

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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



0078

Accredited to
ISO/IEC 17025:2017

Absolute Calibration Limited

Issue No: 058 **Issue date:** 13 May 2025

14 Murrills Estate
Portchester
Hampshire
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Calibration performed by the Organisations at the locations specified below

Locations covered by the organisation and their relevant activities

Laboratory location:

Location details	Activity	Location code
Address 14 Murrills Estate Portchester Hampshire PO16 9RD	Contact 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	<u>Calibration:</u> Electrical Humidity Pressure Temperature Spring Hammers

Site activities performed away from the location listed above:

Location details	Activity	Location code
Customers' sites or premises 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.	Contact 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	<u>Calibration:</u> Electrical Humidity Pressure Temperature



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CALIBRATION AND MEASUREMENT CAPABILITY (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement 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 Ω 10 Ω 100 Ω 1 $k\Omega$ 10 $k\Omega$ 100 $k\Omega$ 1 $M\Omega$ 10 $M\Omega$ 100 $M\Omega$ 1 $G\Omega$	4.0 $\mu\Omega/\Omega$ 0.30 $\mu\Omega/\Omega$ 0.30 $\mu\Omega/\Omega$ 0.36 $\mu\Omega/\Omega$ 0.093 $\mu\Omega/\Omega$ 0.093 $\mu\Omega/\Omega$ 0.093 $\mu\Omega/\Omega$ 0.092 $\mu\Omega/\Omega$ 0.11 $\mu\Omega/\Omega$ 0.22 $\mu\Omega/\Omega$ 0.61 $\mu\Omega/\Omega$ 1.8 $\mu\Omega/\Omega$ 4.5 $\mu\Omega/\Omega$ 5.3 $\mu\Omega/\Omega$	Using direct current comparator bridge. The CMCs are for 4-terminal resistors suitable for oil immersion at 20 °C or between 17 °C to 23 °C. The uncertainties may be increased for other types of resistor.	
Measurement, <i>Other values</i>	80 $m\Omega$ to 800 $m\Omega$ 0.80 Ω to 107.5 Ω 107.5 Ω to 1.34 $k\Omega$ 1.34 $k\Omega$ 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 $\mu\Omega/\Omega$ 0.093 $\mu\Omega/\Omega$ 0.092 $\mu\Omega/\Omega$ 0.11 $\mu\Omega/\Omega$ 0.17 $\mu\Omega/\Omega$ 0.17 $\mu\Omega/\Omega$ 0.22 $\mu\Omega/\Omega$ 0.61 $\mu\Omega/\Omega$ 1.9 $\mu\Omega/\Omega$ 4.5 $\mu\Omega/\Omega$ 5.3 $\mu\Omega/\Omega$ 0.025% 0.062% 0.10 % 0.12 %	See note above	Portchester



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
DC RESISTANCE (continued)				
Generation, <i>Specific values</i>	100 MΩ, 300 MΩ, 1 GΩ 3 GΩ 10 GΩ 30 GΩ, 100 GΩ, 300 GΩ 1 TΩ 3 TΩ 100 MΩ, 300 MΩ, 1.0 GΩ 3 GΩ 10 GΩ, 30 GΩ, 100 GΩ, 300 GΩ 1 TΩ 3 TΩ	0.30 % 0.45 % 0.35 % 0.35 % 0.70 % 0.75 % 0.30 % 0.45 % 0.35 % 0.70 % 0.75 %	Known values of resistance for application to DC resistance measuring devices. Applied Voltage 10 V Applied Voltage 100 V Applied Voltage 500 V Applied Voltage 500 V Applied Voltage 1000 V	
AC RESISTANCE	40 Hz to 1592 Hz 0.1 Ω 1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ	0.030 % 10 μΩ/Ω 6.0 μΩ/Ω 8.0 μΩ/Ω 7.0 μΩ/Ω 6.0 μΩ/Ω	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.	Portchester
DC VOLTAGE				
Specific Values	0.1 V 1 V 10 V 100 V 1 kV	0.70 μV/V 0.53 μV/V 0.49 μV/V 0.53 μV/V 0.78 μV/V	By comparison with DC voltage reference standards using voltage dividers.	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
DC VOLTAGE (continued)				
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	0.6 μ V 0.81 μ V 0.57 μ V/V 0.61 μ V/V 2.5 μ V/V 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 10 pA to 100 pA 100 pA to 100 nA 100 nA to 1 μ A 1 μ A to 10 μ A 10 μ A to 200 μ A 200 μ A to 2 mA 2 mA to 20 mA 20 mA to 100 mA 100 mA to 1 A 1 A to 10 A 10 A to 100 A 100 A to 1000 A	2.60 % 1.20 % 0.26 % 0.13 % 24 μ A/A + 0.12 nA 11 μ A/A + 0.50 nA 11 μ A/A + 5.0 nA 12 μ A/A + 50 nA 24 μ A/A + 0.58 μ A 30 μ A/A 40 μ A/A 50 μ A/A 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.	Portchester
Specific values	100 μ A 1 mA 10 mA 100 mA	5.9 μ A/A 5.7 μ A/A 5.7 μ A/A 5.7 μ A/A	Generation of known direct currents for calibration of Wavetek 4950 Multifunction Transfer Standards	



