


# Schedule of Accreditation

issued by

## United Kingdom Accreditation Service

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

 <p><b>UKAS</b> CALIBRATION</p> <p>0078</p> <p>Accredited to ISO/IEC 17025:2017</p>	<h3>Absolute Calibration Limited</h3> <p>Issue No: 054    Issue date: 10 May 2021</p>	
	<p>14 Murrills Estate Portchester Hampshire PO16 9RD</p>	<p>Contact: Mr Darren Kingswell Tel: +44 (0)2392 321712 Fax: +44 (0)2392 210034 E-Mail: calit@absolute-cal.co.uk Website: www.absolute-cal.co.uk</p>
<p>Calibration performed by the Organisations at the locations specified below</p>		

### Locations covered by the organisation and their relevant activities

#### Laboratory location:

Location details	Activity	Location code
<p><b>Address</b></p> <p>14 Murrills Estate Portchester Hampshire PO16 9RD</p> <p><b>Contact</b> Mr Darren Kingswell  Tel: +44 (0) 2392 321712 Fax: +44 (0) 2392 210034 Email: calit@absolute-cal.co.uk Website: www.absolute-cal.co.uk</p>	<p><u>Calibration:</u></p> <p><a href="#">Electrical</a> <a href="#">Humidity</a> <a href="#">Pressure</a> <a href="#">Temperature</a></p>	Portchester

#### Site activities performed away from the location listed above:

Location details	Activity	Location code
<p><b>Customers' sites or premises</b></p> <p>The customers' site or premises must be suitable for the nature of the particular calibrations undertaken and will be the subject of contract review arrangements between the laboratory and the customer.</p> <p><b>Contact</b> Mr Darren Kingswell  Tel: +44 (0) 2392 321712 Fax: +44 (0) 2392 210034 Email: calit@absolute-cal.co.uk Website: www.absolute-cal.co.uk</p>	<p><u>Calibration:</u></p> <p><a href="#">Electrical</a> <a href="#">Humidity</a> <a href="#">Pressure</a> <a href="#">Temperature</a></p>	Site Calibration



0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code
<u>ELECTRICAL CALIBRATION</u>				
DC RESISTANCE Measurement, <i>Specific Values</i>	100 $\mu\Omega$ 1 m $\Omega$ 10 m $\Omega$ 100 m $\Omega$ 1 $\Omega$ 10 $\Omega$ 100 $\Omega$ 1 k $\Omega$ 10 k $\Omega$ 100 k $\Omega$ 1 M $\Omega$ 10 M $\Omega$ 100 M $\Omega$ 1 G $\Omega$	4.0 ppm 0.30 ppm 0.30 ppm 0.36 ppm 0.093 ppm 0.093 ppm 0.093 ppm 0.092 ppm 0.11 ppm 0.22 ppm 0.61 ppm 1.8 ppm 4.5 ppm 5.3 ppm	Using direct current comparator bridge. The CMCs are for 4-terminal resistors suitable for oil immersion at 20 °C. The uncertainties may be increased for other types of resistor.	Portchester
Measurement, <i>Other values</i>	80 m $\Omega$ to 800 m $\Omega$ 0.80 $\Omega$ to 107.5 $\Omega$ 107.5 $\Omega$ to 1.34 k $\Omega$ 1.34k $\Omega$ to 10.75 k $\Omega$ 10.75 k $\Omega$ to 12 k $\Omega$ 12 k $\Omega$ to 63 k $\Omega$ 63 k $\Omega$ to 134 k $\Omega$ 134 k $\Omega$ to 1.075 M $\Omega$ 1.075 M $\Omega$ to 13.4 M $\Omega$ 13.4 M $\Omega$ to 630 M $\Omega$ 630 M $\Omega$ to 1.075 G $\Omega$ 1.075 G $\Omega$ to 2 G $\Omega$ 2 G $\Omega$ to 20 G $\Omega$ 20 G $\Omega$ to 200 G $\Omega$ 200 G $\Omega$ to 2 T $\Omega$	0.36 ppm 0.093 ppm 0.092 ppm 0.11 ppm 0.17ppm 0.17 ppm 0.22 ppm 0.61 ppm 1.9 ppm 4.5 ppm 5.3 ppm 0.025% 0.062% 0.10 % 0.12 %	See note above	



0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code
DC RESISTANCE (continued) Generation, <i>Specific values</i>				Portchester
	100 M $\Omega$ , 300 M $\Omega$ , 1 G $\Omega$ 3 G $\Omega$ 10 G $\Omega$	0.30 % 0.45 % 0.35 %	Known values of resistance for application to DC resistance measuring devices.  Applied Voltage 10 V	
	30 G $\Omega$ , 100 G $\Omega$ , 300 G $\Omega$ 1 T $\Omega$ 3 T $\Omega$	0.35 % 0.70 % 0.75 %	Applied Voltage 100 V	
	100 M $\Omega$ , 300 M $\Omega$ , 1.0 G $\Omega$ 3 G $\Omega$ 10 G $\Omega$ , 30 G $\Omega$ , 100 G $\Omega$ , 300 G $\Omega$	0.30 % 0.45 % 0.35 %	Applied Voltage 500 V	
	1 T $\Omega$ 3 T $\Omega$	0.70 % 0.75 %	Applied Voltage 500 V Applied Voltage 1000 V	
AC RESISTANCE Generation	40 Hz to 1592 Hz 0.1 $\Omega$ 1 $\Omega$ 10 $\Omega$ 100 $\Omega$ 1 k $\Omega$ 10 k $\Omega$	0.030 % 10 ppm 6.0 ppm 8.0 ppm 7.0 ppm 6.0 ppm	Known AC resistance values for application to resistance measuring instruments. Measurement of suitable resistors of the same nominal values may also be undertaken but the uncertainties may be increased.	
DC VOLTAGE Standard Cell Values	1.018 V	3.5 ppm	By comparison with DC voltage reference standards. The CMCs can be realised with cells only if they have their own temperature-controlled enclosure of suitable thermal stability.	
Zener References	1.018 V 10 V	3.5 ppm 0.23 ppm		



