

Scotia Instrumentation Calibration Capabilities

TYNE & WEAR

A greater range of capabilities can be supported by our facilities in Aberdeen as equipment can be transferred between premises where required. Please contact us on (0191) 296 3444 for details.

PRESSURE MEASUREMENT

Range	Accuracy	Cal. device	Notes
0.1 to 7 barg 1 to 100 psig	0.04% rdg	Budenberg 240 DWT	Calibrations on Industrial Nitrogen. Liquid calibrations as requested, via seal.
1 to 600 barg 10 to 8000 psig	0.03% rdg	Budenberg 380/480D	Calibrations on Tellus oil. Water and other fluids on request using Fig 28 seal.
1 to 1200 barg 10 to 16000 psig	0.05% rdg	Budenberg 380/480H DWT	Calibrations on Tellus oil.
100 to 3550 barg	0.06% rdg	Budenberg 283 DWT	Calibrations on Tellus oil.
10 to 40000 psig	0.04% rdg	Budenberg 580EHX	Calibrations on Tellus oil.
-1 to 20 barg	±0.025% of fs	Druck DPI 610	Comparison.
-1 to 20 barg	±0.008% of fs	Pace 5000	Absolute and gauge mode on nitrogen.
0 to 2 barg	±0.02% of fs	Additel ADT673	Calibrations on air

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TEMPERATURE MEASUREMENT

<u>Range</u>	<u>Accuracy</u>	<u>Cal. device</u>	<u>Notes</u>
-20°C to 250°C	±0.05°C to 0.1°C	6mm OD Pt100 RTD	Via Newport Ind.
K type (-200°C to 1370°C) Thermocouple	0.1°C to 1.5°C	Unomat MCX Calibrator	Simulate/measure
J type (-210°C to +1200°C) Thermocouple	0.1°C to 1.5°C	Unomat MCX Calibrator	Simulate/measure
T type (-250°C to +400°C) Thermocouple	0.1°C to 1°C	Unomat MCX Calibrator	Simulate/measure
Thermocouple types K, J, T, B, C, E, N, R, S (-250°C to 2320°C)	0.15°C	Wavetek 9100 Calibrator	Generate only
Pt100 (-200°C to 850°C)	0.05°C	Wavetek 9100 Calibrator	Generate only
35°C to 500°C	±0.5°C	Fluke 9132 IR Calibrator	

Other probe types can also be simulated - please ask for details

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ELECTRICAL MEASUREMENT

Section 1: Voltage DC

Generate

<u>Range</u>	<u>Accuracy</u>	<u>Cal. device</u>	<u>Notes</u>
100µV	10ppm +1µV	Wavetek 4805	
1mV	0.006%	Fluke 9100	
10mV	0.006%	Fluke 9100	
100mV	0.006%	Fluke 9100	
1V	0.006%	Fluke 9100	
10V	0.0065%	Fluke 9100	
100V	0.0065%	Fluke 9100	
1000V	0.006%	Fluke 9100	
40kV	±2%	HV probe	Using T&R PT30-10.

Measure

<u>Range</u>	<u>Accuracy</u>	<u>Cal. device</u>	<u>Notes</u>
100mV	10ppm	Wavetek 1271	
1V	8ppm	Wavetek 1271	
10V	7ppm	Wavetek 1271	
100V	8ppm	Wavetek 1271	
1000V	10ppm	Wavetek 1271	
Up to 40kV	±2%	HV probe	

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ELECTRICAL MEASUREMENT

Section 2: Voltage AC

Generate

<u>Range</u>	<u>Accuracy</u>	<u>Cal. device</u>	<u>Notes</u>
1mV	0.04% +384 μ V	Fluke 9100	
10mV	0.04% +96 μ V	Fluke 9100	
100mV	0.04% +19.2 μ V	Fluke 9100	
1V	0.04% +192 μ V	Fluke 9100	
10V	0.04% +1.92mV	Fluke 9100	
100V	0.04% +6.3mV	Fluke 9100	
1000V	0.05% +126mV	Fluke 9100	
40kV	5%	HV Probe	HV Biccotest T106

Measure

<u>Range</u>	<u>Accuracy</u>	<u>Cal. device</u>	<u>Notes</u>
100mV	10ppm	Wavetek 1271	
1V	8ppm	Wavetek 1271	
10V	7ppm	Wavetek 1271	
100V	8ppm	Wavetek 1271	
1000V	11ppm	Wavetek 1271	
up to 40kV	$\pm$ 5%	HV probe	

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ELECTRICAL MEASUREMENT

Section 3: Current DC

Generate

<u>Range</u>	<u>Accuracy</u>	<u>Cal. device</u>	<u>Notes</u>
1μA	0.14% +11nA	Fluke 9100	
10μA	0.014% +11nA	Fluke 9100	
100μA	0.14% +11nA	Fluke 9100	
1mA	0.014% +83nA	Fluke 9100	
10mA	0.014% +900nA	Fluke 9100	
100mA	0.016% +9.6μA	Fluke 9100	
2A	0.06% +118μA	Fluke 9100	
20A	0.055% +4.5mA	Fluke 9100	
1000A	0.055% +225mA	Fluke 9100	Via current coil

