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innovators in isotopes

Sercon Ltd, Europa House, Coppicemere Drive,
Crewe, Cheshire CW1 6GZ, UK
Tel: +44 (0)1270 580008
Company Registration No. 4290072 Vat No. 771 1100 74

11 – Installation Report

Client:	University of Sheffield		
Quotation Number:	16061	Date:	18/03/2026
Job Number:	IN1383	Date:	24/06/2026

Contact:	Heather Walker		
Date of Visit:	05/10/2026	No. of Days:	10
Engineer:	Thomas Iordanidis		

Details of visit:

Day 1 (05/10/2026):

- Arrived on site and found 3 boxes outside the lab – no visible exterior damage
- Moved boxes in the laboratory, unpacked and placed on benches – no damages observed
- All plugs to the PC and the units were PAT tested by the university prior to plugging in
- PC turned on – all okay
- Autosampler and connections placed on the PyroEarth
- Modified lead extension converter 16A to 32A plug was used to plug in the PyroEarth
- Edwards rotary pump unpacked and filled up with Edwards-15 oil, connected to the back of the HS2022 – all okay
- HS2022 mains and electronics turned on – COMs established
- Pumps turned on and reached quickly a maximum speed of 92K rpm - system pumping down
- Emag placed on top of the flight tube on existing markings, connected leads and turned on to heat up overnight as Hydrogen is not required by customer / no gas supply available
- Checked filament continuity – all okay
- At a vacuum of ~9.3E-8 the filament and HT were turned on (already conditioned filament) with good emissions of ~140 at a trap of 50.
- Replaced all old copper tubing from gas cylinders for new and established all connections
- Vacuum at the end of the day ~1.6E-7

Day 2 (06/10/2026):

- Vacuum on arrival ~1.1E-8 – all okay
- PyroEarth powered on with modified extension cable & COMs established – all okay
- All gas cannisters were turned on and all old and new connections were tested with SNOOP – no leaks detected
- Checked flows on HS2022 and crimped vacuum – all okay
- Started tuning HS2022 with current Emag position
- After slight Emag move and adjusted height – good peak shapes and stabilities were obtained for CO2, N2 & CO
- Started running reference gas tests to assess peak shapes – after tuning adjustments precision and linearity reference gas specifications were met for CO2 & N2 (see results below)
- Upon discussion with the customer it was decided to test Oxygen pyrolysis first and then move onto combustion (CNS)
- Made up ceramic tube and H2O & CO2 traps, fitted and leak checked – all okay
- Combustion furnace temperature ramped up to reach 1350°C and GC set to 65°C

Day 3 (07/10/2026):

- Vacuum on arrival ~5.4E-9
- Combustion furnace maintained and settled to 1350°C overnight – all okay
- CO peak shape HT checked and pyrolysis isolation valve when opened forms a vacuum of 4.7E-6
- CO background ~3E-10 – all okay
- Helium flow used for pyrolysis was 70ml/ming giving an output flow of 80ml/min
- Ran an Oxygen Pyrolysis Precision run using 0.4mg of Cystine in silver caps

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- Oxygen Pyrolysis Precision passed – since no Hydrogen cannister is available Pyrolysis testing completed
- Demonstrated to customer the pyrolysis set up
- Cooled down furnace to switch to CNS set up
- Made CNS Combustion, Reduction & Secondary Reduction reaction tubes, fitted and leak checked – all okay
- Ramped up combustion furnace temperature to 1000°C through the software, Reduction 860°C, Secondary reduction 600°C and GC set to 130°C for overnight bake out
- Pressure tested system with cold and full temperature tubes – no drop in Pressure over 300 secs – all okay

Day 4 (08/10/2026):

- All furnaces maintained temperatures overnight & GC lowered to 65°C for sample analysis
- Checked CO2 & N2 Peak shapes and HT – all okay
- Pressure test passes without a drop in 300secs
- System N2 background with isolation valve open ~7E-11 – all okay
- Ran dual blanks – no CO2 in blanks – N2 stays around 6E-10
- Customer uses oxygen of purity 99.5 – found leak on gauge connections, new PTFE tape applied and leak restored – blanks still stay around 6E-10
- Ran blanks without the autosampler turning – still high, blanks without oxygen getting into the system no blanks observed suggesting the high blank is coming from the oxygen line – customer reported that she has always had high blanks on her older systems as well
- Ran 10 blanks – N2 blank stayed consistent around ~6E-10
- Oxygen EPC seems to not be reading properly – measured flow out of MFC seems to be responding correctly – possibly a readback issue
- Dropped a beetmix sample to trap sulphur – good flash combustion - good sulphur peak shape and stability obtained
- Submitted a CNS test to check integration windows – all okay
- CO2 sensitivity is lower than expected but seems consistent – possibly a combustion/oxygen issue
- Submitted NCS precision batch overnight with 5 blanks to assess high blank issue using AS Beet Mix (100µg N + 400µg C), n=5

Day 5 (09/10/2026):

