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Quotation Number:	14689	Date:	10/01/2022
Job Number:	IN1277	Date:	22/02/2022

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ADDITIONAL:

Payment Terms:

50% / 40% / 10%

Other: please specify

Penalty Clause Yes / No

Please specify: _____

Blue Book Completion:

Signed	<i>Do'Connor</i>	Date	28/2/23
Verified	<i>John Doe</i>	Date	16/06/23

3 - MACHINE SPECIFICATION

Client:	Queen's University Belfast		
Quotation Number:	14689	Date:	10/01/2022
Job Number:	IN1277	Date:	22/02/2022

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	***
50101/2	Trapping Loop Assy	
70201-1	70201-1 Analyser spares kit – Included	✓
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

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Ref No.	Product Description	Required
GC Units <i>continued</i>		
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 (Inc. With ABCA2)	
70101-2	ABCA2 Spares Kit for AB Analitica Systems	
70101-3	ABCA2 Autosampler Upgrade Kit	
SI1767	CVL505 – Barcode Reader	
SC9973	13C Urea breath test kit for Helicobacter pylori infection	
SC9974	Helicobacter 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 (Inc. With Integra2)	
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

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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	✓
Printer	Printer	
INST1	Installation and start up training at customer's site by Sercon Engineer	✓
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	
SCONTRACT	Maintenance Service Contract - 1 year 3 year 3 year warranty included	✓

3 - MACHINE SPECIFICATION

Client:	Queen's University Belfast		
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SPECIFICATION REQUIREMENTS			
Voltage	Volts 50/60Hzs	230V	
Plug Type	SI2510	3 Metre USA/Japan plug to IEC C 13	
	SI2511	2.5 Metre Australian plug to IEC C 13	
	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		



Client:	Queen's University Belfast		
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HT upgrade. *

Approved by Sales: (Name)		Date: 16/ May/22
Approved by Tech.: (Name)		Date: 16/3/2022



Client:	Queen's University Belfast		
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Job Number:	IN1277	Date:	22/02/2022

[illegible]

4 - LOG SHEET

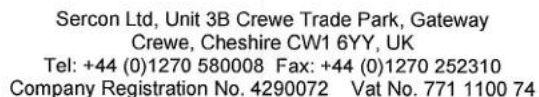
Client:	Queen's University Belfast		
Quotation Number:	14689	Date:	10/01/2022
Job Number:	IN1277	Date:	22/02/2022

Date	Action Taken	By Whom
27.4.22	Unit was pump down with flight tube blanked at the source. Then blacked pumped down fine. Then source was not with inlet line and vacuum could only reach 4's. isolation valve were then blanked off.	HR
①	Thru isolation valve was faulty and was causing the leak.	HR
29/4/22	Comm with PyroEarth established all forces heat up dc and stay at set temp.	SM
②	GC base kept blowing 4Amp replaced with 6A drawing to be changed.	SM
③	Epc tunc went control on readback the prep board doesn't have the correct sampler alignment.	
	Leak check now began V8 com/nc	
④	wrong way read so no flow at sampler V8 now changed to be correct.	
4/5/22	Magnet repositioned and peakshapers evaluated. Unable to converge H ₂ with C ₂ N peaks despite many different magnet positions checked. Source & H ₂ collector removed and H ₂ collector adjusted system set to pump down.	BB
	Despite multiple attempts at repositioning the magnet and returning coincidence for the	

4 - LOG SHEET

Client:	Queen's University Belfast		
Quotation Number:	14689	Date:	10/01/2022
Job Number:	IN1277	Date:	22/02/2022

Date	Action Taken	By Whom
4/5/22	three gases in very difficult to be achieve. A compromised position was eventually found and ref gas runs were processed on the H ₂ gas.	SB
9th May	Still poor peak shapes despite changing headcups and rectifying fault on H ₂ collector Swapped out Enag supply but the peak shapes were still out of coincidence. Swapped Enag and noticed a significant improvement in peak shape & coincidence. Enag repositioned and compromise coincidence position achieved for all 3 gases. Stability & peak shape run for C+N. Magnet allowed to heat up to working temp before anymore testing. CO ₂ ref gas prec 0.048 (1=5).	SB/SM.
26/5	UNIT PACKED - TURBO PUMPS HAVE NO FANS FITTED!!	JH/AB
30/5/22	Drawings amended, units built to drawing spec to validate	



Client:	Queen's University Belfast		
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Job Number:	IN1277	Date:	22/02/2022

S029 v3

6 - TEST / ACCEPTANCE SPECIFICATION

Customer:	Queen's University Belfast		
Quotation Number:	14689	Date:	10/01/2022
Job Number:	IN1277	Date:	22/02/2022

