Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

0246

Accredited to ISO/IEC 17025:2017

DE&S Deca

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Deca Sealand
Welsh Road
Deeside
Flintshire
CH5 2LS

Contact: Mr Ian Ford
Tel: +44 (0)1244 847242
Fax: +44 (0)1244 847058
E-Mail: Ian.Ford@deca.mod.uk
Website: www.gov.uk/deca

Calibration performed at the above address only

DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
ELECTRICAL			All electrical calibrations are performed as a comparison against a reference standard unless otherwise stated
FREQUENCY			
Specific Values	100 kHz 1 MHz 5 MHz 10 MHz	2.3 in 10^{12} 2.3 in 10^{12} 2.3 in 10^{12} 2.3 in 10^{12}	For the calibration of Frequency equipment, timers / counters
RESISTANCE	0 Ω to 2 Ω 2 Ω to 20 Ω 20 Ω to 200 Ω 200 Ω to 2 kΩ 2 kΩ to 20 kΩ 20 kΩ to 200 kΩ 200 kΩ to 2 MΩ 2 MΩ to 20 MΩ 20 MΩ to 200 MΩ	18 μΩ/Ω + 1.0 μΩ 11 μΩ/Ω + 7.0 μΩ 10 μΩ/Ω + 43 μΩ 10 μΩ/Ω + 200 μΩ 10 μΩ/Ω + 2.0 mΩ 10 μΩ/Ω + 20 mΩ 12 μΩ/Ω + 200 mΩ 27 μΩ/Ω + 4.0 Ω 210 μΩ/Ω + 200 Ω	For measurement of instrument outputs
DC/LF MULTIFUNCTION TRANSFER STANDARD SYSTEM			
DC RESISTANCE	10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 100 MΩ	12 μΩ/Ω 10 μΩ/Ω 7.5 μΩ/Ω 5.8 μΩ/Ω 9.9 μΩ/Ω 17 μΩ/Ω 67 μΩ/Ω 250 μΩ/Ω	Sourcing resistance for measuring instruments
DC VOLTAGE	100 mV 1 V 10 V 19 V 100 V 1000 V	11 μV/V 4.5 μV/V 4.3 μV/V 4.3 μV/V 7.0 μV/V 6.1 μV/V	Sourcing and measurement capability for the calibration of voltage instruments