0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code
DC VOLTAGE (continued)				<b>Portchester</b>
Specific Values	0.1 V 1 V 10 V 100 V 1 kV	0.70 ppm 0.53 ppm 0.49 ppm 0.53 ppm 0.78 ppm	By comparison with DC voltage reference standards using voltage dividers.	
Other Values	0 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100V to 1 kV 1 kV to 10 kV 10 kV to 30 kV 30 kV to 50 kV	2.5 $\mu$ V 0.45 $\mu$ V 0.44 ppm 0.50 ppm 2.5 ppm 0.034 % + 0.41 V 0.038 % + 1.0 V 0.038 % + 10 V	By comparison with DC voltage reference standards using voltage dividers where appropriate.	
DC CURRENT	1 pA to 10 pA 100 pA to 100 pA 100 pA to 1.0 nA 1 nA to 10 nA 10 nA to 1 $\mu$ A 1 $\mu$ A to 10 $\mu$ A 10 $\mu$ A to 1 A 1 A to 100 A  100 A to 1000 A	0.40 pA 0.40 pA 0.25 % + 0.4 pA 0.25 % to 0.15 % 0.15 % to 0.030 0.030 % to 0.0060 % 50 ppm 100 ppm  0.50 % to 0.70 %	For measurement of current sources or for application to current measuring instruments.  For calibration of current clamps and similar devices using multi-turn coil method.	
Specific values	100 $\mu$ A 1 mA 10 mA 100 mA	5.9 ppm 5.7 ppm 5.7 ppm 5.7 ppm	Generation of known direct currents for calibration of Wavetek 4950 Multifunction Transfer Standards	



0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code
AC VOLTAGE  Generation	<p><i>10 Hz to 31 Hz</i></p> <p>1 V to 10 V 10 V to 100 V 100 V to 1000 V</p> <p><i>31 Hz to 330 Hz</i></p> <p>0 mV to 1 mV 1 mV to 10 mV 10 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1000 V</p> <p><i>330 Hz to 10 kHz</i></p> <p>0 mV to 1 mV 1 mV to 10 mV 10 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1000 V</p> <p><i>10 kHz to 33 kHz</i></p> <p>0 mV to 1 mV 1 mV to 10 mV 10 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1000 V</p> <p><i>30 kHz to 100 kHz</i></p> <p>0 mV to 1 mV 1 mV to 10 mV 10 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 700 V</p>	<p>0.011 % + 0.35 mV 0.012 % + 6.0 mV 0.017 % + 20 mV</p> <p>0.23 % + 6.0 <math>\mu</math>V 0.035 % + 6.5 <math>\mu</math>V 0.014 % + 15 <math>\mu</math>V 0.0065 % + 35 <math>\mu</math>V 0.0063 % + 350 <math>\mu</math>V 0.0075 % + 2.3 mV 0.017 % + 25 mV</p> <p>0.23 % + 6.0 <math>\mu</math>V 0.035 % + 6.2 <math>\mu</math>V 0.015 % + 15 <math>\mu</math>V 0.0055 % + 35 <math>\mu</math>V 0.0053 % + 350 <math>\mu</math>V 0.0065 % + 1.3 mV 0.012 % + 25 mV</p> <p>0.25 % + 6.0 <math>\mu</math>V 0.050 % + 6.5 <math>\mu</math>V 0.025 % + 15 <math>\mu</math>V 0.0055 % + 35 <math>\mu</math>V 0.0053 % + 350 <math>\mu</math>V 0.0065 % + 1.3 mV 0.012 % + 25 mV</p> <p>0.26 % + 6.0 <math>\mu</math>V 0.070 % + 6.5 <math>\mu</math>V 0.052 % + 15 <math>\mu</math>V 0.011 % + 35 <math>\mu</math>V 0.011 % + 350 <math>\mu</math>V 0.016 % + 3.5 mV 0.012 % + 50 mV</p>	Derived by means of AC/DC transfer techniques.	Portchester



0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code
AC VOLTAGE (continued)  Generation (continued)	100 kHz to 330 kHz			
	0 mV to 1 mV	0.30 % + 6.0 $\mu$ V		
	1 mV to 10 mV	0.080 % + 7.0 $\mu$ V		
	10 mV to 100 mV	0.065 % + 200 $\mu$ V		
	100 mV to 1 V	0.035 % + 35 $\mu$ V		
	1 V to 10 V	0.031 % + 350 $\mu$ V		
	300 kHz to 1 MHz			
	1 V to 10 V	0.18 % + 5.0 mV		
Measurement	220 $\mu$ V to 2.2 mV		Derived by means of AC/DC transfer techniques.	
	10 Hz to 20 Hz	620 ppm + 1.6 $\mu$ V		Portchester
	20 Hz to 40 Hz	620 ppm + 1.6 $\mu$ V		
	40 Hz to 20 kHz	610 ppm + 1.6 $\mu$ V		
	20 kHz to 50 kHz	620 ppm + 2.4 $\mu$ V		
	50 kHz to 100 kHz	630 ppm + 3.0 $\mu$ V		
	100 kHz to 300 kHz	760 ppm + 4.9 $\mu$ V		
	300 kHz to 500 kHz	0.15 % + 9.9 $\mu$ V		
	500 kHz to 1 MHz	0.51 % + 11 $\mu$ V		
	2.2 mV to 7 mV			
	10 Hz to 20 Hz	260 ppm + 1.6 $\mu$ V		
	20 Hz to 40 Hz	210 ppm + 1.6 $\mu$ V		
	40 Hz to 20 kHz	190 ppm + 1.6 $\mu$ V		
	20 kHz to 50 kHz	190 ppm + 2.4 $\mu$ V		
	50 kHz to 100 kHz	210 ppm + 3.0 $\mu$ V		
	100 kHz to 300 kHz	360 ppm + 4.9 $\mu$ V		
	300 kHz to 500 kHz	890 ppm + 9.9 $\mu$ V		
	500 kHz to 1 MHz	0.39 % + 11 $\mu$ V		
	7 mV to 22 mV			
	10 Hz to 20 Hz	120 ppm + 1.6 $\mu$ V		
	20 Hz to 40 Hz	95 ppm + 1.6 $\mu$ V		
	40 Hz to 20 kHz	93 ppm + 1.6 $\mu$ V		
	20 kHz to 50 kHz	100 ppm + 2.4 $\mu$ V		
	50 kHz to 100 kHz	110 ppm + 3.0 $\mu$ V		
	100 kHz to 300 kHz	200 ppm + 4.9 $\mu$ V		
	300 kHz to 500 kHz	710 ppm + 9.9 $\mu$ V		
	500 kHz to 1 MHz	0.29 % + 11 $\mu$ V		



