


Schedule of Accreditation

issued by

United Kingdom Accreditation Service

21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK

 <p>UKAS CALIBRATION 0043</p> <p>Accredited to ISO/IEC 17025:2005</p>	Roxspur Measurement and Control Calibration Laboratory	
	Issue No: 049 Issue date: 02 April 2011	
	2 Downgate Drive Sheffield South Yorkshire S4 8BT	Contact: Mr M Donnelly Tel: +44 (0)114 244 2521 Fax: +44 (0)114 243 4838 E-Mail: mdonnelly@roxspur.com Website: www.roxspur.com
Calibration performed by the Organisations at the locations specified below		

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details	Activity	Location code
Address 2 Downgate Drive Sheffield South Yorkshire S4 8BT	Local contact Mr Mark Donnelly Tel: +44 (0)114 244 2521 Fax: +44 (0)114 243 4838 Email: mdonnelly@roxspur.com Website: www.roxspur.com	Electrical Flow Pressure Temperature P

Site activities performed away from the locations listed above:

Location details	Activity	Location code
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.	Local contact Mr Mark Donnelly Tel: +44 (0)114-244 2521 Fax: +44 (0)114-243 4838 Email: mdonnelly@roxspur.com Website: www.roxspur.com	Electrical Pressure Temperature S



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DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ($k = 2$)	Remarks	Location Code
ELECTRICAL				
DC Voltage				
Measurement	0 V to 200 mV 200 mV to 2 V 2 V to 1100 V	10 ppm + 0.60 μ V 20 ppm + 0.60 μ V 20 ppm		P
Generation	0 V to 30 V	5.0 mV		S
Measurement	0 mV to 320 mV 320 mV to 3.2 V 3.2 V to 32 V 32 V to 320 V 320 V to 1050 V	150 ppm + 10 μ V 150 ppm + 50 μ V 150 ppm + 0.5 mV 150 ppm + 5.5 mV 150 ppm + 25 mV		P
Generation	0 V to 30 V	5.0 mV		S
DC Current				
Measurement	0 μ A to 200 μ A 200 μ A to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A	150 ppm + 2.0 nA 150 ppm + 20 nA 150 ppm + 150 nA 150 ppm 250 ppm		P
Generation	0 mA to 100 mA	0.010 mA		S
Measurement	0 μ A to 320 μ A 320 μ A to 3.2 mA 3.2 mA to 32 mA 32 mA to 320 mA 320 mA to 3.2 A 3.2 A to 10 A 10 A to 20 A	350 ppm + 20 nA 350 ppm + 100 nA 360 ppm + 1.1 μ A 400 ppm + 15 μ A 550 ppm + 150 μ A 500 ppm + 1.1 mA 0.11 % + 5.2 mA		P
Measurement	20 A to 1000 A	0.31 %	For the calibration of clampmeters only	
Generation	0 mA to 100 mA	0.010 mA		S
DC Resistance				
Measurement	0 Ω to 20 Ω 20 Ω to 2 k Ω 2 k Ω to 20 k Ω 20 k Ω to 200 k Ω 200 k Ω to 2 M Ω 2 M Ω to 20 M Ω 20 M Ω to 200 M Ω 200 M Ω to 2 G Ω	100 ppm + 1.0 m Ω 20 ppm + 1.0 m Ω 20 ppm 30 ppm 50 ppm 200 ppm 700 ppm 0.10 %		P



