

CONTENTS PAGE

Client:	South Dakota Board of Regents		
Quotation Number:	16422	Date:	13/07/2022
Job Number:	IN1287	Date:	05/08/2022

- ☒ 1 QUOTATION
- ☒ 2 CUSTOMER ORDER
- ☒ 3 MACHINE SPECIFICATION DOCUMENT_S027_v11
- ☒ 4 LOG SHEET_S028_v3
- ☒ 5 FAULT REPORTING DOCUMENT_S029_v3
- ☒ 6 TEST ACCEPTANCE SPECIFICATION_S030_v9
- ☒ 7 ASSEMBLY AND TEST RECORD_S023_v5
- ☒ 8 SERIAL NUMBER FORM_S053_v4
- ☐ 9 TEST DATA
- ☒ 10 PACKING LIST_S035b_v6
- ☒ 11 INSTALLATION REPORT_S057_v6
- ☒ 12 INSTALLATION ACCEPTANCE AND WARRANTY CERTIFICATE_S071_v3

ADDITIONAL:

Payment Terms:

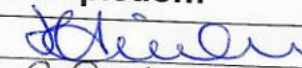
50% / 40% / 10%

Other: please specify

Penalty Clause Yes / No

Please specify:

Blue Book Completion:

Signed		Date	16/06/23
Verified		Date	16/06/23

3 - MACHINE SPECIFICATION

Client:	South Dakota Board of Regents		
Quotation Number:	16422	Date:	13/07/2022
Job Number:	IN1287	Date:	05/08/2022

Ref No.	Product Description	Required
HS2022 (continuous flow)		
20402/1	HS2022 Ref Gas + P Mag	
20402/2	HS2022 Ref Gas + E-Mag	
20402/3	HS2022 Ref Gas + Hd Collector + E-Mag	
20402/4	HS2022 Ref Gas + Hd Collector+E-Mag+Trap Loop	
20501	Hd Collector Assy	Y
50101/2	Trapping Loop Assy	***
70201-1	70201-1 Analyser spares kit - Included	Y
EA Units		
10202/11	iso-EArth	
10202/13	iso-EArth+	
10202/14	iso-Earth HT Furnace Upgrade	
10202/15	Iso-Earth (Without Autosampler)	
11802/1	Earth+PC	
11802/2	EArth+Clarity+PC	
70501-1	Consumables for C and N for Combustion Only	
70501-11	Simultaneous CNS Consumables Kit (approx. 10000 analysis)	
70501-3	Sample Prep Kit (Inc.)	
70501-4	GSL Combustion and Gas C & N Start Up Kit	
70501-5	Simultaneous NCS Consumables Kit	
70501-6	C&N Combustion Only Consumables Kit (approx. 5000 samples)	
70501-8	Simultaneous CNS Consumables Kit (approx. 5000 samples)	
70601-1	Sulphur Start Up Kit (Inc. with Sercon EA Systems)	
70601-2	Sulphur Consumables Kit for 1000 Samples	
70601-4	Sulphur Consumables Kit (approx. 5000 Samples)	
70801-2	Pyrolysis Consumables Kit-Low temp for Solids	
71701-1	Sub Microgram Nitrogen Analysis Start Up Kit	
SI2040	PN150 Pneumatic Autosampler with one no.50 pos, carousel	
SI2345	ME Micro Balance	
SI2737/A	Sercon 50 Position Autosampler Assy	
SI2789	Extra 50 Position Carousel	
SI2744	Automatic Liquid Sampler 15 Position	
SI2743	Liquid Sampler Mounting Plate	
Headspace Equilibration		
10202/10	XYZ Gas Sampling Control Box	
10302/1	Aqua System	
11103	µCarbs for CF	
11103-1	µCarbs for DI	
11601	200 Place Dual Heated Block 240 Volt	
11801	Sercon XYZ Gas Autosampler	
71107-1	CF oxygen-18 equilibration kit	
71107-2	DI Oxygen-18 Equilibration kit	
71201-1	CF deuterium equilibration kit	
71201-2	DI Deuterium Equilibration kit	
71801-1	WES-DI start up kit (Inc. with WES-DI)	
GC Units		
10402/2	Orchid module 1500C (Will run Hd 70901-1 C Spares Kit Inc)	
10901	Nitrogen Option (71301-1 N Spares kit Included)	
HP7890/1	Agilent 7890B GC System	
HP7890/2	Agilent 7890B GC with Auto Injector	
HP7890/3	Agilent 7890B GC + Auto Injector + 150 Vial Sample Tray	
SI2561	Nexis GC 2010 Plus	