0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code
AC VOLTAGE (continued) Measurement (continued)	22 mV to 70 mV  10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz  70 mV to 220 mV  10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz  200 mV to 700 mV  10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz  700 mV to 2.2 V  10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz	88 ppm + 1.7 $\mu$ V 57 ppm + 1.7 $\mu$ V 40 ppm + 1.7 $\mu$ V 64 ppm + 2.3 $\mu$ V 84 ppm + 2.9 $\mu$ V 200 ppm + 4.6 $\mu$ V 380 ppm + 9.2 $\mu$ V 0.14 % + 9.2 $\mu$ V  77 ppm + 1.7 $\mu$ V 46 ppm + 1.7 $\mu$ V 40 ppm + 1.7 $\mu$ V 42 ppm + 2.3 $\mu$ V 73 ppm + 2.9 $\mu$ V 200 ppm + 4.6 $\mu$ V 360 ppm + 9.2 $\mu$ V 0.14 % + 9.2 $\mu$ V  75 ppm + 1.7 $\mu$ V 44 ppm + 1.7 $\mu$ V 40 ppm + 1.7 $\mu$ V 40 ppm + 2.3 $\mu$ V 71 ppm + 2.9 $\mu$ V 200 ppm + 4.6 $\mu$ V 360 ppm + 9.2 $\mu$ V 0.14 % + 9.2 $\mu$ V  74 ppm 43 ppm 34 ppm 41 ppm 68 ppm 190 ppm 330 ppm 0.14 %		Portchester



0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code
AC VOLTAGE (continued) Measurement (continued)	2 V to 7 V  10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz  7 V to 22 V  10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz  20 V to 70 V  10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz  70 V to 220 V  10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz	74 ppm 44 ppm 33 ppm 42 ppm 86 ppm 210 ppm 530 ppm 0.17 %  74 ppm 45 ppm 33 ppm 42 ppm 81 ppm 210 ppm 530 ppm 0.17 %  74 ppm 47 ppm 41 ppm 47 ppm 100 ppm 210 ppm 570 ppm 0.17 %  75 ppm 48 ppm 41 ppm 58 ppm 100 ppm 340 ppm 0.10 %		Portchester





0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code					
AC VOLTAGE (continued) Measurement (continued)	200 V to 700 V  10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz  700 V to 1000 V  10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz	79 ppm 50 ppm 39 ppm 160 ppm 980 ppm  78 ppm 50 ppm 39 ppm 160 ppm 980 ppm	Using voltage divider.	Portchester					
Specific values (measurement)	1 kV to 8 kV 50 Hz	0.50 %							
CMCs for specific values of voltage at the frequencies shown, in ppm of value ( $k = 2$ )									
Voltage	10 Hz	20 Hz	40 Hz, 500 Hz, 1 kHz, 10 kHz and 20 kHz	50 kHz	100 kHz	200 kHz	500 kHz	1 MHz	
60 mV	150	85	76	76	78	160	180	680	
100 mV	120	63	41	38	50	140	140	690	
200 mV	120	63	41	38	50	140	140	690	
600 mV	120	52	29	30	42	140	160	690	
1 V	120	43	16	27	33	120	170	800	
2 V	120	43	16	27	33	120	170	800	
6 V	120	44	18	25	35	83	200	780	
10 V	120	44	21	26	33	83	200	780	
20 V	120	44	21	26	33	83	200	780	
60 V	120	46	37	36	69	110	300	790	
100 V	130	46	37	42	65	120	470		
200 V	130	46	37	42	65	120	470		
600 V	130	78	37	88	820				
1000 V	130	78	48	91	820				