- Assessed overnight CNS batch - CNS specs met & N2 blanks stayed consistent ~1.6E-10
- Although CO2 has met specifications a lower beam area was observed – re-tuning CO2 to improve sense, new CO2 tuning gives good peak shape and stability & passes reference gas specifications
- Customer informed me that she has purchased a new oxygen tank of higher purity (99.999) which will arrive next week, see if this brings the N2 blanks down – this does not seem to be affecting system performance
- Submitted a dual (C&N) Linearity ran using AS Beet Mix samples (Linear range 10-200µg N, 25-500 µg C, n=6)– N2 passes specifications and CO2 as well with excluding the lowest sample (1ul)
- Ran a batch of N2 blanks – blanks are consistent around 6E-10 – all okay
- Submitted another NCS precision batch over the weekend using beetmix samples to check consistent system performance and new CO2 tuning

Day 6 (12/10/2026):

- Over the weekend NCS precision batch met specifications again – all okay
- Checked HT placement for N2 & CO2 and submitted a linearity batch – linearity specifications passed for full linear range
- PyroEarth & HS2022 have both fully met specifications

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- Oxygen EPC reading 0 at all times but by measuring the flow out of the MFC this seems to be a readback issue. Swapped the prep board and the helium EPC maxed out at 50PSI. Put original board back in and now both EPCs read as expected – possibly a loose wire issue
- Heated up furnaces to full temps again and left to settle overnight

Day 7 (13/10/2026):

- Got the old PC turned on to take any projects and software used for the CryoPrep and the Europa Sampler– all okay
- Transferred relevant files to new PC
- Cleared out cables and determined what was required to establish a connection to the new HS2022
- Old wire connecting the sample and Cryo to the IRMS was modified to be plugged in straight into the orange block
- Found an RS232 converter to USB to be able to connect the CryoPrep to the new PC
- All wires are obtained and to be connected

Day 8 (14/10/2026):

- Connected the RS232 USB converter cable and the new wire straight to the orange block
- New valve assignment is as follows: red V3, blue V7 & yellow V15
- Connected valve control into the VALVE CONTROL 0 bank in the IRMS
- System powered on and after a few PC modifications a COM was established
- New software will be used with the old systems, bitmap adjusted to show the actual valve numbers
- Europa Sampler seems to be getting stuck – sampler issue / need to figure out valve assignment but it does move and inject, events might need adjusting
- All systems were powered off as there was a planned national grid power cut during the night – demonstrated to customer the shutdown procedure

Day 9 (15/10/2026):

- Within the customer's contract a separate visit is included for the connection of the Europa Sampler and the CryoPrep this will be done on a later date and the last 2 days will be focused on training
- Powered on the HS2022 and filament turned on with a vacuum of low E-7s – all okay
- Powered on PyroEarth and ramped up all furnace temperatures – reaction tubes should be fine as although the system was turned off there was a standby helium flow going through them
- Both EPCs seem to be reading fine after reseating the original prep board
- Customer training commenced including but not being limited to: Source parameters, Tuning, Trapping and tuning sulphur, Oxygen tuning, software capabilities, reprocessor functions and leak/pressure testing
- Combustion furnace cooled down overnight to fit a new C&N only combustion tube since customer is currently not interested in sulphur

Day 10 (16/10/2026):

- Made a new C&N only combustion tube and fitted & leak checked – all okay
- Ramped up the temperature to 1000°C using the software – all okay
- Pressure test passes with new combustion tube both with cold and full temperature furnaces demonstrating the process to the customer
- Ran a few blanks to assess Nitrogen background – all okay
- Ran a 2mg wheat customer sample to assess beam areas – all okay
- System has passed all specifications and handed instrument to customer
- Installation of HS2022 & PyroEarth completed

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Final Specifications:

Pyrolysis (O2&HD)		
Species	**Test**	**Result (‰ S.D.)**
HD	Ref Gas Precision	N/A (No HD gas available)
HD	Sample Precision	N/A (No HD gas available)
O2	Sample Precision	0.077
Combustion (CNS)		
CO2	Ref Gas Precision	0.042
CO2	Ref Gas Linearity	0.041
CO2	Sample Precision	0.020
CO2	Sample Dual Linearity	0.053
N2	Ref Gas Precision	0.030
N2	Ref Gas Linearity	0.150
N2	Sample Precision	0.094
N2	Sample Dual Linearity	0.103
SO2	Sample Precision	0.088

Recommendations:

If hydrogen is of interest in the future assistance from a Sercon engineer may be required as during the installation it was not possible to tune / no Hydrogen gas cylinder available for reference gas or HD pyrolysis

When heating up your combustion furnace use the ramping up feature in the software

Faults and Shortages:

High blank issue – N2 blanks seem to stay consistently around 6E-10 and this does not seem to be affecting system performance – this is most likely caused by the old oxygen cylinder when the higher purity O2 is received it might be worth connecting it to the system to see if the blanks decrease

CryoPrep Connections: Modified cable to connect straight to the orange block and used an RS232 converter to USB to establish COMs – all okay

Follow up:

A Sercon engineer will visit on a later date to connect the CryoPrep & Europa sampler to the new HS2022

Please contact us at service@sercongroup.com if you have any future questions or problems

Engineer: Thomas Iordanidis Date: 16/10/2026

Signed: 