3 - MACHINE SPECIFICATION

Client:	South Dakota Board of Regents		
Quotation Number:	16422	Date:	13/07/2022
Job Number:	IN1287	Date:	05/08/2022

Ref No.	Product Description	Required
---------	---------------------	----------

GC Units *continued*

SI2564	Nexis GC-2030	
70901-3	GC Pyrolysis H and O Start Up Kit	
70901-4	GC Pyrolysis H Spares Kit	
70901-5	GC Combustion C Spares Kit (approx. 5000 samples)	
70901-6	GC Pyrolysis h Start Up Kit (approx. 5000 samples)	
71301-1	GC N Spares kit	

ABCA2 Units

10502/1	ABCA2 Sercon XYZ Autosampler	
10602	ABCA2 Gas Box	
20602	Complete Sercon ABCA2 system	
20603	ABCA IR Analyser	
70101-1	ABCA2 spares kit (<i>Inc. With ABCA2</i>)	
70101-2	ABCA2 Spares Kit for AB Analytica Systems	
70101-3	ABCA2 Autosampler Upgrade Kit	
SI1767	CVL505 - Barcode Reader	
SC9973	13C Urea breath test kit for <i>Helicobacter pylori</i> infection	
SC9974	<i>Helicobacter</i> Test kit for children age 3-11 (45mg)	

Integra2 Units

20802/4	Integra2	
70201-2	Integra2 analyser spares kit - Included	
70401-1	Integra-2 consumables (<i>Inc. With Integra2</i>)	

Trace Gas Systems

10802/4	CryoPrep	
10802/5	Automated LN refiller	
10802/6	CryoFlex (TOC)	
10802/7	CryoGas	
10802/8	CryoFlex (LA)	
SI2533	Silicon Carbide Vertical Furnace	
SI2731	213nm Laser Ablation System	
SI2733	isoScell 100 sampler chamber	
71001-1	Cryoprep Spares Kit	
71001-5	CryoGas Consumables Kit	

TOC Units

14001	Thermalox Environmental TOC-IRMS	
14002	Thermalox Environmental TOC-Standalone	
14003	Thermalox Environmental TOC-Standalone No Sampler	
SI2772	CO2 Detector, High sensitivity Option	
SI2773	NOx detector Option	
SI2774	Vacuum pump Option	
SI2775	Stirred Vial rack Option	
72101-1	TOC Start Up Kit	
72101-2	TOC Chem Pack	
72101-3	TOC & TN Instrument with heavy usage - one year	
72101-4	TOC only - economy holding	

GEO 20-22 (dual inlet)

10702	GEO 20-22 Water Equilibration System (D & 18O)	
21802/1	GEO 20-22	
21802/2	GEO 20-22 + E-Mag	

3 - MACHINE SPECIFICATION

Client:	South Dakota Board of Regents		
Quotation Number:	16422	Date:	13/07/2022
Job Number:	IN1287	Date:	05/08/2022

21802/3	GEO 20-22 + E-Mag +Hd	
21802/4	GEO 20-22 Inlet	
70301-1	GEO start up kit - Included	
70301-3E	Comprehensive GEO 20-22 spares kit for 5 years operation	

HT-EA

11501/4	HT-EA (With Autosampler)	
11501/5	HT-EA With Liquid Option	
11501/6	HT-EA Stand Alone	
11501/7	HT-EA (Without Autosampler)	
SI2622	CTC PAL3-LSI-L-S	
SI2624	CTC PAL3-Kit-Standalone	
70801-1	Pyrolysis Consumables Kit-High Temp for Solids	
71501-1	HT-EA Pyrolysis Start Up kit O and H	
71501-2	HT-EA Pyrolysis Kit for Water injections	
71501-3	HT-EA Sensitivity Start Up Kit for O & H in small samples	
71501-4	HT-EA Sensitivity Consumables Kit for O & H in small samples	
71501-5	HT-EA Sensitivity Kit for O&H in Small Samples (5000 samples)	
71501-7	HT-EA Kit for Room Temp Equilibration	
71501-8	HT-EA Pyrolysis Kit for Water injections (approx. 1 year kit)	