0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code
AC CURRENT Generation	<p><i>10 Hz to 1 kHz</i></p> <p>10 <math>\mu</math>A to 100 <math>\mu</math>A 100 <math>\mu</math>A to 1 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 10 A</p> <p><i>1 kHz to 5 kHz</i></p> <p>10 <math>\mu</math>A to 100 <math>\mu</math>A 100 <math>\mu</math>A to 1 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 10 A</p> <p><i>5 kHz to 10 kHz</i></p> <p>1 A to 10 A</p> <p><i>10 kHz to 20 kHz</i></p> <p>1 A to 10 A</p> <p><i>30 Hz to 400 Hz</i></p> <p>10 A to 1000 A</p>	<p>0.030 % + 15 nA 0.025 % + 120 nA 0.020 % + 1.2 <math>\mu</math>A 0.015 % + 12 <math>\mu</math>A 0.040 % + 120 <math>\mu</math>A 0.060 % + 1.5 mA</p> <p>0.040 % + 30 nA 0.025 % + 120 nA 0.025 % + 1.2 <math>\mu</math>A 0.025 % + 12 <math>\mu</math>A 0.055 % + 160 <math>\mu</math>A 0.11 % + 1.9 mA</p> <p>0.26 % + 7.0 mA</p> <p>0.85 % + 20 mA</p> <p>0.20 % to 0.70 %</p>	<p>Known values of AC current for application to current measuring instruments.</p> <p>For calibration of current clamps and similar devices using multi-turn coil method.</p>	Porchester
Measurement	<p><i>45 Hz to 100 Hz</i></p> <p>0 <math>\mu</math>A to 100 <math>\mu</math>A 100 <math>\mu</math>A to 1 mA 1 mA to 5 mA</p> <p><i>100 Hz to 1 kHz</i></p> <p>0 <math>\mu</math>A to 100 <math>\mu</math>A 100 <math>\mu</math>A to 1 mA</p> <p><i>1 kHz to 5 kHz</i></p> <p>0 mA to 1 mA 1 mA to 5 mA</p> <p><i>40 Hz to 10 kHz</i></p> <p>5 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 3 A 3 A to 10 A 10 A to 20 A</p>	<p>0.070 % + 25 nA 0.070 % + 0.30 <math>\mu</math>A 0.070 % + 2.5 <math>\mu</math>A</p> <p>0.070 % + 35 nA 0.030 % + 0.30 <math>\mu</math>A</p> <p>0.030 % + 0.30 <math>\mu</math>A 0.030 % + 3.0 <math>\mu</math>A</p> <p>34 ppm + 0.12 <math>\mu</math>A 34 ppm + 0.23 <math>\mu</math>A 38 ppm + 2 <math>\mu</math>A 43 ppm + 20 <math>\mu</math>A 72 ppm + 20 <math>\mu</math>A 76 ppm + 0.2 mA</p>		



0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code
INDUCTANCE				
Specific Values - Generation	1 kHz		Known values of inductance for application to inductance measuring instruments.	
	1 μH	1.2 nH		
	3 μH	3.6 nH		
	5 μH	4.2 nH		
	10 μH	8.0 nH		
	30 μH	3.8 nH		
	100 μH	12 nH		
	300 μH	28 nH		
	1 mH	80 nH		
	3 mH	27 nH		
	10 mH	0.70 μH		
	30 mH	3.4 μH		
	100 mH	8.4 μH		
	400 mH	30 μH		
	1 H	85 μH		
Specific Values - Measurement	1 kHz		Using inductance bridge.	Portchester
	1 μH	3.0 nH		
	3 μH	5.0 nH		
	5 μH	6.0 nH		
	10 μH	9.0 nH		
	30 μH	0.014 %		
	100 μH	0.014 %		
	300 μH	0.010 %		
	1 mH	0.010 %		
	3 mH	0.010 %		
	10 mH	0.010 %		
	30 mH	0.014 %		
	100 mH	0.010 %		
	400 mH	0.010 %		
	1 H	0.010 %		
Other Values				
Measurement	1 kHz		Using inductance bridge.	
	1 μH to 10 μH	0.30 %		
	10 μH to 100 μH	0.10 %		
	100 μH to 1 mH	0.020 %		
	1 mH to 10 mH	0.015 %		
	10 mH to 100 mH	0.015 %		
	100 mH to 1 H	0.015 %		
	1 H to 10 H	0.12 %		



0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code
<b>CAPACITANCE</b>				<b>Portchester</b>
Specific Values				
Generation	1 kHz		Known values of capacitance for application to capacitance measuring instruments.	
	10 pF	4.0 ppm		
	100 pF	4.0 ppm		
	1 nF	4.0 ppm		
	10 nF	41 ppm		
	100 nF	41 ppm		
	1 μF	63 ppm		
	100 μF	0.050 %		
Measurement	1 kHz			
	10 pF	9.5 ppm		
	100 pF	7.7 ppm		
	1 nF	7.4 ppm		
	10 nF	41 ppm		
	100 nF	41 ppm		
	1 μF	63 ppm		
	100 μF	0.050 %		
Other Values	1 kHz and 1592 Hz			
	1 pF to 10 μF	0.010 %		
	10 μF to 100 μF	0.050 %		
<b>FREQUENCY</b>				
Specific Values	1 MHz and 10 MHz	2.6 in 10 <sup>12</sup>	Using off-air reference.	
Other Values	0.001 Hz to 0.01 Hz 0.01 Hz to 10 Hz 10 Hz to 100 MHz 100 MHz to 18 GHz	12 in 10 <sup>7</sup> + 1 count 12 in 10 <sup>8</sup> + 1 count 12 in 10 <sup>9</sup> + 1 count 4.0 in 10 <sup>9</sup> + 1 count	Using frequency counter.	
<b>TIME INTERVAL</b>				
	1 μs to 10 ms 10 ms to 100 ms 0.1 s to 1 s 1 s to 10 s 10 s to 100 s 100 s to 1000 s 1000 s to 10 000 s 10 000 s to 100 000 s	10 ns 30 ns 200 ns 2.0 μs 20 μs 200 μs 2.0 ms 20 ms	Using time interval averaging	
Timers and time interval	5 s to 24 hours	50 ms	Stopwatch Calibration	
<b>TRANSITION TIME</b> (pulse waveforms)	0 ns to 20 ns 20 ns to 200 ns 200 ns to 2 μs	5.5 % + 520 ps 5.5 % + 540 ps 5.5 %	Using fast rise oscilloscope.	