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



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement 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 μ V		
	1 mV to 10 mV	0.080 % + 7.0 μ V		
	10 mV to 100 mV	0.065 % + 200 μ V		
	100 mV to 1 V	0.035 % + 35 μ V		
	1 V to 10 V	0.031 % + 350 μ V		
	300 kHz to 1 MHz			
	1 V to 10 V	0.18 % + 5.0 mV		
Measurement	220 μ V to 2.2 mV		Derived by means of AC/DC transfer techniques.	
	10 Hz to 20 Hz	620 μ V/V + 1.6 μ V		
	20 Hz to 40 Hz	620 μ V/V + 1.6 μ V		
	40 Hz to 20 kHz	610 μ V/V + 1.6 μ V		
	20 kHz to 50 kHz	620 μ V/V + 2.4 μ V		
	50 kHz to 100 kHz	630 μ V/V + 3.0 μ V		
	100 kHz to 300 kHz	760 μ V/V + 4.9 μ V		
	300 kHz to 500 kHz	0.15 % + 9.9 μ V		
	500 kHz to 1 MHz	0.51 % + 11 μ V		
	2.2 mV to 7 mV			
	10 Hz to 20 Hz	260 μ V/V + 1.6 μ V		
	20 Hz to 40 Hz	210 μ V/V + 1.6 μ V		
	40 Hz to 20 kHz	190 μ V/V + 1.6 μ V		
	20 kHz to 50 kHz	190 μ V/V + 2.4 μ V		
	50 kHz to 100 kHz	210 μ V/V + 3.0 μ V		
	100 kHz to 300 kHz	360 μ V/V + 4.9 μ V		
	300 kHz to 500 kHz	890 μ V/V + 9.9 μ V		
	500 kHz to 1 MHz	0.39 % + 11 μ V		
	7 mV to 22 mV			
	10 Hz to 20 Hz	120 μ V/V + 1.6 μ V		
	20 Hz to 40 Hz	95 μ V/V + 1.6 μ V		
	40 Hz to 20 kHz	93 μ V/V + 1.6 μ V		
	20 kHz to 50 kHz	100 μ V/V + 2.4 μ V		
	50 kHz to 100 kHz	110 μ V/V + 3.0 μ V		
	100 kHz to 300 kHz	200 μ V/V + 4.9 μ V		
	300 kHz to 500 kHz	710 μ V/V + 9.9 μ V		
	500 kHz to 1 MHz	0.29 % + 11 μ V		



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



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
AC VOLTAGE (continued) Measurement (continued)	2 V to 7 V <i>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</i> 7 V to 22 V <i>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</i> 20 V to 70 V <i>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</i> 70 V to 220 V <i>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</i>	74 μ V/V 44 μ V/V 33 μ V/V 42 μ V/V 86 μ V/V 210 μ V/V 530 μ V/V 0.17 % 74 μ V/V 45 μ V/V 33 μ V/V 42 μ V/V 81 μ V/V 210 μ V/V 530 μ V/V 0.17 % 74 μ V/V 47 μ V/V 41 μ V/V 47 μ V/V 100 μ V/V 210 μ V/V 570 μ V/V 0.17 % 75 μ V/V 48 μ V/V 41 μ V/V 58 μ V/V 100 μ V/V 340 μ V/V 0.10 %		Portchester



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AC VOLTAGE (continued)							Portchester	
Measurement (continued)	200 V to 700 V							
	10 Hz to 20 Hz		79 μ V/V					
	20 Hz to 40 Hz		50 μ V/V					
	40 Hz to 20 kHz		39 μ V/V					
	20 kHz to 50 kHz		160 μ V/V					
	50 kHz to 100 kHz		980 μ V/V					
	700 V to 1000 V							
	10 Hz to 20 Hz		78 μ V/V					
	20 Hz to 40 Hz		50 μ V/V					
	40 Hz to 20 kHz		39 μ V/V					
	20 kHz to 50 kHz		160 μ V/V					
	50 kHz to 100 kHz		980 μ V/V					
Specific values (measurement)	1 kV to 8 kV		0.50 %		Using voltage divider.			
CMCs for specific values of voltage at the frequencies shown, expressed in μ V/V ($k = 2$)								
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			