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
DC/LF MULTIFUNCTION TRANSFER STANDARD SYSTEM (cont'd)			
DC CURRENT	100 μA	39 μA/A	Sourcing and measurement capability for the calibration of current instruments
	1 mA	35 μA/A	
	10 mA	30 μA/A	
	100 mA	36 μA/A	
	1 A	51 μA/A	
	10 A	73 μA/A	
AC VOLTAGE	1 mV		Sourcing and measurement capability for the calibration of voltage instruments
	20 Hz	0.21 %	
	30 Hz	0.21 %	
	40 Hz	0.21 %	
	55 Hz	0.22 %	
	300 Hz	0.21 %	
	1 kHz	0.21 %	
	10 kHz	0.21 %	
	20 kHz	0.21 %	
	30 kHz	0.21 %	
	50 kHz	0.21 %	
	100 kHz	0.32 %	
	10 mV		
	20 Hz	320 μV/V	
	30 Hz	310 μV/V	
	40 Hz	310 μV/V	
	55 Hz	310 μV/V	
	300 Hz	300 μV/V	
	1 kHz	310 μV/V	
	10 kHz	300 μV/V	
	20 kHz	310 μV/V	
	30 kHz	360 μV/V	
	50 kHz	340 μV/V	
	100 kHz	530 μV/V	
	100 mV		
	20 Hz	130 μV/V	
	30 Hz	120 μV/V	
	40 Hz	130 μV/V	
	55 Hz	160 μV/V	
	300 Hz	120 μV/V	
	1 kHz	110 μV/V	
	10 kHz	110 μV/V	
	20 kHz	130 μV/V	
	30 kHz	180 μV/V	
	50 kHz	190 μV/V	
	100 kHz	370 μV/V	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
AC VOLTAGE (cont'd)	1 V		
	10 Hz	49 µV/V	
	20 Hz	51 µV/V	
	30 Hz	46 µV/V	
	40 Hz	41 µV/V	
	55 Hz	41 µV/V	
	300 Hz	39 µV/V	
	1 kHz	45 µV/V	
	10 kHz	41 µV/V	
	20 kHz	40 µV/V	
	30 kHz	40 µV/V	
	50 kHz	47 µV/V	
	100 kHz	78 µV/V	
	300 kHz	180 µV/V	
	500 kHz	470 µV/V	
	1 MHz	0.16 %	
	10 V		
	10 Hz	55 µV/V	
	20 Hz	48 µV/V	
	30 Hz	53 µV/V	
	40 Hz	41 µV/V	
	55 Hz	40 µV/V	
	300 Hz	40 µV/V	
	1 kHz	45 µV/V	
	19 V		
	1 kHz	39 µV/V	
	10 kHz	36 µV/V	
	20 kHz	38 µV/V	
	30 kHz	46 µV/V	
	50 kHz	57 µV/V	
	100 kHz	91 µV/V	
	300 kHz	160 µV/V	
	500 kHz	710 µV/V	
	1 MHz	0.14 %	
	100 V		
	10 Hz	55 µV/V	
	20 Hz	51 µV/V	
	30 Hz	50 µV/V	
	40 Hz	52 µV/V	
	55 Hz	48 µV/V	
	300 Hz	44 µV/V	
	1 kHz	42 µV/V	
	10 kHz	43 µV/V	
	20 kHz	44 µV/V	
	30 kHz	45 µV/V	
	50 kHz	51 µV/V	
	100 kHz	100 µV/V	
	700 V		
	50 kHz	190 µV/V	
	100 kHz	480 µV/V	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
AC VOLTAGE (cont'd)	1000 V		
	40 Hz	53 µV/V	
	55 Hz	51 µV/V	
	300 Hz	52 µV/V	
	1 kHz	49 µV/V	
	10 kHz	60 µV/V	
	20 kHz	63 µV/V	
	30 kHz	89 µV/V	
AC CURRENT	100 µA		Sourcing and measurement capability for the calibration of current instruments
	10 Hz	190 µA/A	
	20 Hz	190 µA/A	
	30 Hz	180 µA/A	
	40 Hz	180 µA/A	
	55 Hz	190 µA/A	
	300 Hz	180 µA/A	
	1 kHz	170 µA/A	
	5 kHz	390 µA/A	
	1 mA		
	10 Hz	140 µA/A	
	20 Hz	150 µA/A	
	30 Hz	130 µA/A	
	40 Hz	110 µA/A	
	55 Hz	110 µA/A	
	300 Hz	110 µA/A	
	1 kHz	110 µA/A	
	5 kHz	170 µA/A	
	10 mA		
	10 Hz	140 µA/A	
	20 Hz	130 µA/A	
	30 Hz	120 µA/A	
	40 Hz	110 µA/A	
	55 Hz	110 µA/A	
	300 Hz	110 µA/A	
	1 kHz	110 µA/A	
	5 kHz	170 µA/A	
	100 mA		
	10 Hz	140 µA/A	
	20 Hz	130 µA/A	
	30 Hz	130 µA/A	
	40 Hz	110 µA/A	
	55 Hz	110 µA/A	
	300 Hz	110 µA/A	
	1 kHz	110 µA/A	
	5 kHz	170 µA/A	
	1 A		
	10 Hz	180 µA/A	
	20 Hz	180 µA/A	
	30 Hz	170 µA/A	
	40 Hz	140 µA/A	
	55 Hz	140 µA/A	
	300 Hz	130 µA/A	
	1 kHz	180 µA/A	
	5 kHz	300 µA/A	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
AC CURRENT (cont'd)	10 A *10 Hz* *20 Hz* *30 Hz* *40 Hz* *55 Hz* *300 Hz* *1 kHz* *5 kHz* *10 kHz*	 370 µA/A 380 µA/A 380 µA/A 360 µA/A 360 µA/A 370 µA/A 390 µA/A 640 µA/A 0.12 %	
DC/LF AUTOMATED CALIBRATION SYSTEM			
DC VOLTAGE	0 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1000 V	15 µV/V + 1.4 µV 7.9 µV/V + 2.6 µV 7.8 µV/V + 6.7 µV 7.5 µV/V + 110 µV 9.0 µV/V + 0.30 mV	Sourcing and measurement capability for the calibration of voltage instruments
DC CURRENT	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 2 A to 10 A	160 µA/A + 2.3 nA 70 µA/A + 12 nA 75 µA/A + 120 nA 70 µA/A + 1.2 µA 160 µA/A + 24 µA 200 µA/A + 180 µA	Sourcing and measurement capability for the calibration of current instruments
DC RESISTANCE	0 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 100 MΩ	10 mΩ (2-wire configuration) 50 µΩ/Ω 20 µΩ/Ω 15 µΩ/Ω 15 µΩ/Ω 35 µΩ/Ω 630 µΩ/Ω 250 µΩ/Ω 500 µΩ/Ω	The zero uncertainty for 4-wire configurations will be lower than that for 2-wire configurations and will largely depend on the resolution of the instrument being calibrated.
AC VOLTAGE	2 mV to 200 mV *30 Hz to 1 kHz* *1 kHz to 10 kHz* *10 kHz to 30 kHz* *30 kHz to 100 kHz* 200 mV to 2 V *30 Hz to 300 Hz* *300 Hz to 1 kHz* *1 kHz to 30 kHz* *30 kHz to 100 kHz* 2 V to 20 V *30 Hz to 300 Hz* *300 Hz to 1 kHz* *1 kHz to 30 kHz* *30 kHz to 100 kHz*	 200 µV/V + 11 µV 160 µV/V + 11 µV 180 µV/V + 11 µV 540 µV/V + 11 µV 100 µV/V + 47 µV 100 µV/V + 47 µV 50 µV/V + 47 µV 180 µV/V + 47 µV 100 µV/V + 0.47 mV 100 µV/V + 0.47 mV 100 µV/V + 0.47 mV 210 µV/V + 0.47 mV	Sourcing and measurement capability for the calibration of voltage instruments