Measure

<u>Range</u>	<u>Accuracy</u>	<u>Cal. device</u>	<u>Notes</u>
100μA up to 10mA	50ppm	Wavetek 1271	
100mA	100ppm	Wavetek 1271	
2A	150ppm	Wavetek 1271	
2000A	±1.5% of rdg	Fluke 353 clamp meter	

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Section 4: Current AC

Generate

<u>Range</u>	<u>Accuracy</u>	<u>Cal. device</u>	<u>Notes</u>
1μA	0.07% +900nA	Fluke 9100	
10μA	0.07% +900nA	Fluke 9100	
100μA	0.07% +300nA	Fluke 9100	
1mA	0.07% +300nA	Fluke 9100	
10mA	0.07% +3.2μA	Fluke 9100	
100mA	0.08% +32μA	Fluke 9100	
2A	0.1% +480μA	Fluke 9100	
20A	0.2% +6.9mA	Fluke 9100	
1000A	±1.3% of rdg	Fluke 9100	Via current coil.

Measure

<u>Range</u>	<u>Accuracy</u>	<u>Cal. device</u>	<u>Notes</u>
100μA up to 100mA	200ppm	Wavetek 1271	
2A	500ppm	Wavetek 1271	
2000A	±1.5% of rdg	Fluke 353 clamp meter	

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Section 5: Resistance

Generate

<u>Range</u>	<u>Accuracy</u>	<u>Cal. device</u>	<u>Notes</u>
50 $\mu\Omega$ to 2 Ω	$\pm 0.8\%$	Time 5070	
1 Ω	0.025% +10m Ω	Fluke 9100	
10 Ω	0.025% +10m Ω	Fluke 9100	
100 Ω	0.02% +20m Ω	Fluke 9100	
1k Ω	0.015% +80m Ω	Fluke 9100	
10k Ω	0.020% +800m Ω	Fluke 9100	
100k Ω	0.02% +8 Ω	Fluke 9100	
1M Ω	0.05% +100 Ω	Fluke 9100	
10M Ω	0.15% +2k Ω	Fluke 9100	
100M Ω	0.26% +40k Ω	Fluke 9100	
100G Ω	$\pm 1\%$	Hi Ohms Box	Via 1271.

Measure

<u>Range</u>	<u>Accuracy</u>	<u>Cal. device</u>	<u>Notes</u>
10 Ω	18ppm	Wavetek 1271	The 1271 is a meter and can only measure the stated values.
100 Ω to 100K Ω	10ppm	Wavetek 1271	
1M Ω	15ppm	Wavetek 1271	
10M Ω	30ppm	Wavetek 1271	
100M Ω	400ppm	Wavetek 1271	
1G Ω	$\pm 0.3\%$	Wavetek 1271	

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ELECTRICAL MEASUREMENT

Section 6: Frequency

Generate

<u>Range</u>	<u>Accuracy</u>	<u>Cal. device</u>	<u>Notes</u>
0.1Hz to 10MHz	0.01ppm	Global 4401	
0.5Hz to 10MHz	25ppm of rdg	Wavetek 9100	

Measure

<u>Range</u>	<u>Accuracy</u>	<u>Cal. device</u>	<u>Notes</u>
10Hz to 200MHz	±3ppm +1lsd	Racal Dana 1991 counter	Standard used: GPS Frequency Reference.

Section 7: Conductivity and Capacitance

Generate

<u>Range</u>	<u>Accuracy</u>	<u>Cal. device</u>	<u>Notes</u>
2.5nS to 2.5mS	± 0.04% (Best)	Fluke 9100	Check only.
500pF to 40mF	±0.3 +15pF (Best)	Fluke 9100	Check only.
10pF to 100µF	±1%	Time 1071 Decade Box	

Measure

<u>Range</u>	<u>Accuracy</u>	<u>Cal. device</u>	<u>Notes</u>
1mH, 10mH	±1% to 5lsd	Metrix IX 3131	
100mH	±0.5% +5lsd		
1H	±0.3% +5lsd		
10nF	±0.6% +5lsd		
100nF	±0.4% +5lsd		
Above 1000nF	±0.4% +3lsd		

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ELECTRICAL MEASUREMENT

Section 8: RCD Testers

Measure

<u>Range</u>	<u>Accuracy</u>	<u>Cal. device</u>	<u>Notes</u>
10mA to 150mA	±1mA	Transmille 2080/Transmille 2100	
30ms to 150ms	±1ms	Transmille 2080/Transmille 2100	

Section 9: Tachometers

Generate

<u>Range</u>	<u>Accuracy</u>	<u>Cal. device</u>	<u>Notes</u>
to 60,000rpm	± 0.01%	Fluke 9100/Global 4401	Frequency source. Via test box.

