CERTIFICATION OF CALIBRATION

Date Of Calibration: 13-Jan-2017 **Certificate Number:** GA10350_1/17739

4533

ISSUED BY: GEOTECHNICAL INSTRUMENTS (UK) LTD

Customer: **Leyden Kirby Associates Limited**

Eton Business Park Eton Hill Road Radcliffe
MANCHESTER M26 2ZS UNITED KINGDOM

Description: Gas Analyser

Model: GA2000

Serial Number: GA10350

UKAS Accredited results:

Results after adjustment :

Methane (CH_4)		
Certified Gas (%)	**Instrument Reading (%)**	**Uncertainty (%)**
5.1	5.1	0.41
15.0	15.1	0.64
50.0	49.2	0.94

Carbon Dioxide (CO_2)		
Certified Gas (%)	**Instrument Reading (%)**	**Uncertainty (%)**
5.1	4.9	0.43
15.1	14.8	0.70
50.0	49.9	1.1

Oxygen (O_2)		
Certified Gas (%)	**Instrument Reading (%)**	**Uncertainty (%)**
21.0	21.0	0.31

The inwards assessment was carried out 05-Jan-2017.
The maximum adjustment is larger than the inwards assessment uncertainty.
Inwards assessment data is available if requested.

All concentrations are molar.

CH_4, CO_2 readings recorded at : 30.4 °C ± 1.5 °C

O2 reading recorded at : 21.9 °C ± 1.5 °C

Barometric Pressure : 1000 mbar ± 3 mbar

Method of Test : The analyser is calibrated in a temperature controlled chamber using a series of reference gases, in compliance with procedure LP004.

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

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The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Calibrations marked 'Non-UKAS Accredited results' on this certificate have been included for completeness.

Non-UKAS Accredited results:

Barometer (mbar)	
Reference	**Instrument Reading**
1000	1000

Internal Flow	
Applied (l/hr)	**Instrument Reading (l/hr)**
5.00	5.15
10.00	10.20

Approved by Signatory

Dawn Hemings

Laboratory Inspection

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Instrument Service Report

Unit Type: GA2000	Part Number:	Date:	Next Service Due:	Customer Name:
Serial Number: GA10350	GA2K1-E100	16-Jan-2017	13-Jul-2017	Leyden Kirby Associates Limited

Actions/Investigation Description	Result	Comments
Serial Number Check	Yes	
Serial Comms Test	Pass	
Full Automatic Calibration	Pass	
Service history of instrument reviewed	Yes	
Inwards gas check data reviewed	Yes	
Instrument turns on	Pass	
Customer specific requirements observed and reported fault(s) acknowledged	N/A	
Backlight operates correctly	Yes	
External visual inspection performed	Pass	
Microfibre (inlet port) filter replaced	Yes	
Instrument has latest software	Yes	
Memory cleared (cold start)	Yes	
Internal visual inspection performed	Pass	
PTFE filter replaced	Yes	
Chemical sensor(s) replaced	Yes	CO cell replaced
Battery over 6 years old and replaced	No	

Instrument Service Report

Unit Type: GA2000	Part Number:	Date:	Next Service Due:	Customer Name:
Serial Number: GA10350	GA2K1-E100	16-Jan-2017	13-Jul-2017	Leyden Kirby Associates Limited

Actions/Investigation Description	Result	Comments
O2 sensor replaced	No	
All screws tightened to correct torque	Yes	
All connectors are secure	Pass	
Check diagnostic channels	Pass	
Case compression test	Pass	
Impact and stability test	Pass	
Pump flow test	Pass	
Automated instrument pressure system test (leak test)	Pass	
Pump vacuum test and flow fails in main read screen	Pass	
Pressure transducer test(s) as per user operation	Pass	
Final visual inspection on instrument	Pass	
Blanking plugs in place	Yes	
Carry strap pins in place	Yes	
Case assembly closed and screws tightened to correct torque	Yes	
Response to customer's reported comments	NA	
GPS function test	NA	
Internal flow calibrated - refer to results on Calibration Certificate	Pass	

Instrument Service Report

Unit Type: GA2000	Part Number:	Date:	Next Service Due:	Customer Name:
Serial Number: GA10350	GA2K1-E100	16-Jan-2017	13-Jul-2017	Leyden Kirby Associates Limited

Actions/Investigation Description	Result	Comments
Temperature probe tested	Pass	
Anemometer tested	NA	
As Received Chemical Cell Gas Assessment Performed (RIG 8)	Yes	
As Received Gas Assessment Performed (RIG 1 or RIG 2)	Yes	
Chemical gas sensors calibrated – refer to Calibration Certificate	Retest Passed	

Customer Comments

Returned for full service and calibration.
CUSTOMER REQUEST ACCESSORIES DO NOT NEED TO BE REPAIRED / REPLACED.

Accessory Test	Result	Comments
Charger	Pass	Charger output is in spec.
Water Trap	Pass	Replaced PTFE filter. Replaced tubing, Replaced hose barb, Tested ok.

Service Details:		Service Engineer:	Calibration Engineer:	Approved By:	Signature:
Service Scheme	✓	David Edwards	Suk Balrey	Dawn Hemings	
Standard Service					