kPa 24 kPa to 3.5 MPa 3.5 MPa to 7 MPa	0.0045 % Q [0.010%, 2.6 Pa] Q [0.010%, 1.2 Pa] Q [0.010%, 0.75 Pa] Q [0.010%, 0.38 Pa] Q [0.0060 %, 0.23 Pa] Q [0.010%, 0.38 Pa] Q [0.010%, 0.75 Pa] Q [0.010%, 1.2 Pa] Q [0.010%, 2.6 Pa] 0.0046 % 0.0039 % 0.0076 % Q [0.0040%, 1.7 kPa]	
<u>Gas pressure (absolute)</u>			
Calibration of pressure indicating instruments and gauges	3.5 kPa to 20 kPa 20 kPa to 700 kPa 700 kPa to 3.5 MPa	Q [0.0047 %, 0.17 Pa] Q [0.0039 %, 0.17 Pa] Q [0.0076 %, 0.17 Pa]	
Vacuum	4×10^{-4} mbar to 1×10^{-3} mbar 1×10^{-3} mbar to 1×10^{-2} mbar 1×10^{-2} mbar to 1×10^{-1} mbar 0.1 mbar to 1 mbar 1 mbar to 13 mbar 13 mbar to 100 mbar 100 mbar to 1300 mbar	1.8×10^{-4} mbar to 2.0×10^{-4} mbar 1.9×10^{-4} mbar to 3.1×10^{-4} mbar 8.4×10^{-4} mbar to 1.3×10^{-3} mbar 0.0019 mbar to 0.011 mbar 0.0054 mbar to 0.052 mbar 0.13 mbar to 0.82 mbar 0.40 mbar to 2.8 mbar	Calibration by direct comparison against indications from various reference devices

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
TEMPERATURE			
Platinum Resistance Thermometers			Calibration in fixed points
	-38.8344 °C	0.010 °C	Triple point of Mercury
	0.010 °C	0.0068 °C	Triple point of Water
	29.7646 °C	0.0072 °C	Melting point of Gallium
	156.5985 °C	0.011 °C	Melting point of Gallium
	231.928 °C	0.011 °C	Melting point of Tin
	419.527 °C	0.011 °C	Melting point of Zinc
Temperature sensors and indicators (inclusive of PRT's and thermocouples)	-80 to 230 °C	0.016 °C	In liquid baths
PRT's and indicators	-80 to -40	0.090 °C	In dry blocks
	-40 to 0	0.075 °C	
	0 to 140	0.075 °C	
	140 to 200	0.27 °C	
	200 to 300	0.35 °C	
Thermocouples and indicators	-80 to -40	0.13 °C	In dry blocks
	-40 to 0	0.090 °C	
	0 to 140	0.075 °C	
	140 to 200	0.30 °C	
	200 to 300	0.35 °C	
Base metal thermocouples (type T and type K only)	-80 to -40 °C	0.31 °C	In dry blocks
	- 40 to 0 °C	0.26 °C	
	0 to 140 °C	0.26 °C	
	140 to 200 °C	0.37 °C	
	200 to 300 °C	0.43 °C	
Dry blocks	-80 to -40 °C	0.077 °C	Method consistent with Euramet CG 13, (Axial, Radial and stability measurements of the Instrument calibrated will replace "best quality instrument" components in the uncertainty budget)
	-40 to 0 °C	0.065 °C	
	0 to 140 °C	0.045 °C	
	140 to 200 °C	0.27 °C	
	200 to 300 °C	0.35 °C	
Environmental chambers	0 to 100 °C	0.1 °C	Uncertainty may increase depending on chamber performance and gradient fluctuations
Data loggers	-20 to +60 °C	0.12 °C	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
HUMIDITY			
Calibration of hygrometers and temperature in air	Example conditions		HygroGen Chamber and Chilled Mirror Hygrometer
	5 %rh @ 23 °C	0.20 %rh	
	50 %rh @ 23 °C	0.57 %rh	
	95 %rh @ 23 °C	1.02 %rh	Humidity devices with an electrical output can be calibrated (we have the capability with our electrical equipment)
	18 %rh @ 0 °C	0.30 %rh	
	50 %rh @ 0 °C	0.80 %rh	
	95 %rh @ 0 °C	1.40 %rh	
	50 %rh @ 50 °C	0.44%rh	
	95 %rh @ 50 °C	0.88 %rh	By comparison with Platinium Resistance thermometer
	5 %rh @ 60 °C	0.20 %rh	
	50 %rh @ 60 °C	0.44 %rh	
Temperature sensors incorporated in humidity instruments	0 °C to 60 °C	0.12 °C	
	Dew Point -25 °C to 60 °C	0.13 °C	Using a chilled mirror hygrometer
Humidity controlled chambers, including associated recorders, indicators and controllers	0 to 100 °C	0.1 °C	Using a chilled mirror hygrometer
	5 %rh to 95 %rh		
	Example conditions		
	75 %rh @ 50 °C	0.89 %rh	
	30 %rh @ 60 °C	0.71 %rh	
	11 %rh @ 70 °C	0.2 %rh	
	30 %rh @ 80 °C	0.25 %rh	

END

Appendix - Calibration and Measurement Capabilities

Introduction

The definitive statement of the accreditation status of a calibration laboratory is the Accreditation Certificate and the associated Schedule of Accreditation. This Schedule of Accreditation is a critical document, as it defines the measurement capabilities, ranges and boundaries of the calibration activities for which the organisation holds accreditation.

Calibration and Measurement Capabilities (CMCs)

The capabilities provided by accredited calibration laboratories are described by the Calibration and Measurement Capability (CMC), which expresses the lowest measurement uncertainty that can be achieved during a calibration. If a particular device under calibration itself contributes significantly to the uncertainty (for example, if it has limited resolution or exhibits significant non-repeatability) then the uncertainty quoted on a calibration certificate will be increased to account for such factors.

The CMC is normally used to describe the uncertainty that appears in an accredited calibration laboratory's schedule of accreditation and is the uncertainty for which the laboratory has been accredited using the procedure that was the subject of assessment. The measurement uncertainty is calculated according to the procedures given in the GUM and is normally stated as an expanded uncertainty at a coverage probability of 95 %, which usually requires the use of a coverage factor of $k = 2$. An accredited laboratory is not permitted to quote an uncertainty that is smaller than the published measurement uncertainty in certificates issued under its accreditation.

Expression of CMCs - symbols and units

It should be noted that the percentage symbol (%) represents the number 0.01. In cases where the measurement uncertainty is stated as a percentage, this is to be interpreted as meaning percentage of the measurand.
Thus, for example, a measurement uncertainty of 1.5 % means $1.5 \times 0.01 \times q$, where q is the quantity value.

The notation Q[a, b] stands for the root-sum-square of the terms between brackets: $Q[a, b] = [a^2 + b^2]^{1/2}$