Section 10: Sound Level Calibration

Generate

<u>Range</u>	<u>Accuracy</u>	<u>Cal. device</u>	<u>Notes</u>
94 & 114dB	±0.3dB	Quest QC-20 Calibrator	Generate Dual Frequency

Scotia Instrumentation Calibration Capabilities**TYNE & WEAR****PUMP TESTING**

<u>Range</u>	<u>Uncertainty</u>	<u>Cal. device</u>	<u>Notes</u>
Testing to 27,500psi	0.5%	Test Cabinet	Testing of adaptors, valves, hose assemblies etc.

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DIMENSIONAL METROLOGY

<u>Device type</u>	<u>Range</u>	<u>Cal. device</u>	<u>Uncertainty & Notes</u>
External Micrometers	0 to 40" 0 to 1000mm	Slip gauges	0.4" - 4" $\pm 0.000003"$ - 0.000007" Above 2" (50 mm) the Trimos device is used for calibration.
Internal Micrometers	0 to 40" 0 to 1000mm	Trimos Linear Meas. Device	$\pm 0.6 + (4 \times \text{length in meters})$ in μm +1lsd BSENISO3611:2010 BS959:2008
Depth Micrometers	0 to 40" 0 to 1000mm	Trimos Linear Meas. Device	$\pm 0.6 + (4 \times \text{length in meters})$ in μm +1lsd BS6468:2008
Vernier Calipers	0 to 40" 0 to 1000mm	Slip gauges Trimos Linear Meas. Device	0.4" - 4" $\pm 0.000003"$ - 0.000007"/ $\pm 0.6 + (4 \times \text{length in meters})$ in μm +1lsd BS887:2008
Steel Rules / tapes	1m	Steel rule Trimos Linear Meas. Device	Manufacturer or customer spec. BS4035:1996
Depth Verniers	0 to 40"	Traceable Slip gauges/ Trimos Linear Meas. Device	0.4" - 4" $\pm 0.000003"$ - 0.000007"/ $\pm 0.6 + (4 \times \text{length in meters})$ in μm +1lsd Up to 40" BS6365:2008
Height Gauges	0 to 24"	Traceable Slip/Rod Gauges	0.4" - 4" $\pm 0.000003"$ - 0.000007"/ $\pm 0.0002"$ - 0.0006" BS1643:2008
Dial Indicator	0.0001/001"	Traceable Slip Gauges/ Trimos Linear Meas. Device	0.4" - 4" $\pm 0.000003"$ - 0.000007"/ $\pm 0.6 + (4 \times \text{length in meters})$ in μm +1lsd BS907:2008
Coatings thickness	1000microns	Calibrated Foil Set	$\pm 0.005\text{mm}$ Manufacturer's spec.
Scales	1g to 54kg	Mass weights	M3 - M1 class Certify mass weights OIML R111:2004
Electronic thickness meters	0 to 250mm	Calibrated blocks	0.1mm Manufacturer's spec.
Protractors	Digital & Mechanical	Sine bar/Slip gauges	Digital - Manufacturer's spec. BS939:2007
Coating Thickness Foils	1000microns	ULM	$\pm 0.005\text{mm}/$ Manufacturer's spec.

Scotia Instrumentation Calibration Capabilities**TYNE & WEAR****DIMENSIONAL METROLOGY (Contd)**

Paint Thickness meters	1000microns	Calibrated foils	Manufacturer's spec.
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TORQUE MEASUREMENT

<u>Range</u>	<u>Accuracy</u>	<u>Cal. device</u>	<u>Notes</u>
0 to 100Nm	± 0.25% of reading	Torque Analyser	Torque wrenches are also serviced and adjusted. BSENISO6789-1:2017
10Nm to 1000Nm	±0.25% of reading	Torque Analyser	BSENISO6789-1:2017
100 to 2800Nm / 2100lbf.ft	±0.25% of reading	Torque Analyser	BS EN ISO 6789:2003
1Nm to 25Nm	±1% of reading	Torque Tester	BSENISO6789-1:2017

FLOWMETERS (LIQUID)

<u>Range</u>	<u>Accuracy</u>	<u>Cal. device</u>	<u>Notes</u>
-12.2 to 12.2m/s	2 - 5%	Panametrics PT878	Test only.

Our UKAS capabilities are taken from the current Schedule for Lab 0208 on www.ukas.org

To see just what Scotia Instrumentation has to offer on sales and hires as well as repairs and calibrations, visit us at our web-site on :

<http://www.scotia-instrumentation.com>

or contact us at :

info@scotia-instrumentation.com

External On-Site capabilities are listed on document ID : [CCL04](#)

Full capabilities at Aberdeen are listed on document ID : [CCL01](#)

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