Special tests

Sales Signature: 	Date: 22/2/22
Test Signature: 	Date: 22/2/22

6 - TEST / ACCEPTANCE SPECIFICATION

Customer:	Queen's University Belfast		
Quotation Number:	14689	Date:	10/01/2022
Job Number:	IN1277	Date:	22/02/2022

HS20-22				
Reference Gas Precision (n=5)				
¹³ C	(CO ₂)	0.06	0.06	0.048 SB
¹⁵ N		0.06	0.03	SM
¹⁸ O	(CO ₂)	0.06		
³⁴ S	(SO ₂)	0.1		
² H		0.4		

Reference Gas Linearity		
¹³ C	≤0.02‰/nA	
¹⁵ N	≤0.02‰/nA	

IsoEarth & IsoEarth+						
Combustion (n=5)						
¹³ C	100 µg C	0.1	0.02	SM	10 µg C	0.8
¹⁵ N	100 µg N	0.15	0.12	SM	10 µg N	1.5
³⁴ S	25 µg S	0.3	0.13	SM	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:	Queen's University Belfast		
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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	
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LC-I

(n=5)

¹³ C		0.2	
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6 - TEST / ACCEPTANCE SPECIFICATION

Customer:	Queen's University Belfast		
Quotation Number:	14689	Date:	10/01/2022
Job Number:	IN1277	Date:	22/02/2022

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:	Queen's University Belfast		
Quotation Number:	14689	Date:	10/01/2022
Job Number:	IN1277	Date:	22/02/2022

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	

7: ASSEMBLY AND TEST RECORD

Client:	Queen's University Belfast		
Quotation Number:	14689	Date:	10/01/2022
Job Number:	IN1277	Date:	22/02/2022

PRODUCT:

20/22

SERIAL NUMBER:

20402/4-2022/1277

ASSEMBLED:
(Name)

James Hanrahan

Date:

31/3/22

PRE-TEST
INSPECTION:
(Production name)

P. Hayes

Date:

31/3/22

PRE-TEST
INSPECTION:
(Test name)

S. Moran

Date:

31/3/22

SYSTEM TEST:
(Name)

S. Moran

Date:

26/5/22

PRE-DESPATCH
INSPECTION:
(Name)

James Hanrahan

Date:

27/5/22

P.A.T. Test results

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

Earth Continuity

0.073 Ω

Insulation

7300 MΩ

Earth Leakage Current

0.35 mA. @ 0.05 kVA.

Tested by:

P. Hayes

Date:

31/3/22

7: ASSEMBLY AND TEST RECORD

Client:	Queens University Belfast		
Quotation Number:	14689	Date:	10/1/22
Job Number:	IN1277	Date:	22/2/22

PRODUCT:

PYRO EARTH

SERIAL NUMBER:

10202/14-2022/1277

 ASSEMBLED:
 (Name)

Ben

Date:

27/4/22

 PRE-TEST
 INSPECTION:
 (Production name)

P. Mayo

Date:

27/4/22

 PRE-TEST
 INSPECTION:
 (Test name)

S. Mayo

Date:

27/4/22

 SYSTEM TEST:
 (Name)

S. Mayo

Date:

26/5/22

 PRE-DESPATCH
 INSPECTION:
 (Name)

Mayo. Ben Ben

Date:

27/5/22

P.A.T. Test results

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

Earth Continuity

0.048
 Ω

Insulation

>300
 $M\Omega$

Earth Leakage Current

0.55

mA. @

0.211

kVA.

Tested by:

P. Mayo

Date:

27/4/22

8 - Serial Numbers Record Document

Client:	Queen's University Belfast		
Quotation Number:	14689	Date:	10/01/2022
Job Number:	IN1277	Date:	22/02/2022

Units	S/N
MS/ABCA	20402/4-2022/1277
Integra 2	
Prep Unit 1	10202/4-2022/1277
Prep Unit 2/Misc	
Electronics Upgrade	
CETAC	
Gas Box	
Autosampler	42648
BCR	
Dual Heater Block	

Pump Kit and Optics	S/N
Turbo pump S	220188532
Turbo pump A	220239124
Rotary Pump	210380225
Voltage	110 / 240
Gauge S	220221626
Gauge A	986010445
Source	20102MS-192
Collector 1	20301-113
Collector 2	20501-045
Magnet	129

Parts	S/N
Fan PSU	
24V PSU	

Additional System Info:

PCBs	S/N
Electronics Box	20220003
Prep PCB	20210010
VFC PCB	22001
Watchdog PCB	
Head Amp PCB 1	22002
Head Amp PCB 2	2004
Electromagnet RP	22001