Ref No.	Product Description	Required
Upgrades		
12101	Evacuation System ***	
12102	2 Ref Gas+ Dilutor Box ***	
20101	Standard Source Assy ***	
20102	HS Source Assy ***	
20301	Standard Collector Assy ***	
30202/1	System Control Upgrade (Pmag) installation not included	Edwards Or Pfeiffer
30202/2	System Controller Upgrade (Emag) installation not included	Edwards Or Pfeiffer
10202/7	Preparation PCB Upgrade	
30202/3	Hijack Box ***	
30302/4	nEXT85 Edwards Pumping System Upgrade Single - installation not included	
30302/5	nEXT85 Edwards Pumping System Upgrade Dual - installation not included	
30302/6	nEXT85 Edwards Pumping System Upgrade Triple- installation not included	
SI2542	ABCA2 Upgrade Kit	
CALLISTOW	Callisto software upgrade ***	
Specials		
11702	LC-I interface	
12202	Leco Interface Unit	
SI2320	Agilent 1260 Series Refractive Index Detection HPLC System	
71401-1	ABCA-G Start Up/Spares Kit	
71401-2	ABCA-G Equilibration Spares Kit - Room temp O only	
71401-3	ABCA-G Equilibration Spares Kit - Room Temp O & H	
71601-1	LC Interface Spares Kit	
ADDITIONS		
PC	Windows 7 based PC System with Callisto Software	Y
Printer	Printer	
INST1	Installation and start up training at customer's site by Sercon Engineer	Y
INST2	Installation and start up training at customer's site by Agents Engineer	
WARR	1 year warranty	
WARR2	2 year warranty	
TRAIN	Training in UK for one person for 3 days	Y
SCONTRACT	Maintenance Service Contract - 1 year	

3 - MACHINE SPECIFICATION

Client:	South Dakota Board of Regents		
Quotation Number:	16422	Date:	13/07/2022
Job Number:	IN1287	Date:	05/08/2022

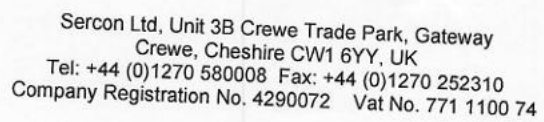
SPECIFICATION REQUIREMENTS			
Voltage	110 Volts 50/60Hzs		
Plug Type	SI2510	3 Metre USA/Japan plug to IEC C 13	Y
	SI2511	2.5 Metre Australian plug to IEC C 13	Y
	SI2512	3 Metre UK 13 amp Fused plug to IEC C 13	
	SI2523	3metre Schuko (Euro) Plug to IEC C13 Socket	
	SI2514	2.5 metre Chinese mains to IEC C13	
Pallet	Stamped for export heat treated for 30 min @ 56 °C		
	Complies with all Export Requirements		Y



Sercon Ltd, Unit 3B Crewe Trade Park, Gateway
Crewe, Cheshire CW1 6YY, UK
Tel: +44 (0)1270 580008 Fax: +44 (0)1270 252310
Company Registration No. 4290072 Vat No. 771 1100 74

4 - LOG SHEET

Date	Action Taken	By Whom
22/9/22	Instrument Pumped down to 1E-68	SM
	Ref gas connected up all flow and crimps Set no leaks present	
23/9/22	Conc now upto temp CO2 Peak + Stability are very good	SM
	CO2 Precision run - 0.03 ✓ CO2 Linearity - 0.42 ✓	SM
	N2 Peak + Stability again very good N2 Precision - 0.04 ✓ N2 Linearity - 0.20 ✓	
	Hydrogen crimp set but customer doesn't want to analyse H2 so no testing carried out	SM
28/9/22	Instrument Specs Passed Including N2 Soak Test ready to ship	SM



Client:	South Dakota Board of Regents		
Quotation Number:	16422	Date:	13/07/2022
Job Number:	IN1287	Date:	05/08/2022