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
AC CURRENT				
Generation	<i>10 Hz to 1 kHz</i> 10 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 <i>1 kHz to 5 kHz</i> 10 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 <i>5 kHz to 10 kHz</i> 1 A to 10 A <i>10 kHz to 20 kHz</i> 1 A to 10 A <i>30 Hz to 400 Hz</i> 10 A to 1000 A	0.030 % + 15 nA 0.025 % + 120 nA 0.020 % + 1.2 µA 0.015 % + 12 µA 0.040 % + 120 µA 0.060 % + 1.5 mA 0.040 % + 30 nA 0.025 % + 120 nA 0.025 % + 1.2 µA 0.025 % + 12 µA 0.055 % + 160 µA 0.11 % + 1.9 mA 0.26 % + 7.0 mA 0.85 % + 20 mA 0.20 % to 0.70 %	Known values of AC current for application to current measuring instruments. For calibration of current clamps and similar devices using multi-turn coil method.	Portchester
Measurement	<i>10 Hz to 5 kHz</i> 0 µA to 200 µA 200 µA to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A <i>40 Hz to 10 kHz</i> 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	0.035 % + 25 nA 0.030 % + 0.23 µA 0.030 % + 2.3 µA 0.030 % + 23 µA 0.081 % + 0.23 mA 34 µA/A + 0.12 µA 34 µA/A + 0.23 µA 38 µA/A + 2.0 µA 43 µA/A + 20 µA 72 µA/A + 20 µA 76 µA/A + 0.20 mA		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
INDUCTANCE				
Specific Values - Generation	1 kHz 1 µH 10 µH 100 µH 1 mH 10 mH 100 mH 1 H 10 H	0.0012 µH 0.010 µH 0.016 µH 0.13 µH 0.78 µH 8.4 µH 0.12 µH 24 mH	Known values of inductance for application to inductance measuring instruments.	
Specific Values - Measurement	1 kHz 1 µH 10 µH 100 µH 1 mH 10 mH 100 mH 1 H	0.005 µH 0.011 µH 0.016 % 0.014 % 0.013 % 0.013 % 0.015 %	Using inductance bridge.	Portchester
Other Values				
Measurement	1 kHz 1 µH to 10 µH 10 µH to 100 µH 100 µH to 1 mH 1 mH to 10 mH 10 mH to 100 mH 100 mH to 1 H 1 H to 10 H	0.45 % 0.11 % 0.021 % 0.016 % 0.015 % 0.015 % 0.24 %	Using inductance bridge.	
CAPACITANCE				
Specific Values				
Generation	1 kHz 10 pF 100 pF 1 nF 10 nF 100 nF 1 µF 100 µF	4.0 µF/F 4.0 µF/F 4.0 µF/F 41 µF/F 41 µF/F 63 µF/F 0.050 %	Known values of capacitance for application to capacitance measuring instruments.	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
CAPACITANCE				
Measurement	1 kHz 10 pF 100 pF 1 nF 10 nF 100 nF 1 μ F 100 μ F	9.5 μ F/F 7.7 μ F/F 7.4 μ F/F 41 μ F/F 41 μ F/F 63 μ F/F 0.050 %		
Other Values	1 kHz 1 pF to 10 μ F 10 μ F to 100 μ F	0.010 % 0.050 %		
Capacitance Simulation	0.4 nF to 1.1 nF 10 Hz to 10 kHz 1.1 nF to 3.3nF 10 Hz to 3 kHz 3.3 nF to 11 nF 10 Hz to 1 kHz 11 nF to 33 nF 10 Hz to 1 kHz 33 nF to 110 nF 10 Hz to 1 kHz 110 nF to 330 nF 10 Hz to 1 kHz 330 nF to 1.1 μ F 10 Hz to 600 Hz 1.1 μ F to 3.3 μ F 10 Hz to 300 Hz 3.3 μ F to 11 μ F 10 Hz to 150 Hz 11 μ F to 33 μ F 10 Hz to 120 Hz 33 μ F to 110 μ F 10 Hz to 80 Hz 110 μ F to 330 μ F DC to 50 Hz 330 μ F to 1.1 mF DC to 20 Hz 1.1 mF to 3.3 mF DC to 6 Hz 3.3 mF to 11 mF DC to 2 Hz 11 mF to 33 mF DC to 0.6 Hz 33 mF to 110 mF DC to 0.2 Hz	0.59 % + 12 pF 0.59 % + 12 pF 0.29 % + 15 pF 0.29 % + 0.12 nF 0.29 % + 0.14 nF 0.29 % + 0.40 nF 0.29 % + 1.4 nF 0.30 % + 3.5 nF 0.29 % + 15 nF 0.49 % + 35 nF 0.53 % + 0.15 μ F 0.53 % + 0.35 μ F 0.53 % + 1.2 μ F 0.53 % + 3.5 μ F 0.53 % + 12 μ F 0.88 % + 35 μ F 1.3 % + 0.12 mF	These values are sourced by simulation.	Portchester