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
AC VOLTAGE (cont'd)	20 V to 200 V		
	30 Hz to 300 Hz	100 µV/V + 4.7 mV	
	300 Hz to 1 kHz	100 µV/V + 4.7 mV	
	1 kHz to 10 kHz	100 µV/V + 4.7 mV	
	10 kHz to 30 kHz	200 µV/V + 4.7 mV	
	30 kHz to 100 kHz	500 µV/V + 4.7 mV	
	200 V to 1000 V		
	40 Hz to 1 kHz	150 µV/V + 47 mV	
	1 kHz to 10 kHz	150 µV/V + 47 mV	
	10 kHz to 30 kHz	210 µV/V + 47 mV	
AC CURRENT	2 µA to 200 µA		Sourcing and measurement capability for the calibration of voltage instruments
	40 Hz to 5 kHz	350 µA/A + 200 nA	
	200 µA to 2 mA		
	40 Hz to 5 kHz	360 µA/A + 280 nA	
	2 mA to 20 mA		
	40 Hz to 5 kHz	550 µA/A + 280 nA	
	20 mA to 200 mA		
	300 Hz to 1 kHz	200 µA/A + 300 µA	
	1 kHz to 5 kHz	300 µA/A + 300 µA	
	200 mA to 2 A		
	300 Hz to 1 kHz	600 µA/A + 690 µA	
	1 kHz to 5 kHz	700 µA/A + 690 µA	
PRESSURE			Methods consistent with EURAMET CG17.
Gas pressure (absolute)			
Calibration of pressure measuring instruments and gauges	3.5 kPa to 175 kPa	Q[0.005 0 %, 2.2 Pa]	Calibration against a deadweight tester standard
	175 kPa to 700 kPa	Q[0.004 6 %, 2.2 Pa]	
Gas pressure (gauge)			
Calibration of pressure measuring instruments and gauges	-100 kPa to -20 kPa	0.004 3 %	Calibration against a deadweight tester standard
	-20 kPa to 0 kPa	70 Pa	
	3.5 kPa to 175 kPa	0.004 3 %	
	175 kPa to 700 kPa	0.004 3 %	
	700 kPa to 3.5 MPa	0.005 7 %	
	-100 kPa to 0 kPa	Q[0.003 3 %, 63 Pa]	Calibration against digital pressure controller
	0 to 40 kPa	Q[0.007 1 %, 9.5 Pa]	
	40 kPa to 250 kPa	Q[0.005 0 %, 70 Pa]	
	250 kPa to 3.5 MPa	Q[0.006 0 %, 0.74 kPa]	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
PRESSURE (cont'd)			
Hydraulic pressure (gauge)			
Calibration of pressure measuring instruments and gauges	0.35 MPa to 0.69 MPa 0.69 MPa to 6.9 MPa 6.9 MPa to 69 MPa	0.011 % 0.008 5 % 0.005 8 %	Calibration against a deadweight tester standard
	0 MPa to 7 MPa 7 MPa to 35 MPa 35 MPa to 70 MPa	Q[0.008 8%, 2.3 kPa] Q[0.005 8%, 15 kPa] Q[0.005 8%, 11 kPa]	Calibration against digital pressure gauges
TEMPERATURE			
Temperature Indicators and/or recorders with temperature sensors	5 °C to 60 °C 60 °C to 120 °C	0.037 °C 0.057 °C	Calibration against a reference standard in stirred liquid baths
ROTATIONAL SPEED			
Optical Tachometers	45 RPM to 1000 RPM 1000 RPM to 100,000 RPM	0.011% + 0.050 RPM 0.011% + 0.50 RPM	Calibration against a reference standard
TORQUE			
Hand Torque Tools	BS EN ISO 6789:2017 0.04 N·m to 1500 N·m	1.0% of reading	The uncertainty quoted is both for the application of the calibration torque and the device being calibrated
	For screwdrivers (Type II, Classes D, E and F 1.0 N·m to 10 N·m	1.0% of reading	Calibrations may also be given in lb·in & lb·ft
Hand Torque Tools	BS EN ISO 6789:2003 (withdrawn & superseded) 0.04 N·m to 1500 N·m	1.0% of reading	
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: $Q[a, b] = [a^2 + b^2]^{1/2}$