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DC Resistance (cont'd)				
Generation	0 Ω to 40 Ω 40 Ω to 400 Ω 400 Ω to 4 k Ω 4 k Ω to 40 k Ω 40 k Ω to 400 k Ω 400 k Ω to 4 M Ω 4 M Ω to 40 M Ω 40 M Ω to 400 M Ω	0.060 % + 24 m Ω 0.020 % + 24 m Ω 0.020 % + 100 m Ω 0.020 % + 1.0 Ω 0.030 % + 10 Ω 0.055 % + 200 Ω 0.070 % + 2.0 k Ω 0.080 % + 20 k Ω		P
AC Voltage				
Measurement	10 mV to 200 mV 20 Hz to 10 kHz 10 kHz to 100 kHz	300 ppm + 10 μ V 550 ppm + 15 μ V		P
	200 mV to 200 V 20 Hz to 30 kHz 30 kHz to 100 kHz	400 ppm 500 ppm		
	200 V to 1100 V 45 Hz to 10 kHz	450 ppm		
Generation	10 mV to 32 mV 40 Hz to 10 kHz	0.30 % + 150 μ V		P
	32 mV to 320 mV 40 Hz to 10 kHz 10 kHz to 50 kHz	450 ppm + 50 μ V 550 ppm + 150 μ V		
	320 mV to 3.2 V 10 Hz to 10 kHz 10 kHz to 30 kHz 30 kHz to 100 kHz	500 ppm + 350 μ V 450 ppm + 600 μ V 0.10 % + 3.0 mV		
	3.2 V to 32 V 10 Hz to 10 kHz 10 kHz to 30 kHz 30 kHz to 100 kHz	500 ppm + 3.0 mV 550 ppm + 6.0 mV 0.15 % + 40 mV		
	32 V to 100 V 10 Hz to 10 kHz 10 kHz to 30 kHz 30 kHz to 100 kHz	550 ppm + 10 mV 550 ppm + 20 mV 0.15 % + 140 mV		
	100 V to 320 V 40 Hz to 3 kHz 3 kHz to 30 kHz	650 ppm + 25 mV 650 ppm + 80 mV		
	320 V to 750 V 40 Hz to 10 kHz	650 ppm + 160 mV		



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AC Current Measurement	20 Hz to 1 kHz 10 μ A to 200 μ A 200 μ A to 200 mA 200 mA to 2 A	350 ppm + 30 nA 360 ppm 650 ppm		P
Generation	10 Hz to 3 kHz 10 μ A to 32 μ A 32 μ A to 320 μ A 320 μ A to 3.2 mA 3.2 mA to 32 mA 32 mA to 320 mA 320 mA to 3.2 A 3.2 A to 20 A	0.50 % + 1.1 μ A 600 ppm + 350 nA 600 ppm + 350 nA 600 ppm + 4.0 μ A 0.10 % + 40 μ A 0.15 % + 600 μ A 0.25 % + 6.0 mA		P
Frequency	40 Hz to 100 Hz 20 A to 1000 A	0.50 %	For the calibration of clampmeters only	
Generation	10 Hz to 1 MHz	70 ppm		P
Measurement	10 Hz to 200 kHz	2.0 in 10^6		P
Time interval	60 s to 8 hrs 60 s to 8 hrs	0.40 s 0.60 s		P S
Electrical calibration of temperature indicators, controllers and recorders for the following sensors:				
Nobel metal thermocouples				
Types R and S	0 $^{\circ}$ C to 200 $^{\circ}$ C 200 $^{\circ}$ C to 1700 $^{\circ}$ C	0.50 $^{\circ}$ C 0.40 $^{\circ}$ C	with cold junction compensation	P
Type B	600 $^{\circ}$ C to 1700 $^{\circ}$ C	0.40 $^{\circ}$ C	with cold junction compensation	P
Type R and S	0 $^{\circ}$ C to 200 $^{\circ}$ C 200 $^{\circ}$ C to 1700 $^{\circ}$ C	0.70 $^{\circ}$ C 0.60 $^{\circ}$ C	with cold junction compensation	S
Type B	600 $^{\circ}$ C to 1700 $^{\circ}$ C	0.60 $^{\circ}$ C	with cold junction compensation	S
Base metal thermocouples	- 200 $^{\circ}$ C to 0.0 $^{\circ}$ C 0 $^{\circ}$ C to 1372 $^{\circ}$ C	0.25 $^{\circ}$ C 0.20 $^{\circ}$ C	with cold junction compensation	P
	- 200 $^{\circ}$ C to 0.0 $^{\circ}$ C 0 $^{\circ}$ C to 1372 $^{\circ}$ C	0.50 $^{\circ}$ C 0.40 $^{\circ}$ C	with cold junction compensation	S