0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )		Remarks	Location Code
RF BANDWIDTH (oscilloscope calibration)	For input voltages in the range 10 mV p-p to 5 V p-p			Expressed in terms of the frequency at which the - 3dB point is obtained, with respect to a low frequency reference point	Portchester
	50 kHz to 250 MHz	2.5 %		For input VSWR not exceeding 1.3:1	
	250 MHz to 550 MHz	2.6 %			
	50 kHz to 600 MHz	6.0 %		For input VSWR not exceeding 2.5:1	
	600 MHz to 1.6 GHz	6.5 %			
	1.6 GHz to 2.1 GHz	7.5 %			
Electrical calibration of temperature indicators and simulators		Excluding CJC	Including CJC	By injection or measurement of equivalent DC voltages.	
Types K and N thermocouples	-250 °C to -200 °C -200 °C to -50 °C -50 °C to +1370 °C	1.0 °C 0.25 °C 0.12 °C	1.0 °C 0.34 °C 0.26 °C		
Type T thermocouples	-200 °C to -100 °C -100 °C to 0 °C 0 °C to 400 °C	0.20 °C 0.12 °C 0.10 °C	0.30 °C 0.26 °C 0.24 °C		
Type R thermocouples	0 °C to 40 °C 40 °C to 250 °C 250 °C to 1760 °C	0.8 °C 0.5 °C 0.32 °C	1.3 °C 1.1 °C 1.1 °C		
Type E thermocouples	-50 °C to +150 °C 150 °C to 1000 °C	0.10 °C 0.050 °C	0.24 °C 0.24 °C		
Type J thermocouples	-210 °C to -180 °C -180 °C to +100 °C 100 °C to +1200 °C	0.20 °C 0.10 °C 0.10 °C	0.28 °C 0.26 °C 0.24 °C		
Resistance sensors	-200 °C to 0 °C 0 °C to 750 °C 750 °C to 850 °C	0.010 °C 0.040 °C 0.050 °C		Simulation using equivalent DC resistance values.	



0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code
<u>RELATIVE HUMIDITY and DEW POINT</u>				<b>Portchester</b>
<u>Dew point</u>	-20 °C to +82 °C	0.20 °C		
<u>Relative humidity instruments including psychrometers</u>	10 °C to 50 °C 5 %rh to 65 %rh 65 %rh to 98 %rh	0.19 °C 2.0 %rh 3.0 % of reading	Results can be reported in other humidity units	
	50 °C to 85 °C 5 %rh to 70 %rh 70 %rh to 98 %rh	0.19 °C 2.5 %rh 3.5 % of reading		
<u>Relative humidity instruments</u>	5 °C to 60 °C 5 %rh to 15 %rh 15 %rh to 50 %rh 50 %rh to 75 %rh 75 %rh to 95 %rh	0.19 °C 0.50 %rh 1.0 %rh 1.5 %rh 2.0 %rh	Chamber volume 1.5 litres	
Saturated salt capsules	At 20 °C 5 %rh to 50 %rh 50 %rh to 75 %rh 75 %rh to 98 %rh	1.1 %rh 1.6 %rh 2.1 %rh		
<u>TEMPERATURE</u>				
Resistance thermometers	Triple point of water (0.01 °C) Ice point (0.00 °C)	0.0030 °C 0.0050 °C		
	-70 °C to +250 °C 250 °C to 450 °C 450 °C to 650 °C	0.016 °C 0.030 °C 0.055 °C	By comparison in a fluid bath	
	-100 °C to +650 °C	0.10 °C	By comparison in a dry block	
	-100 °C to -50 °C -50 °C to +155 °C	0.037 °C 0.030 °C	4 mm and 6 mm dry block reference probes by comparison in a dry block	
Platinum thermocouples	0 °C to 600 °C 600 °C to 1100 °C 1100 °C to 1200 °C	1.5 °C 1.6 °C 2.0 °C		
Other thermocouples	-90 °C to +600 °C 600 °C to 1100 °C 1100 °C to 1200 °C	0.20 °C 2.0 °C 2.3 °C		



0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code	
<u>TEMPERATURE (Ctd)</u>					
Calibration of Block calibrators	-90 °C to +125 °C -50 °C to +250 °C 250 °C to 600 °C 250 °C to 600 °C 600 °C to 1100 °C 1100 °C to 1200 °C	0.12 °C 0.09 °C 0.16 °C 1.2 °C 2.1 °C 2.3 °C	using PRT sensors using PRT sensors using PRT sensors using thermocouples using thermocouples using thermocouples	Portchester	
Calibrations in air chamber	-40 °C to +5 °C 5 °C to 100 °C	0.19 °C 0.25 °C			
Electronic thermometers with sensors	Ranges as for above sensors	as for sensor			
<u>PRESSURE</u>					
Calibration of pressure indicating instruments and gauges			Including calibration of pressure measuring devices with an electrical output		
Gas pressure (absolute)	800 kPa to 1150 kPa	25 Pa	Calibration by comparison with a digital pressure standard		
Gas pressure (gauge)					
Calibration of pressure indicating instruments and gauges	-100 kPa to -10 kPa -10 kPa to -3.5 kPa 1.5 kPa to 3.5 kPa 3.5 kPa to 2.5 MPa 2.5 MPa to 6 MPa 6 MPa to 25 MPa	0.010 % 0.020 % 0.040 % + 1.5 Pa 0.0080 % 0.050 % + 2.7 kPa 0.050 % + 13 kPa	Absolute pressure calibrations may be undertaken by associated barometric pressure measurement with an additional uncertainty of $\pm 25$ Pa		
Hydraulic pressure (gauge)					
Calibration of pressure indicating instruments and gauges	600 kPa to 6.0 MPa 6.0 MPa to 70 MPa	0.010 % 0.010 %	Calibration by comparison with a digital pressure standard		