S028_v3



6 - TEST / ACCEPTANCE SPECIFICATION

Customer:	South Dakota Board of Regents		
Quotation Number:	16422	Date:	13/07/2022
Job Number:	IN1287	Date:	05/08/2022

HS20-22				
Reference Gas Precision (n=5)				
¹³ C	(CO ₂)	0.06	0.03	✓
¹⁵ N		0.06	0.04	✓
¹⁸ O	(CO ₂)	0.06		
³⁴ S	(SO ₂)	0.1		
² H		0.4	N/A Crimp Set	✓

Reference Gas Linearity				
¹³ C	≤0.02‰/nA	0.42	STD Dev	✓
¹⁵ N	≤0.02‰/nA	0.20	STD Dev	✓

IsoEarth & IsoEarth+						
Combustion (n=5)						
¹³ C	100 µg C	0.1		10 µg C	0.8	
¹⁵ N	100 µg N	0.15		10 µg N	1.5	
³⁴ S	25 µg S	0.3		10 µg S	1.0	
Dual	400 µg C	0.1		100 µg N	0.15	

Integra2				
¹³ C	100 µg C	0.2		
¹⁵ N	100 µg N	0.3		
Dual	100 µg N & 400 µg C	0.4 & 0.15		
³⁴ S	30 µg S	0.5		
¹⁸ O	100 µg O	0.5		

6 - TEST / ACCEPTANCE SPECIFICATION

Customer:	South Dakota Board of Regents		
Quotation Number:	16422	Date:	13/07/2022
Job Number:	IN1287	Date:	05/08/2022

HT-EA			
Pyrolysis (n=5)			
¹⁸ O	100 µg O or 1 µl water	0.3	
² H	200 µg H or 1 µl water	1.0	

Aqua, µCarbs & GasBox					
Equilibrations (n=5)					
¹⁸ O	0.2 ml water	0.1			
² H	0.2 ml water	2.0			
Carbonates (n=5)					
¹³ C	100 µg CaCO ₃	0.08			
¹⁸ O	100 µg CaCO ₃	0.1			
Gas Analysis (n=5)					
¹³ C	5% CO ₂	0.1		Air CO ₂	0.1
¹⁸ O	5% CO ₂	0.1		Air CO ₂	0.2
² H	0.5 ml H ₂	1.5			
¹⁵ N	0.5 ml N ₂	0.1		100 ppm N ₂ O	0.5
¹³ C	Breath (12 ml)	0.1			
DIC (n=5)					
¹³ C	15ppm (0.5ml)	0.15			

LC-I			
(n=5)			
¹³ C		0.2	

6 - TEST / ACCEPTANCE SPECIFICATION

Customer:	South Dakota Board of Regents		
Quotation Number:	16422	Date:	13/07/2022
Job Number:	IN1287	Date:	05/08/2022

GC Orchid						
Combustion (n=3 for each analyte)						
¹³ C	3 Alkanes	100 ng C	0.2		10 ng C	0.5
¹⁵ N	2 Amines	100 ng N	0.5		14 ng N	1.5
Pyrolysis (n=3 for each analyte)						
² H	3 Alkanes	250 ng H	3.0		25 ng H	10.0
¹⁸ O	3 FAMES	100 ng O	0.5		20 ng O	2.0
Water pyrolysis (n=5)						
² H	0.1 µl water	3.0				
¹⁸ O	0.1 µl water	0.4				

CryoRange						
(n=5)						
¹³ C	Air CO ₂ (12ml)	0.1		Air CH ₄ (125ml)	0.2	
¹⁵ N	Air N ₂ (1ml)	0.1		Air N ₂ O (125ml)	0.4	
¹⁸ O	Air CO ₂ (12ml)	0.15		Air N ₂ O (125ml)	0.7	
¹⁸ O	Air O ₂ (1ml)	0.1				
² H	Air CH ₄	3.0				
¹³ C	TOC (5ppm)	0.4				
¹³ C	Laser					

6 - TEST / ACCEPTANCE SPECIFICATION

Customer:	South Dakota Board of Regents		
Quotation Number:	16422	Date:	13/07/2022
Job Number:	IN1287	Date:	05/08/2022