Furnaces	S/N
Combustion	
Reduction	
HT-EA	
GC Oven	
Furnace 1	
Furnace 2	

PC	S/N
PC	2817426971
Monitor	CN-0UHJMO-QDC00-1CC-1B4A-A0
Printer	

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: 58202397

Shipper / Exporter:

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

Consignee:

Queen's University Belfast
14 Chrono Centre
Palaeoecology Centre
42 Fitzwilliam Street
Belfast
BT9 6AX
Northern Ireland
UK

Tel: +44 (0)1270 580008
Reference: IN1277

Contact Name: Paula Reimer
Contact Tel Number:

BOX: 1

Quantity	Product Code	Product Description	Serial Number: if available
☐ 1	20402/4	HS20-22	20402/4-2022/1277

Packed by:

Date:

27.05.22

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: 58202397

Shipper / Exporter:

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

Consignee:

Queen's University Belfast
14 Chrono Centre
Palaeoecology Centre
42 Fitzwilliam Street
Belfast
BT9 6AX
Northern Ireland
UK

Tel: +44 (0)1270 580008
Reference: IN1277

Contact Name: Paula Reimer
Contact Tel Number:

BOX: 2

Quantity	Product Code	Product Description	Serial Number: if available
☐ 1	10202/4	PYRO Earth	10202/4-2022/1277

Packed by:

Date:

27.05.22

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: 58202397

Shipper / Exporter:

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

Consignee:

Queen's University Belfast
14 Chrono Centre
Palaeoecology Centre
42 Fitzwilliam Street
Belfast
BT9 6AX
Northern Ireland
UK

Tel: +44 (0)1270 580008
Reference: IN1277

Contact Name: Paula Reimer
Contact Tel Number:

BOX: 3

Quantity	Product Code	Product Description	Serial Number: if available
☐ 1	SI0685	Electronic magnet & teet	129
☐ 1	SI0103	Rotary pump	210380225
☐ 1	SI10202-8	Autosampler	42648
☐ 1	SI0155	PC	28174269711
☐ 1	SI2391	Monitor	CN-ONHJMO-QDCOD-ICC-IB4Q
☐ 1		Mains and TDC cables inside cable box	
☐ 1	70201-1	analyser spares kit	
☐ 1	70501-3	start-up consumables kit	
☐ 1	70501-5	start-up consumables kit for simultaneous CNS analysis	
☐ 1		USB software backup (inside of the pc box)	
☐ 1		USB window recovery (inside of the pc box)	

Packed by:

[Signature]

Date:

27.05.22

Claims for damage or shortages must be made within 3 days

Packing List

Customer Reference: 58202397

Shipper / Exporter:

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

Consignee:

Queen's University Belfast
14Chrono Centre
Palaeoecology Centre
42 Fitzwilliam Street
Belfast
BT9 6AX
Northern Ireland
UK

Tel: +44 (0)1270 580008
Reference: IN1277

Contact Name: Paula Reimer
Contact Tel Number:

BOX: Dimensions and weights

	<u>L</u>		<u>W</u>		<u>H</u>			
Box 1	<u>100cm</u>	x	<u>88cm</u>	x	<u>107cm</u>	cm	gw	<u>135.5</u> kg
Box 2	<u>100cm</u>	x	<u>88cm</u>	x	<u>107cm</u>	cm	gw	<u>126</u> kg
Box 3	<u>100cm</u>	x	<u>88cm</u>	x	<u>81cm</u>	cm	gw	<u>88</u> kg

11 – Installation Report

Client:	Queens University Belfast. Northern Ireland		
Quotation Number:	14689	Date:	10 th Jan 2022
Job Number:	IN1277	Date:	6 th Feb 2023

Contact:	Dr Gerard Barrett		
Date of Visit:	6 th - 10 th Feb 2023	No. of Days:	5
Engineer:	David Harris		

Details of visit:

Arrived on site. Unpacked instrument. No visible damage noted to boxes or instruments during unpacking.
 Set up MS on desktop.

Installed rotary pump, added oil - All OK.

Fitted eMag – All OK.

Plumbed backline gas line to suit configuration. Customer installed tubing to O₂ cylinder.

Hooked up back line gas plumbing to instruments and also between units.– All OK.

Purged back line gasses. Purging lines causes O₂ alarms to trigger within lab due to low ventilation. Engineer would have preferred to purge the lines out to a fuller extent. Possible air bubbles still remain in lines (see below "Ref Gas" section)

No power to PyroEarth – Checked fuse – All OK

Electrician called to check power input from 16amp mains plug. Electrician found issue with plug that had been fitted by university contractors. PyroEarth could not be powered until 3rd day of engineers visit.

Due to this delay it was decided by the customers to concentrate on NCS side training and not look at Pyro side of instrument. This can be attempted at a later date if the customer decided to ever use the pyrolysis method.