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Electrical calibration of temperature indicators, controllers and recorders for the following sensors: (cont'd)				
Pt 100	- 100 °C to + 660 °C	0.030 °C		P
	- 100 °C to + 660 °C	0.30 °C		S
FLOW				
Flow rate - Gas	0.005 l/min to 0.25 l/min 0.25 l/min to 2 l/min 2 l/min to 50 l/min	0.50 % 0.40 % 0.40 %	Calibrations medium: Compressed Air Oxygen Argon Carbon Dioxide Nitrous Oxide Helium Nitrogen	P
PRESSURE				
Gas pressure (absolute)				
Calibration of pressure indicating instruments and gauges	3.5 kPa to 120 kPa 120 kPa to 3.1 MPa	80 Pa 0.015 % + 80 Pa	Calibration of pressure devices with an electrical output may be undertaken	P
	3 kPa to 80 kPa 80 kPa to 120 kPa 120 kPa to 2.1 MPa 2.1 MPa to 4.1 MPa	3.0 kPa 300 Pa 3.0 kPa 4.0 kPa		S
Gas pressure (gauge)				
Calibration of pressure indicating instruments and gauges	- 90 kPa to - 3.5 kPa 3.5 kPa to 3 MPa	0.015 % 0.015 %		P
	- 100 kPa to + 2 MPa 2 MPa to 4 MPa	2.5 kPa 4.0 kPa		S
Hydraulic pressure (absolute)				
Calibration of pressure indicating instruments and gauges	700 kPa to 6.1 MPa 6.1 MPa to 120.1 MPa	0.016 % + 80 Pa 0.02 % + 80 Pa		P
	10 kPa to 60 MPa	100 kPa		S
Hydraulic pressure (gauge)				
Calibration of pressure indicating instruments and gauges	600 kPa to 6 MPa 6 MPa to 120 MPa	0.016 % 0.020 %		P
	0 to 60 MPa	100 kPa		S



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TEMPERATURE				
Resistance thermometers	- 196 °C 0 °C to - 80 °C Ice Point (0 °C) Triple Point of water (0.01 °C) Gallium Melt Point (29.7646 °C) 0 °C to 300 °C	0.050 °C 0.050 °C 0.027 °C 0.0080 °C 0.010 °C 0.050 °C		P
Platinum thermocouples	0 °C to 1100 °C 1100 °C to 1600 °C	0.50 °C 1.8 °C		P
	0 °C to 1100 °C 1100 °C to 1600 °C	2.0 °C 4.0 °C		S
	Fixed point calibrations			
	Gallium Melt Point (29.7646 °C) Tin (231.9 °C) Zinc (419.5 °C) Copper (1084.62 °C) Palladium (1552 °C)	0.35 °C 0.50 °C 0.50 °C 0.40 °C 1.7 °C		P
Other thermocouples	- 196 °C 0 °C to - 80 °C Gallium Melt Point (29.7646 °C) 0 °C to 300 °C 300 °C to 650 °C 650 °C to 1100 °C 1100 °C to 1300 °C	0.26 °C 0.15 °C 0.10 °C 0.15 °C 0.25 °C 1.0 °C 2.5 °C		P
	- 80 °C to + 200 °C 200 °C to 1000 °C 1000 °C to 1300 °C	1.0 °C 3.0 °C 5.0 °C		S
Compensating and extension cables for				P
Noble metal thermocouples	0 °C to 40 °C	0.26 °C		
Base metal thermocouples	0 °C to 40 °C	0.15 °C		
Liquid-in-glass thermometers	- 80 °C to - 40 °C - 40 °C to 0 °C Ice point (0 °C) 0 °C to 100 °C 100 °C to 300 °C	0.11 °C 0.050 °C 0.050 °C 0.050 °C 0.050 °C		P
Optical Pyrometers	800 °C to 1100 °C 1100 °C to 2200 °C	5.0 °C 8.0 °C	Using effective wavelength of 0.65 μm to 0.66 μm	P
Radiation thermometers	500 °C to 1100 °C 1100 °C to 1600 °C	4.0 °C 5.0 °C		P



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TEMPERATURE (cont'd)				
Electronic thermometers with sensors	Range as per sensors	As for sensors		P
Electronic thermometers with sensors	0 °C to 200 °C	0.50 °C		S
Analogue	200 °C to 600 °C	1.3 °C		
Digital	600 °C to 1100 °C	2.0 °C		
	1100 °C to 1300 °C	3.4 °C		
Metal block calibrators	- 20 °C to + 300 °C	0.050 °C		P
	300 °C to 1100 °C	1.0 °C		
Temperature surveys				
Autoclaves, incubators and Freezers	- 80 °C to + 200 °C	1.0 °C	Single and multipoint monitoring probes. Time dependent temperature profiling.	S
Ovens, furnaces and environmental chambers	0 °C to 600 °C	1.1 °C		
	600 °C to 1100 °C	1.9 °C		
	1100 °C to 1600 °C	3.5 °C		
END				