Geo2			
Internal precision (no change overs)			
² H	200 Bar µl	0.15	
¹³ C	100 Bar µl	0.01	
¹⁵ N	100 Bar µl	0.01	
¹⁸ O	100 Bar µl	0.015	
³⁴ S	100 Bar µl	0.015	
Single cold finger volumes (10 change overs)			
¹³ C	20 Bar µl	0.01	
¹⁸ O	20 Bar µl	0.015	
¹³ C	3 Bar µl	0.02	
¹⁸ O	3 Bar µl	0.03	
CAPS (n=5)			
¹³ C	50 µg CaCO ₃	0.03	
¹⁸ O	50 µg CaCO ₃	0.06	
WES (n=5)			
² H		1.0	
¹⁸ O		0.05	
Manifold (10 tubes)			
² H		0.5	
¹³ C		0.02	
¹⁵ N		0.02	
¹⁸ O		0.03	
³⁴ S		0.03	

6 - TEST / ACCEPTANCE SPECIFICATION

Customer:	South Dakota Board of Regents		
Quotation Number:	16422	Date:	13/07/2022
Job Number:	IN1287	Date:	05/08/2022

Special tests

Sales Signature: <i>[Signature]</i>	Date: <i>31/10/22</i>
Test Signature: <i>[Signature]</i>	Date: <i>28/9/22</i>

7: ASSEMBLY AND TEST RECORD

Client:	South Dakota Board of Regents		
Quotation Number:	16422	Date:	13/07/2022
Job Number:	IN1287	Date:	05/08/2022

PRODUCT:

MS2022/4

SERIAL NUMBER:

20402/4-2022/1287

 ASSEMBLED:
 (Name)

Jan H

Date:

26/9/22

 PRE-TEST
 INSPECTION:
 (Production name)

P. Hayes

Date:

26/9/22

 PRE-TEST
 INSPECTION:
 (Test name)

S. Mars

Date:

26/9/22

 SYSTEM TEST:
 (Name)

S. Mars

Date:

28/9/22

 PRE-DESPATCH
 INSPECTION:
 (Name)

Jan H

Date:

29/9/22

P.A.T. Test results

 In compliance with Low Voltage directive 73/23/EEC
 To Low Voltage standard EN61010 – 1:1993

Earth Continuity

0.093
 Ω

Insulation

2300

 M Ω

Earth Leakage Current

0.25

mA. @

0.05

kVA.

Tested by:

P. Hayes

Date:

26/9/22

8 - Serial Numbers Record Document

Client:	South Dakota Board of Regents		
Quotation Number:	16422	Date:	13/07/2022
Job Number:	IN1287	Date:	05/08/2022

Units	S/N
MS/ABCA	20402/4-2022/1287

Integra 2
Prep Unit 1
Prep Unit 2/Misc
Electronics Upgrade
CETAC
Gas Box
Autosampler
BCR
Dual Heater Block

Pump Kit and Optics	S/N
---------------------	-----

(E) Turbo pump S	220350951
(E) Turbo pump A	220361909
(E) Rotary Pump	210823789
Voltage	(110) / 115
Gauge S	210722546
Gauge A	220399481
Source	20101H5
Collector 1	20301-118
Collector 2	20501-046
Magnet	124

<u>Parts</u>	<u>S/N</u>
Fan PSU	
24V PSU	

Additional System Info:

PCBs	S/N
------	-----

Electronics Box	20220009
Prep PCB	
VFC PCB	22003
Watchdog PCB	
Head Amp PCB 1	21008
Head Amp PCB 2	22009
Electromagnet RP	124

Furnaces	S/N
----------	-----

Combustion
Reduction
HT-EA
GC Oven
Furnace 1
Furnace 2

PC	S/N
----	-----

PC	J8LJYP3
Monitor	CN-09WCH1-FCC00-238-ATDX
Printer	-A01

Key

- Pumps: (E) Edwards
 P: Pfeiffer
 Furnaces: V/S: Vecstar
 E: Elite
 Magnet: E: Electromagnet
 S: Standard
 Turbos & Gauges: S: Source
 A: Analyser
 Collectors: Std: Standard
 S: Sulphur
 HD: Hydrogen Deuterium