0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code		
<b>CALIBRATION OF 16<sup>TH</sup>/17<sup>TH</sup> EDITION TEST EQUIPMENT</b>						
Insulation Resistance	<i>Test voltages up to 1.1kV</i> 0 MΩ to 5 MΩ 5 MΩ to 10 MΩ 10 MΩ to 100 MΩ 100 MΩ to 1 GΩ 10 GΩ	0.12 % + 10 kΩ 1.2 % + 10 kΩ 1.2 % + 65 kΩ 1.2 % + 8.1 MΩ 5.8 %	Using dedicated calibrator that covers all relevant functions.	Portchester		
Continuity Resistance	<i>Test voltage 5 kV</i> 1 GΩ to 200 GΩ	1.8 %				
Continuity Current	0 mA to 320 mA	1.5 % + 0.81 mA				
Insulation Voltage	50 V to 1000 V	1.2 % + 0.93 V				
Loop Resistace	<i>At 50 Hz</i> 0.05 Ω to 1 kΩ 10 Ω 100 Ω 1 kΩ	0.58 % + 5.0 mΩ 0.72 % 0.58 % 0.58 %				
RCD Current	<i>At 50 Hz</i> 2 mA to 10 mA 10 mA to 30 mA 30 mA to 100 mA 100 mA to 300 mA 300 mA to 1 A 1 A to 3 A	1.4 % + 73 μA 1.4 % + 110 μA 1.4 % + 0.16 mA 1.4 % + 0.11 mA 1.4 % + 1.7 mA 1.4 % + 3.1 mA			For trip times up to 5 s.	
RCD Trip Time	20 ms to 390 ms 390 ms to 900 ms	0.69 ms 8.1 ms				
Earth Bond Current	<i>At 50 Hz</i> 100 mA to 500 mA 500 mA to 10 A 10 A to 30 A	1.7 % 1.7 % 1.7 %				
Earth Bond Resistance	<i>At 50 Hz</i> 0.05 Ω to 1 kΩ	0.58 % + (4.7 to 35) mΩ				





0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code
<b>CALIBRATION OF 16<sup>TH</sup>/17<sup>TH</sup> EDITION TEST EQUIPMENT</b> (continued)				<b>Portchester</b>
Earth Leakage Current Test	<i>At 50 Hz</i> 240 $\mu$ A, 1 mA and 3 mA	1.7 % + 9.7 $\mu$ A	Using dedicated calibrator that covers all relevant functions.	
Flash Voltage Test	<i>At 50 Hz</i> 500 V to 1000 V (Class 1) 1000 V to 1500 V (Class 1) 2000 V to 3600 V (Class 2)	4.6 % + 12 V 4.6 % + 17 V 4.6 % + 23 V		
Flash Current Test	<i>At 50 Hz:</i> 1 mA to 3 mA	5.8 % + 17 $\mu$ A		
AC Voltage Output <i>At 50 Hz</i>	100 V to 400 V	2.3 % + (0.20 to 0.28) V		<b>Site Calibration</b>
<u>RELATIVE HUMIDITY</u>				
Humidity controlled chambers (including associated indicators, controllers and recorders)	<i>10 °C to 90 °C</i> 5.0 %rh to 98 %rh	2.0 %rh	There may be an additional uncertainty due to the performance of the chamber being calibrated	
<u>TEMPERATURE</u>				
Temperature controlled chambers, autoclaves, fridges/refrigerators, freezers, ovens and furnaces (including associated indicators, controllers and recorders)	-80 °C to -40 °C -40 °C to +150 °C 150 °C to 250 °C 250 °C to 375 °C 375 °C to 600 °C 600 °C to 1100 °C	1.0 °C 0.15 °C 1.0 °C 2.1 °C 5.2 °C 5.6 °C	Single and multipoint time dependent temperature profiling, also referred to as spatial temperature surveying or mapping	
Temperature indicators with probes	-196 °C  -20 °C to +140 °C 140 °C to 600 °C	0.50 °C  0.15 °C 0.21 °C	Using customer's source	
<u>TIME</u>				
Timers and time interval	5 s to 24 hours	1.0 s	Elapsed time measurement.	



0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code
<b>ELECTRICAL</b>				
<b>TEMPERATURE SIMULATION</b>				
Calibration of temperature indicators for the following sensor types				
Base metal thermocouple	-250 °C to -200 °C	1.5 °C	] Excluding cold junction compensation	<b>Site Calibration</b>
	-200 °C to 0 °C	0.29 °C		
	0 °C to 1000 °C	0.12 °C		
	1000 °C to 1370 °C	0.17 °C		
Noble metal thermocouple	-250 °C to -200 °C	1.5 °C	] Including cold junction compensation	
	-200 °C to 0 °C	0.40 °C		
	0 °C to 1370 °C	0.30 °C		
Resistance sensors	0 °C to 40 °C	1.2 °C	] Excluding cold junction compensation	
	40 °C to 250 °C	0.70 °C		
	250 °C to 1760 °C	0.47 °C		
	0 °C to 40 °C	1.5 °C	] Including cold junction compensation	
DC VOLTAGE	40 °C to 250 °C	1.2 °C		
	250 °C to 1760 °C	1.1 °C		
	750 °C to 850 °C	0.40 °C		
Generation	-200 °C to 0 °C	0.040 °C	Application of known DC voltages to voltage measuring instruments.	
	0 °C to 750 °C	0.35 °C		
	750 °C to 850 °C	0.40 °C		
	0 mV to 10 mV	0.027 % + 3.9 μV		
	10 mV to 0.1 V	0.018 % + 8.5 μV		
	0.1 V to 1 V	0.010 % + 14 μV		
Measurement	1 V to 10 V	0.012 % + 120 μV	Using digital multimeter.	
	10 V to 100 V	0.023 % + 6.0 mV		
	100 V to 1000 V	0.035 % + 58 mV		
	0 mV to 100 mV	0.030 % + 6.0 μV		
	100 mV to 1 V	0.0050 % + 9.0 μV		
	1 V to 10 V	0.0040 % + 60 μV		
Using multimeter and voltage divider.	10 V to 100 V	0.0060 % + 0.70 mV		
	100 V to 1000 V	0.0060 % + 2.0 mV		
	1 kV to 2 kV	0.060 % + 0.60 V		
	2 kV to 20 kV	0.080 % + 6.0 V		