No air flow through plumbing. Issue with air compressor. Problem resolved by the customer.

Set up new PC – All OK

Comms established. Software responds for all units and components (PyroEarth comms established OK after power installed by electrician) - All OK.

Activated pump. Instrument pumps down with no issues. Overnight vac of 1.0e-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. Background good. – All OK

System pressure tests pass – All OK

Furnaces reach NCS temps - All OK.

11 – Installation Report

Client:	Queens University Belfast. Northern Ireland		
Quotation Number:	14689	Date:	10 th Jan 2022
Job Number:	IN1277	Date:	6 th Feb 2023

Ref Gas

During testing of Ref Gas instability was seen on N₂. Suspect air trapped in back-line plumbing. 2/1 signature suggests it is interference from nitrogen gas. No leaks found. However precision and linearity dropped samples yield good results. Beams are all stable.

The situation seemed to improve over the week. This again makes engineer suspect air bubbles trapped in nitrogen plumbing lines.

CO₂ Peak Shape (2/1) = OK

CO₂ Stability (2/1) = OK

CO₂ Peak Shape (3/1) = OK

CO₂ Stability (3/1) = OK

N₂ Peak Shape = OK

N₂ Stability = OK

Ref Gas ¹³C Precision = 0.029‰ S.D.

Ref Gas ¹⁸O Precision = 0.082‰ S.D.

Ref Gas ¹³C Linearity = 0.080‰ S.D.

Ref Gas ¹⁵N Precision = 0.029‰ S.D.

Ref Gas ¹⁵N Linearity = 0.014‰ S.D.

NCS / NC Mode

Set up system for NCS mode.

Installed NCS tubes.

All tubes installed. Furnaces heated up – All OK.

Ran blank tests. O₂ line purge required. Blanks come down OK after purge.

Tuned for SO₂ from Cystine combusted sample.

SO₂ Peak shape good.

Chromatography Peak shapes good. Good sensitivity on SO₂ samples.

Ran 0.3mg samples of Cystine (75µg ³⁴S). Results good.

Ran N & C only precision samples (100µg N + 400 µg C in dissolved AS Beet Mix) and N & C only linearity samples (10-200µg N + 25-500µg C in dissolved AS Beet Mix) – Results good.

SO₂ Peak Shape (2/1) = OK

AS Beet Mix ¹⁵N Precision = 0.074‰ S.D.

AS Beet Mix ¹⁵N Linearity = 0.191‰ S.D.

Cystine ³⁴S Precision = 0.124‰ S.D.

AS Beet Mix ¹³C Precision = 0.034‰ S.D.

AS Beet Mix ¹³C Linearity = 0.058‰ S.D.

Trained customers on usage of instruments and using Callisto & the Reprocessor for 2 days.

During training an event happened to the HT Combustion/Pyro furnace.

An odd noise was heard coming from inside the furnace. This was followed by what looked like something combusting inside the furnace but outside of the reaction tube. Flashing and burning cinders seen in top of furnace.

Cooled down furnace and removed combustion tube to check inside.

No noticeable damage seen. White ash noted on outside of combustion tube.

Engineer suspects the part of the heat proof tile broke away and fell into the heated area of the furnace causing it to combust at the high temperatures (1000°C).

Customer to keep furnace cooled over the weekend and then re-heat the following week whilst monitoring situation.

11 – Installation Report

Client:	Queens University Belfast. Northern Ireland		
Quotation Number:	14689	Date:	10 th Jan 2022
Job Number:	IN1277	Date:	6 th Feb 2023

Recommendations:	
Monitor furnace as HT furnace when rising to operational temperatures. Contact Sercon with status of furnace.	
Faults and Shortages:	
EMA-sorb (CO ₂ scrubber) not present in Pyro start up kit. Sercon informed and material sent out to customer. Package received.	
Follow up:	
Possible dial in/site visit (during service visit) to advise on Pyrolysis method if customer decides to run this type of analysis.	
Engineer:	David Harris
Date:	10 th Feb 2023
Signed:	

12 – Installation Acceptance and Warranty Certificate

Client:	Queens University Belfast. Northern Ireland		
Quotation Number:	14689	Date:	10 th Jan 2022
Job Number:	IN1277	Date:	6 th Feb 2023

Contact:	Dr Gerard Barrett
System:	HS20-22, PyroEArth
Software:	V40.5.6
Engineer:	David Harris
Installation Date:	10 th Feb 2023

Warranty commences:	10 th Feb 2023
Warranty Expires:	10 th Feb 2026

Customer Acceptance:

Name: Gerard Barrett

Signature: 

Date: 13/02/2023

Notes:

Engineer's Signature:

On behalf of Sercon Limited

Name: David Harris

Signature: 

Date: 10th Feb 2023