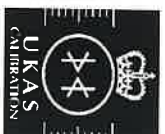


CERTIFICATION OF CALIBRATION



Date Of Calibration: 12-Aug-2021

Certificate Number: G503409_1/28653

Issued by: QED Environmental Systems Ltd.

Customer: Structural Soils Limited

Spring Lodge 172 Chester Road Helsby
Frodsham Cheshire WA6 0AR UNITED KINGDOM

Description: Gas Analyser

Model: GA5000

Serial Number: G503409

UKAS Accredited results:

Results after adjustment :

Methane (CH ₄)			
Certified Gas (%)	Instrument Reading (%)		Uncertainty (%)
5.0	5.0		0.072
14.9	14.9		0.13
59.7	59.3		0.42

Carbon Dioxide (CO ₂)			
Certified Gas (%)	Instrument Reading (%)		Uncertainty (%)
5.0	4.8		0.074
15.1	14.7		0.13
40.3	40.3		0.29

Oxygen (O ₂)			
Certified Gas (%)	Instrument Reading (%)		Uncertainty (%)
21.1	21.2		0.25

The inwards assessment was carried out 03-Aug-2021.

The maximum adjustment is larger than the specification limit.

Inwards assessment data is available if requested.

All concentrations are molar.

CH₄, CO₂ readings recorded at : 32.3 °C ± 2.5 °C

O₂ readings recorded at : 22.5 °C ± 2.5 °C

Barometric Pressure : 1006 mbar ± 4 mbar

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

Instrument has passed calibration as the measurement result is within the specification limit. The specification limit takes into account the measurement uncertainty.

The results relate only to the item calibrated

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.

Calibration Instance:112 IGC Instance:112

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QED Environmental Systems Ltd. Cyan Park - Unit 3, Jimmy Hill Way, Coventry, CV2 4QP, UNITED KINGDOM

Registered in England and Wales 1898734

CERTIFICATION OF CALIBRATION

Date Of Calibration: 12-Aug-2021

Issued by: QED Environmental Systems Ltd.



Certificate Number: G503409_1/28653

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 after adjustment:

Barometer (mbar)	
Reference	Instrument Reading
1006	1007

Additional Gas Cells		
Gas	Certified Gas (ppm)	Instrument Reading (ppm)
CO	509	509
H ₂ S	53.6	54

Internal Flow	
Applied (l/hr)	Instrument Reading (l/hr)
5.0	4.9
10.0	9.9

Date of Issue : 25-Aug-2021

Approved by Signatory

Dawn Hemings

Laboratory Inspection

End of Certificate

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.

Calibration Instance:112 IGC Instance:112

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Instrument Service Report

<u>Unit Type:</u> GA5000	<u>Part Number:</u>	<u>Date:</u>	<u>Next Service Due:</u>	<u>Customer Name:</u>
<u>Serial Number:</u> G503409	GA5KB0B0-101	25-Aug-2021	12-Feb-2022	Structural Soils Limited
Actions/Investigation Description	Result	Comments		
Serial Number Check	Yes			
Battery Requires Replacing	No			
Internal Flow Calibrated	Yes			
Full Automatic Calibration	Pass			
Serial Comms Test (USB)	Pass			
Service history of instrument reviewed	Yes			
Inwards gas check data reviewed	Yes	Poor user calibration performed		
Instrument turns on	Pass			
Backlight operates correctly	Yes			
External visual inspection performed	Pass			
Internal visual inspection performed	Pass			
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			
Pressure transducer test(s) as per user operation	Pass			

Instrument Service Report

<u>Unit Type:</u> GA5000	<u>Part Number:</u> GA5KB0B0-101	<u>Date:</u> 25-Aug-2021	<u>Next Service Due:</u> 12-Feb-2022	<u>Customer Name:</u> Structural Soils Limited
<u>Serial Number:</u> G503409				
Actions/Investigation Description	Result	Comments		
Final visual inspection on instrument	Pass			
Case assembly closed and screws tightened to correct torque	Yes			
PTFE filters replaced	Yes			
Pump flow greater than 550 ml/min	Pass	620ml		
Automated instrument pressure system test (leak test)	Pass			
Pump vacuum greater than -400 mb and flow fails	Pass	-455mb		
GPS function test	NA			
Temperature probe tested	Pass			
Anemometer tested	Pass			
Chemical gas sensors calibrated – refer to Calibration Certificate	Pass			
Check main PCB and sensor PCB have the latest software	Yes			
Transducers calibrated	Pass			
As Received Chemical Cell Gas Assessment Performed (CAL16)	Yes			
As Received Gas Assessment Performed (CAL01 or CAL02)	Yes			
Chemical sensor(s) replacement over 2yrs UK and 21mths overseas.	N/A			
O2 sensor replacement over 3yrs UK, 33mths overseas	NA			

Instrument Service Report

<u>Unit Type:</u> GA5000	<u>Part Number:</u> GA5KB0B0-101	<u>Date:</u> 25-Aug-2021	<u>Next Service Due:</u> 12-Feb-2022	<u>Customer Name:</u> Structural Soils Limited
<u>Serial Number:</u> G503409				

Customer Comments

Returned for full service and calibration

General Comments/Feedback

This instrument was tested against known certified gas values and the user calibration was seen to be worse than the factory calibration for the following channels: CH4 CO2 . Common reasons for this are an out of date or poor user calibration. Regular user calibrations carried out in accordance with our operating manual will help to optimise performance. For further information on user calibration please visit the FAQ section of our website.

Thank you for returning your gas analyser to the QED Service Centre for full service and calibration. We are pleased to inform you that the analyser was received and fully assessed by one of our experienced Service Engineers and no significant faults or issues were observed during the assessment. Our extensive service was carried out, and any necessary components replaced. The analyser has successfully passed all of our rigorous testing and quality checks and has been calibrated using our bespoke, state of the art calibration facility.

For further information about how to get the best use from your instrument please visit our YouTube channel <http://www.youtube.com/GeotechTV> and on our Website <https://qedenv.com>

If you require any further assistance with your instrument please email our Technical Support Team at technical@qedenv.co.uk or call us on +44 (0) 333 800 0088 (Monday to Thursday 08.30 - 17.00 & Friday 08.30 - 15.30) UK time zone.

<u>Service Details:</u> Service Scheme	☒	<u>Service Engineer:</u>	<u>Calibration Engineer:</u>	<u>Approved By:</u>	<u>Signature:</u>
Standard Service	☐	Matthias McBride	Suk Balrey	Dawn Hemings	