0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k=2$ )	Remarks	Location Code
<b>DC RESISTANCE</b>				<b>Site Calibration</b>
Generation	10 mΩ to 10 kΩ 10 kΩ to 100 kΩ 100 kΩ to 1 MΩ 1 MΩ to 10 MΩ 10 MΩ to 100 MΩ	130 ppm + 0.30 mΩ 0.070 % + 45 mΩ 0.070 % + 2.5 Ω 0.070 % + 120 Ω 0.090 % + 1.5 kΩ	Application of known DC resistances to resistance measuring instruments.	
Measurement	10 Ω to 100 Ω 100 Ω to 1 kΩ 1 kΩ to 10 kΩ 10 kΩ to 100 kΩ 100 kΩ to 1 MΩ 1 MΩ to 10 MΩ 10 MΩ to 100 MΩ	0.012 % + 5.4 mΩ 0.012 % + 2.9 mΩ 0.012 % + 0.13 Ω 0.012 % + 1.30 Ω 0.013 % + 17 Ω 0.050 % + 0.26 kΩ 1.3 % + 12 kΩ	Using digital multimeter.	
<b>DC CURRENT</b>				
Generation	0 μA to 100 μA 100 μA to 1 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 10 A	0.029 % + 6.4 nA 0.019 % + 8.1 nA 0.012 % + 0.27 μA 0.013 % + 2.4 μA 0.035 % + 63 μA 0.071 % + 2.3 mA	Application of known DC currents to current measuring instruments.	
Measurement	0 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 3 A	0.060 % + 2.5 μA 0.060 % + 6.0 μA 0.12 % + 0.20 mA 0.15 % + 1.0 mA	Using digital multimeter.	
<b>AC VOLTAGE</b>				
Generation	1 mV to 10 mV  40 Hz to 400 Hz 400 Hz to 800 Hz 800 Hz to 3.2 kHz 3.2 kHz to 6.4 kHz 6.4 kHz to 12.8 kHz  10 mV to 100 mV  40 Hz to 400 Hz 400 Hz to 800 Hz 800 Hz to 1.6 kHz 1.6 kHz to 3.2 kHz 3.2 kHz to 6.4 kHz 6.4 kHz to 12.8 kHz	  0.17 % + 6.0 μV 0.33 % + 12 μV 0.47 % + 12 μV 1.2 % + 23 μV 2.9 % + 60 μV    0.12 % + 60 μV 0.33 % + 120 μV 0.49 % + 120 μV 0.47 % + 120 μV 1.2 % + 230 μV 2.9 % + 580 μV	Application of known AC voltages to voltage measuring instruments.	



0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code
AC VOLTAGE (continued)				<b>Site Calibration</b>
Generation	100 mV to 1 V			
	40 Hz to 400 Hz	0.090 % + 87 $\mu$ V		
	400 Hz to 800 Hz	0.17 % + 140 $\mu$ V		
	800 Hz to 1.6 kHz	0.33 % + 240 $\mu$ V		
	1.6 kHz to 3.2 kHz	0.47 % + 470 $\mu$ V		
	3.2 kHz to 6.4 kHz	1.2 % + 1.2 mV		
	6.4 kHz to 12.8 kHz	2.9 % + 2.3 mV		
	1 V to 10 V			
	40 Hz to 400 Hz	0.090 % + 0.90 mV		
	400 Hz to 800 Hz	0.17 % + 1.2 mV		
	800 Hz to 1.6 kHz	0.33 % + 2.4 mV		
	1.6 kHz to 3.2 kHz	0.47 % + 5.0 mV		
	3.2 kHz to 6.4 kHz	1.2 % + 12 mV		
	6.4 kHz to 12.8 kHz	2.9 % + 35 mV		
	10 V to 100 V			
	40 Hz to 400 Hz	0.14 % + 14 mV		
	100 V to 1000 V			
	40 Hz to 400 Hz	0.19 % + 0.59 V		
Measurement	10 mV to 100 mV		Using digital multimeter.	
	32 Hz to 330 Hz	0.12 % + 25 $\mu$ V		
	330 Hz to 10 kHz	0.19 % + 25 $\mu$ V		
	100 mV to 1.0 V			
	32 Hz to 330 Hz	0.080 % + 0.18 mV		
	330 Hz to 10 kHz	0.080 % + 0.18 mV		
	1 V to 10 V			
	32 Hz to 330 Hz	0.080 % + 5.0 mV		
	330 Hz to 10 kHz	0.080 % + 5.0 mV		



0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code
AC VOLTAGE (continued)				Site Calibration
Measurement	10 V to 100 V  32 Hz to 330 Hz 330 Hz to 10 kHz	0.080 % + 50 mV 0.080 % + 50 mV		
	100 V to 750 V  32 Hz to 330 Hz 330 Hz to 10 kHz	0.080 % + 0.50 V 0.080 % + 0.50 V		
	50 Hz			
	750 V to 2 kV 2 kV to 8 kV	0.51 % + 3.00 V 0.68 % + 50 V		
AC CURRENT			Application of known AC currents to current measuring instruments.	
Generation	10 $\mu$ A to 100 $\mu$ A  45 Hz to 100 Hz 100 Hz to 400 Hz 400 Hz to 800 Hz	0.22 % + 85 nA 0.12 % + 90 nA 0.34 % + 150 nA		
	100 $\mu$ A to 1 mA  45 Hz to 100 Hz 100 Hz to 400 Hz 400 Hz to 800 Hz 800 Hz to 1.6 kHz 1.6 kHz to 3.2 kHz	0.11 % + 0.51 $\mu$ A 0.090 % + 0.70 $\mu$ A 0.12 % + 0.40 $\mu$ A 0.24 % + 0.42 $\mu$ A 0.47 % + 0.60 $\mu$ A		
	1 mA to 10 mA  45 Hz to 100 Hz 100 Hz to 400 Hz 400 Hz to 800 Hz 800 Hz to 1.6 kHz 1.6 kHz to 3.2 kHz 3.4 kHz to 6.4 kHz	0.10 % + 2.6 $\mu$ A 0.070 % + 3.1 $\mu$ A 0.12 % + 3.2 $\mu$ A 0.23 % + 3.8 $\mu$ A 0.58 % + 5.5 $\mu$ A 2.3 % + 12 $\mu$ A		



0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks	Location Code
AC CURRENT (continued)				<b>Site Calibration</b>
Generation	10 mA to 100 mA 45 Hz to 100 Hz 100 Hz to 400 Hz 400 Hz to 800 Hz 800 Hz to 1.6 kHz 1.6 kHz to 3.2 kHz 3.4 kHz to 6.4 kHz	0.10 % + 26 $\mu$ A 0.070 % + 29 $\mu$ A 0.12 % + 30 $\mu$ A 0.23 % + 36 $\mu$ A 0.58 % + 54 $\mu$ A 2.3 % + 120 $\mu$ A		
	100 mA to 1 A 45 Hz to 100 Hz 100 Hz to 400 Hz 400 Hz to 800 Hz 800 Hz to 1.6 kHz 1.6 kHz to 3.2 kHz 3.4 kHz to 6.4 kHz	0.13 % + 0.30 mA 0.15 % + 0.30 mA 0.17 % + 0.40 mA 0.26 % + 0.50 mA 0.60 % + 0.70 mA 2.3 % + 1.2 mA		
	1 A to 10 A 10 Hz to 400 Hz 400 Hz to 800 Hz 800 Hz to 1.6 kHz	0.14 % + 10 mA 0.24 % + 12 mA 0.36 % + 12 mA		
Measurement	0.1 A to 1 A 10 Hz to 1 kHz	0.15 % + 0.60 mA	Using digital multimeter.	
	1 A to 3 A 10 Hz to 1 kHz	0.20 % + 2.8 mA		
<b>PRESSURE</b>				
Gas pressure (absolute)				
Calibration of pressure indicating instruments and gauges	10 kPa to 400 kPa 400 kPa to 2.0 MPa	0.022 % + 420 Pa 0.062 % + 350 Pa	Including calibration of pressure measuring devices with an electrical output	
Gas pressure (gauge)				
Calibration of pressure indicating instruments and gauges	-95 kPa to 0 kPa 0 kPa to 10 kPa 10 kPa to 2 MPa	0.014 % + 75 Pa 0.020 % + 1.8 Pa 0.015 % + 370 Pa		
Hydraulic pressure (gauge)				
Calibration of pressure indicating instruments and gauges	0 MPa to 7 MPa 7 MPa to 16 MPa	0.035 % + 0.24 kPa 0.12 % + 2.3 kPa		
END				



0078  
Accredited to  
ISO/IEC 17025:2017

**Schedule of Accreditation**  
issued by  
**United Kingdom Accreditation Service**  
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

**Absolute Calibration Limited**  
Issue No: 054 Issue date: 10 May 2021

Calibration performed by the Organisation at the locations specified

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 uncertainty of measurement 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 CIPM-ILAC definition of the CMC is as follows:

*A CMC is a calibration and measurement capability available to customers under normal conditions:*

- (a) as published in the BIPM key comparison database (KCDB) of the CIPM MRA; or*
- (b) as described in the laboratory's scope of accreditation granted by a signatory to the ILAC Arrangement.*

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 CMC is calculated according to the procedures given in M3003 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 CMC in certificates issued under its accreditation.

The CMC may be described using various methods in the Schedule of Accreditation:

- As a single value that is valid throughout the range.
  - As an explicit function of the measurand or of a parameter (see below).
  - As a range of values. The range is stated such that the customer can make a reasonable estimate of the likely uncertainty at any point within the range.
  - As a matrix or table where the CMCs depend on the values of the measurand and a further quantity.
- In graphical form, providing there is sufficient resolution on each axis to obtain at least two significant figures for the CMC.

**Expression of CMCs - symbols and units**

In general, only units of the SI and those units recognised for use with the SI are used to express the values of quantities and of the associated CMCs. Nevertheless, other commonly used units may be used where considered appropriate for the intended audience. For example, the term "ppm" (part per million) is frequently used by manufacturers of test and measurement equipment to specify the performance of their products. Terms like this may be used in Schedules of Accreditation where they are in common use and understood by the users of such equipment, providing their use does not introduce any ambiguity in the capability that is being described.

When the CMC is expressed as an explicit function of the measurand or of a parameter, this often comprises a relative term (e.g., percentage) and an absolute term, i.e. one expressed in the same units as those of the measurand. This form of expression is used to describe the capability that can be achieved over a range of values. Some examples are shown below. It should be noted that these expressions are not mathematical formulae but are instead written in a commonly used shorthand for expressing uncertainties - therefore, for the purposes of clarity, an indication of how they are to be interpreted is also provided below.

DC voltage, 100 mV to 1 V: 0.0025 % + 5.0  $\mu$ V:

Over the range 100 mV to 1 V, the CMC is 0.0025 % · V + 5.0  $\mu$ V, where V is the measured voltage.

Hydraulic pressure, 0.5 MPa to 140 MPa: 0.0036 % + 0.12 ppm/MPa + 4.0 Pa

Over the range 0.5 MPa to 140 MPa, the CMC is 0.0036 % · p + (0.12 · 10<sup>-6</sup> · p · 10<sup>-6</sup>) + 4.0 Pa, where p is the measured pressure in Pa.

It should be noted that the percentage symbol (%) simply represents the number 0.01. In cases where the CMC is stated only as a percentage, this is to be interpreted as meaning percentage of the measured value or indication.

Thus, for example, a CMC of 1.5 % means 1.5 · 0.01 · i, where i is the instrument indication.