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
FREQUENCY				
Specific Values	1 MHz and 10 MHz	2.6×10^{12}	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 10^7 + 1 count 12 in 10^8 + 1 count 12 in 10^9 + 1 count 4.0 in 10^9 + 1 count	Using frequency counter.	
TIME INTERVAL	1 μ s 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 μ s 20 μ s 200 μ s 2.0 ms 20 ms	Using time interval averaging	Portchester
Timers and time interval	1 s to 24 hours	50 ms	Stopwatch Calibration	
TRANSITION TIME (pulse waveforms)	0 ns to 20 ns 20 ns to 200 ns 200 ns to 2 μ s	5.5 % + 520 ps 5.5 % + 540 ps 5.5 %	Using fast rise oscilloscope.	
SPRING HAMMERS				
Impact Energy Imparted from Spring Operated Impact Test Apparatus - as specified in BS EN 60068-2-75:1997, BS EN 60068-2-75:2014 and IEC 60068-2-75 1997	0.10 Joule to 1.0 Joule	0.010 Joule	Calibrations can be given in Joule or Newton Metre units.	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement 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	
	50 kHz to 250 MHz	2.5 %		<input type="checkbox"/> For input VSWR not exceeding 1.3:1	
	250 MHz to 550 MHz	2.6 %			
	50 kHz to 600 MHz	6.0 %			
	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	<i>The uncertainties will be increased for values of VSWR greater than those shown above.</i> By injection or measurement of equivalent DC voltages.	Portchester
Types K thermocouples	-250 °C to -220 °C -200 °C to -50 °C -50 °C to +1370 °C	0.40 °C 0.25 °C 0.065 °C	0.52 °C 0.28 °C 0.27 °C		
Types N thermocouples	-200 °C to -60 °C -60 °C to 450 °C 450 °C to +1300 °C	0.20 °C 0.08 °C 0.06 °C	0.35 °C 0.27 °C 0.26 °C		
Type T thermocouples	-200 °C to -170 °C -170 °C to -20 °C -20 °C to 1200 °C	0.10 °C 0.07 °C 0.04 °C	0.30 °C 0.26 °C 0.26 °C		
Type R thermocouples	0 °C to 70 °C 70 °C to 720 °C 720 °C to 1760 °C	0.38 °C 0.27 °C 0.16 °C	0.44 °C 0.34 °C 0.25 °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 -20 °C -2000 °C to +1200 °C	0.10 °C 0.07 °C 0.04 °C	0.29 °C 0.26 °C 0.26 °C		
Pt 100 Resistance sensors	-200 °C to 500 °C 500 °C to 700 °C 700 °C to 850 °C	0.010 °C 0.020 °C 0.050 °C		Simulation and measurement	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
<u>RELATIVE HUMIDITY and DEW POINT</u>				
Dew point	-20 °C to +90 °C	0.20 °C		
Relative humidity instruments	10 °C 20 %rh to 50 %rh 10 °C to 90 °C 10 %rh to 50 %rh 10 °C to 90 °C 50 %rh to 95 %rh	0.15 °C 1.2 %rh 0.15 °C 1.5 %rh 0.20 °C 2.0 %rh	Using a working volume of 10 mm within chamber space	
Relative humidity instruments	10 °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	
	-90 °C to -40 °C -40 °C to 155 °C 155 °C to 300 °C 300 °C to 500 °C 500 °C to 650 °C	0.087 °C 0.048 °C 0.072 °C 0.076 °C 0.097 °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	
Noble Metal thermocouples (Type R only)	+100 °C to +650 °C +650 °C to +1100 °C +1100 °C to +1200 °C	1.00 °C 1.80 °C 2.30 °C	By comparison in a dry block	
Base Metal thermocouples (Type K)	-90 °C to +300 °C +300 °C to +650 °C +650 °C to +1100 °C +1100 °C to +1200 °C	0.30 °C 0.50 °C 1.60 °C 2.30 °C	By comparison in a dry block	
(Type T)	-90 °C to +350 °C	0.30 °C		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
Base Metal thermocouples (continued) (Type J)	-40 °C to +300 °C +300 °C to +650 °C +650 °C to +750 °C	0.30 °C 0.50 °C 1.20 °C		
(Type N)	-90 °C to +300 °C +300 °C to +650 °C +650 °C to +1100 °C +1100 °C to +1200 °C	0.40 °C 0.50 °C 1.60 °C 2.30 °C		
Calibration of Block calibrators	-100 °C to 155 °C 155 °C to 230 °C 230 °C to 650 °C 650 °C to 1100 °C 1100 °C to 1200 °C	0.042 °C 0.053 °C 0.073 °C 1.8 °C 2.2 °C	using PRT sensors using PRT sensors using PRT sensors using thermocouples using thermocouples	
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)	80 kPa to 115 kPa	10 Pa	Calibration by comparison with a digital pressure standard	
Calibration of pressure indicating instruments and gauges	-95 kPa to -3.5 kPa -3.5 kPa to 3.5 kPa 3.5 kPa to 50 kPa 50 kPa to 2.5 MPa 2.5 MPa to 6 MPa 6 MPa to 25 MPa	0.010 % 0.040 % + 1.5 Pa 0.010 % 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 ± 10 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 deadweight tester using hydraulic oil or alternatively water via a separator which will attract an additional 2.8 kPa measurement uncertainty.	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
CALIBRATION OF 16TH/17TH EDITION TEST EQUIPMENT				
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.	
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 %		Portchester
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		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
CALIBRATION OF 16TH/17TH EDITION TEST EQUIPMENT (continued)			Using dedicated calibrator that covers all relevant functions.	
Earth Leakage Current Test	At 50 Hz 240 µA, 1 mA and 3 mA	1.7 % + 9.7 µA		
Flash Voltage Test	At 50 Hz 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	At 50 Hz: 1 mA to 3 mA	5.8 % + 17 µA		
AC Voltage Output At 50 Hz	100 V to 400 V	2.3 % + (0.20 to 0.28) V		
RELATIVE HUMIDITY				
Humidity controlled chambers (including associated indicators, controllers and recorders)	10 °C to 90 °C 5.0 %rh to 98 %rh	2.0 %rh	There may be an additional uncertainty due to the performance of the chamber being calibrated	
TEMPERATURE				
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	0.50 °C	Using customer's source	
	-20 °C to +140 °C 140 °C to 600 °C	0.15 °C 0.21 °C		
TIME				
Timers and time interval	5 s to 24 hours	1.0 s	Elapsed time measurement.	