Packing List

Customer Reference: P0380814

Shipper / Exporter:

Sercon Limited
Unit 3B Crewe Trade park
Gateway
Crewe
CW1 6JT
UK

Tel: +44 (0)1270 580008
Reference: IN1287

Consignee:

South Dakota Board of Regents
Plant Science Department
1390 College Avenue
Biostress Lab, Room 247
Brookings, SD 57007-2141
USA

Contact Name: Janet Miller
Contact Tel Number: 001 605 688 4600

BOX: 1

Quantity	Product Code	Product Description	Serial Number: if available
☒ 1	20402/4	HS2022/4	20402/4-2022/1287

Packed by:

Janet Miller *Janet Miller*

Date:

29.09.22

Claims for damage or shortages must be made within 3 days



S035b_v6

Sercon Limited
Unit 3B Crewe Trade Park
Gateway, Crewe
CW1 6JT U.K.
Company Registration No.: 4290072

Phone: +44 (0) 1270 580008
Fax: +44 (0) 1270 252310
sales@sercongroup.com
www.sercongroup.com
VAT No.: 771 1100 74
19/01/2017

Packing List

Customer Reference: P0380814

Shipper / Exporter:

Sercon Limited
Unit 3B Crewe Trade park
Gateway
Crewe
CW1 6JT
UK

Tel: +44 (0)1270 580008
Reference: IN1287

Consignee:

South Dakota Board of Regents
Plant Science Department
1390 College Avenue
Biostress Lab, Room 247
Brookings, SD 57007-2141
USA

Contact Name: Janet Miller
Contact Tel Number: 001 605 688 4600

BOX: 2

Quantity	Product Code	Product Description	Serial Number: if available
☒ 1	SI0155	Pc	J8LJYP3
☒ 1	SI2907	Monitor	CN-09WCH1-FCC00-238-AT0X-A01
☒ 1	SI1719	Rotary pump (mains for rotary inside box)	210823789
☒ 1	SI0685	Electronic magnet	124
☒ 1	70201-1	70201-1 analyser spares kit	
☒ 1		USB software backup	
☒ 1		USB windows recovery	
☒ 1		Electronics manuals on software USB	
☒ 3		USA Mains cable for 2022 PC and monitor inside bag	

Packed by:

Date:

[Signature]
[Signature]
29.09.22

Claims for damage or shortages must be made within 3 days

Shipper / Exporter:

Sercon Limited
Unit 3B Crewe Trade park
Gateway
Crewe
CW1 6JT
UK

Tel: +44 (0)1270 580008
Reference: IN1287

Packing List

Customer Reference: P0380814

Consignee:

South Dakota Board of Regents
Plant Science Department
1390 College Avenue
Biostress Lab, Room 247
Brookings, SD 57007-2141
USA

Contact Name: Janet Miller
Contact Tel Number: 001 605 688 4600

BOX: Dimensions and weights

	<u>L</u>		<u>W</u>		<u>H</u>	
Box 1	<u>99</u>	x	<u>85</u>	x	<u>107</u>	cm
Box 2	<u>99</u>	x	<u>85</u>	x	<u>77</u>	cm

gw 136 kg

gw 78 kg



COLLECTION NOTE

Job Number: **IN1287**
Customer: South Dakota Board of Regents
Contact: **Janet Miller**

Collection on
Date:

3/10/22

No.
of boxes: **2**

By:
Company:

NG TRANSPORT.

Vehicle
Reg No. **YJ16 XCG**

Signature:

James Hunt

Print:

JAMES HUNT



S062_v3

Sercon Ltd
Unit 3B Crewe Trade Park
Gateway, Crewe, Cheshire
CW1 6JT U.K.
Registered in England and Wales: 4290072

Phone: +44 (0) 1270 580008
Fax: +44 (0) 1270 252310
sales@sercongroup.com
www.sercongroup.com
VAT No.: 771 1100 74
19/01/2017

11 – Installation Report

Client:	South Dakota State University - Brookings, SD. USA		
Quotation Number:	16422	Date:	13/07/22.
Job Number:	IN1287	Date:	1 st Dec 2022

Contact:	Janet Miller		
Date of Visit:	29 th November -1 st December 2022	No. of Days:	3
Engineer:	David Harris		