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



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



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
AC VOLTAGE (continued)	100 mV to 1 V			Site Calibration
	40 Hz to 400 Hz	0.090 % + 87 µV		
	400 Hz to 800 Hz	0.17 % + 140 µV		
	800 Hz to 1.6 kHz	0.33 % + 240 µV		
	1.6 kHz to 3.2 kHz	0.47 % + 470 µV		
	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		
Measurement	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		
	10 mV to 100 mV		Using digital multimeter.	
	32 Hz to 330 Hz	0.12 % + 25 µV		
	330 Hz to 10 kHz	0.19 % + 25 µV		
	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		
Generation	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		



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



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
AC CURRENT (continued)				
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 μ A 0.070 % + 29 μ A 0.12 % + 30 μ A 0.23 % + 36 μ A 0.58 % + 54 μ A 2.3 % + 120 μ 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.	
<u>PRESSURE</u>	1 A to 3 A 10 Hz to 1 kHz	0.20 % + 2.8 mA		
Gas pressure (absolute)				
Calibration of pressure indicating instruments and gauges	20 kPa to 200 kPa	0.10 % + 0.26 kPa	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 3.5 kPa 3.5 kPa to 10 kPa 10 kPa to 2 MPa	0.050 % + 0.24 kPa 0.061 % + 4.0 Pa 0.050 % + 3.7 Pa 0.050 % + 0.33 kPa	Absolute pressure Measurements across These ranges will attract an Additional uncertainty of 0.010 % + 0.26 kPa	
Hydraulic pressure (gauge)				
Calibration of pressure indicating instruments and gauges	0 MPa to 7 MPa 7 MPa to 16 MPa	0.010 % + 3.9 kPa 0.050 % + 3.3 kPa		

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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: $Q[a, b] = [a^2 + b^2]^{1/2}$