Details of visit:

Arrived on site. Unpacked instrument. No damage noted to boxes or 2022.
 Set up MS on desktop. He gauge obstructing positioning, as a result the GSL had to be moved to make space.
 Installed rotary pump, added oil - All OK.
 Fitted eMag - All OK.
 Hooked up back line gas plumbing - All OK.
 Hooked up to GSL prep system - All OK.
 2022 powers on - All OK.
 Customer requested the current PC be used instead of setting up new PC. (PC is only 2 years old from electronics upgrade which was installed in 2020).
 Updated Callisto & Reprocessor software to new version - All OK.
 Comms established - All OK.
 Activated pump. Instrument pumps down with no issues. Overnight vac of 2.4e-08mBar achieved. All OK.
 Powered on Source. Emissions good - All OK.
 Slight adjustment of crimps required for Ref Gases. Positioned magnet and tuned beams.
 Peak shapes good.
 Slightly high background is noted with isolation valve closed. Instrument needs time to fully pump down as background is dropping.
 Checked instrument against Ref gasses (¹³C & ¹⁵N) - All OK

CO₂ Peak Shape (2/1) = OK

CO₂ Stability (2/1) = OK

N₂ Peak Shape = OK

N₂ Stability = OK

Ref Gas ¹³C Precision = 0.019‰ S.D.

Ref Gas ¹³C Linearity = 0.134‰ S.D.

Ref Gas ¹⁵N Precision = 0.097‰ S.D.

Ref Gas ¹⁵N Linearity = 0.060‰ S.D.

Customer fitted new combustion & reduction tubes and new water trap to GSL prep unit.
 System responds OK.
 At customer's request edited out unused valves from software (Gilson sampler not in use).
 Updated bit map - All OK.
 Adjusted inlet prep unit crimp to standard pressures (4.0e-06mBar)
 Pressure test passes.
 Note increased sensitivity on Dual samples.
 High N₂ background noted on carrier gas. Attempt to bake out GC column.
 Blank high but dropping with each sample.
 Run series of blank samples and test batch overnight. GC possibly needed more time to cool as peaks shifting during run. Data not too bad but ¹⁵N numbers are being thrown off by what looks like high blank and high background.
 Now fails pressure test. Investigate issue.

11 – Installation Report

Client:	South Dakota State University - Brookings, SD. USA		
Quotation Number:		Date:	
Job Number:	IN1287	Date:	1 st Dec 2022

Autosampler found to be leaking. Adjusted and fixed leak.
 Air inputs from autosampler are back to front. Adjusted air inlets – All OK.
 Pressure test still fails. Check plumbing of GSL. Large leak found.
 Replaced seal on V5. Leak now resolved. Passes pressure test – All OK
 High blank noted on combusted samples.
 Purge H₂ flow very low. Increase purge flow reduces high blank to normal levels.
 Reduce carrier flow from 75ml/min to 65ml/min at customer's request.
 Chromatography shows tailing CO₂, suspect GC column. Separation also not great with temp at 65°C. Advise to
 bake out GC column at 140°C overnight and reassess. Possible that new GC column is needed.
 Improved chromatography by adjusting O₂ pulse flow. Less tailing of CO₂ peaks is now observed.
 At request of customer provided basic training for some of the students who will be operating the instrument.

Recommendations:

Bake out or replace GC column.

Faults and Shortages:

N/A

Follow up:

Engineer to dial in to check progress at some point in near future.

Engineer: David Harris

Date: 1st December 2022

Signed:



12 – Installation Acceptance and Warranty Certificate

Client:	South Dakota State University, Brookings, SD. USA		
Quotation Number:	16422	Date:	13/07/22
Job Number:	IN1287	Date:	1 st December 2022

Contact:	Janet M Miller
System:	20-22
Software:	V40.5.6
Engineer:	David Harris
Installation Date:	1 st December 2022

Warranty commences:	1 st December 2022
Warranty Expires:	1 st December 2023

Customer Acceptance:

Name: Janet M Miller

Signature: Janet Miller

Date: 07 December 2022

Engineer's Signature:

On behalf of Sercon Limited

Name: David Harris

Signature: [Signature]

Date: 1st December 2022

Notes: