



## FLASH 2000 Elemental Analyzer (CHNS) Operating Instructions

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### Instrument Warmup

- Prior to instrument use, ensure that He and O<sub>2</sub> gas pressure gauges are above 50 psi.
- Log onto computer; Open Flash 2000 (Eager Experience) and select Analyzer #1.
- Load the method: ...\\data\diniro\n c h s system 12-16-2021.mth
- Then click on “View Elemental Analyzer parameters”

If the parameters match the correct temperature/flow parameters in this table, then click [OK] and then click [Send parameters to analyzer]

Temperature		
Left Furnace	950	°C
Right Furnace	0	°C
Oven	65	°C

Flow / Timing		
Carrier	140	ml/min
Oxygen	250	ml/min
Reference	100	ml/min
Cycle (Run time)	840	sec
Sampling Delay	12	sec
Oxygen Injection	5	sec
End		

If the parameters don't match, then save a new method in your folder and manually edit the parameters following the instructions below:

Current method must not be “STANDBY METHOD WHEN FINISHED.”

To save a new method: [File] > [Save method].

- Data will be saved in the nmrnet.usc.edu server. Methods should be saved under Computer > Local Disk (C.) > Eager for FLASH > data > username

[Edit] > [Edit Elemental Analysis Parameters]

- Unselect “Set Instrument to Stand By” box
- Select “Left Furnace” box, set the correct temperature
- Select “Oven”, set the correct temperature
- In the Flow / Timing tab, select all three checkboxes and set the correct values
- Click [Send], then [OK]
- Click [Yes] in “Save method settings before closing?” popup box

Note: “Stand by” light on instrument should no longer be on.

### To view parameters of the instrument

[View] > [View Elemental Analyzer Status] > [General]

- Temperature – “Actual” temperature of left furnace should rise to “Set” temperature.
- Flow – “Actual” flow rates for carrier and reference gas should match “Set” rates.

Note: Instrument Warmup is complete when “Set” temperature matches “Actual” and “Temperature Ready” circle turns green. Instrument warm up takes around 20 minutes.

### Setup Table

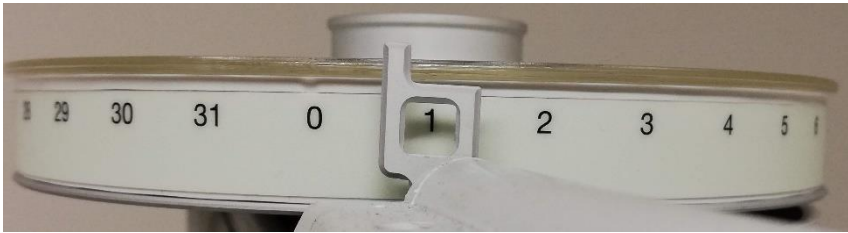
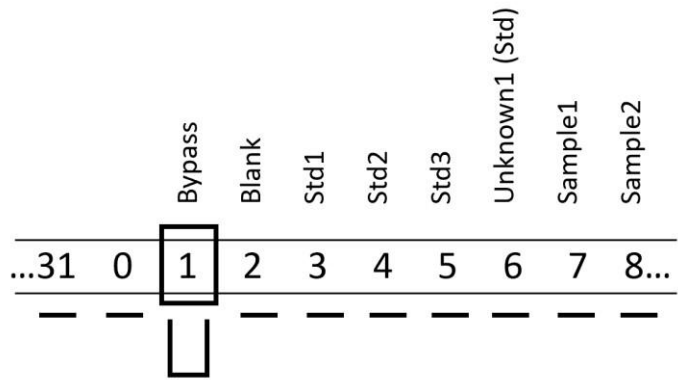
- Click “Sample Table” icon below main tool bar. To create a new sample table, delete previous table by clicking “Delete Sample Table” icon.
- To delete previous calibration curve and results, go to [Recalculation] > [Reset Calibration Factors]
- Click [OK] to all following popup messages
- Manually input the “Sample Name” column as directed below:

Sample Name	Filename	Type	Standard Name
Bypass		Bypass	
Blank		Blank	
Standard 1		Std	BBOT
Standard 2		Std	BBOT
Standard 3		Std	BBOT
Unknown #1		Unk	

Note: Under “Type” column, select cell and click on appearing green icon to “Select Sample Type” and set according to sample type (bypass, blank, unknown, etc.). When selecting standard, it will prompt you to select the “Standard name” and will automatically input the name of the standard being used.

Running three standards is recommended to get an accurate calibration curve. To ensure accurate calibration prior to running unknowns, an additional standard should be run as “Unknown #1”.

To make sure the order on the sample table and instrument sampler match, start with in this position:



## Weighing Samples

Note: Only Bypass sample needs to be prepared for this step.

Prepare samples with tin crucibles (See below for graphical illustration); make sure the samples are loaded into correct positions according to the order in sample table.



1. clean all tools with ethanol

2. place a tin crucible and re-zero (Wave on your left side of the balance)

3. take the crucible out, add sample using clean spatula

4. check the sample weight



5. press air out of the tin and close the capsule using 2 tweezers

6. twist tin as Z shape from side to side using two tweezers

7. fold tin into 1/3 of original width (Z twist)

8. fold 1/3 of tin from top



9. fold one more time

10. bend the tin to avoid getting stuck in auto sampler

11. record the weight to the computer (wave on your right side of the balance)

12. repeat step 1 to 11 for rest of samples

Weigh before and after adding sample to ensure there is no sample loss. Left side of balance is for taring and right is for recording the mass into the sample table. To insert sample, remove lid from autosampler and insert crucible into corresponding well.

Bypass sample should be between 2-3 mg. To get an accurate calibration curve, three standard masses should increase from 2-3 mg, for example: 2.0 mg, 2.5 mg, 3.0 mg OR 2.0 mg, 3.0 mg, and 4.0 mg is also an acceptable scale for the calibration curve. Blank is an empty crucible.

## Running Bypass and setting up component table

[Run] > [Start single sample data acquisition]

- “Channel status” should read *Acquiring*. Bypass run takes 14 minutes.

To view the chromatogram of the sample being analyzed click

[View] > [View sample being acquired]

After running the bypass, click “Component Table” icon below main tool bar. Click on [Show], check [Retention time] and [Peak name]. Check the peak positions and peak window for each element; make sure the peaks are correctly identified and the peak windows are not overlapping. Adjust retention time in table so that arrow is around the peak maximum for each peak. Finally click [Peak Identification] and then [OK]. Window can then be closed.

## Running Blank through Unknown #1

In the Analyzer #1 window, click “Sample Table” icon below main tool bar.

Sample Name	Filename	Type	Standard Name	Weight
Bypass		Bypass		
Blank		Blank		
Standard 1		Std	BBOT	
Standard 2		Std	BBOT	
Standard 3		Std	BBOT	
Unknown #1		Unk		

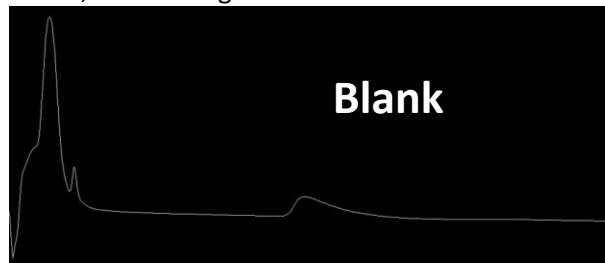
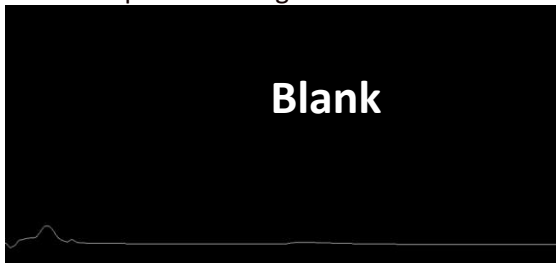
Select cell under “Weight” for Blank (see above).

[Balance] > [Receive weight from balance]; click on appearing green icon (“get weight from balance”).

Wave hand on right side of balance to automatically record the weight onto sample table.

[Run] > [Start sequence of samples] > [Start Now]

When a blank is running the chromatogram will look like the figures shown below. The left figure shows the y-axis from 0 to 10 mV, while the right figure is normalized to peak height. Note that the maximum peak has a signal of about 1.4 mV. This is fine, as a real signal will be > 10 mV.



## Checking Unknown #1 and calibration curve

- Click “Summarize results” icon below main tool bar. Nitrogen, carbon, and hydrogen values of Unknown #1 should match those of the standards.
- Click “View Calibration Curve” icon below main tool bar. Set [Linear Fit] as calibration method. All three standard points should be on the line and  $R^2$  value should be equal or greater than 0.999.

## Running Samples

In the Analyzer #1 window, click “Sample Table” icon below main tool bar. Input your samples into the Sample table after Unknown #1. Under “Type” column, select cell and click on appearing green icon to “Select Sample Type” and set as Unknown (see below). Prepare tin

Sample Name	Filename	Type	Standard Name
Bypass		Bypass	
Blank		Blank	
Standard 1		Std	BBOT
Standard 2		Std	BBOT
Standard 3		Std	BBOT
Unknown #1		Unk	
Sample 1		Unk	
Sample 2		Unk	

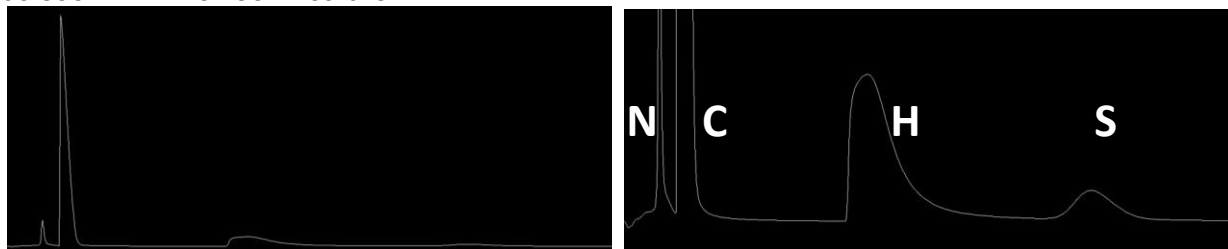
Prepare samples in tin crucibles and place into autosampler according to the order in sample table.

To record weight of sample select cell under “Weight” for Sample 1 (see above).

[Balance] > [Receive weight from balance]; click on appearing green icon (“get weight from balance”). Wave hand on right side of balance to automatically record the weight onto sample table.

[Run] > [Start sequence of samples] > [Start Now]

When a sample is running, the chromatogram will show 4 peaks of different intensities, with the second one (carbon) of about 70 mV in intensity. The peak for sulfur is much smaller but can be seen with the zoom feature.



## Collecting Data and Shutting instrument down

To collect data: Click “Summarize results” icon below main tool bar. Once this has opened, click the Excel icon below main tool bar. This will prompt a window to export your data in excel format to your folder.

Save your method before you shut down the instrument.

To shut down instrument:

[File] > [Load previous method] > Select “STANDBY METHOD WHEN FINISHED” under [Computer > Local Disk (C:) > Eager for FLASH > data > Flash Data > Standby Methods]

Double check instrument is turned off by:

[Edit] > [Edit Elemental Analysis Parameters]

- “Left Furnace” box must be unchecked.
- “Set instrument to Standby” box must be checked.
- Click [Send]
- Click [Okay]
- Select [Yes] for “Save method before closing?”

[View] > [View Elemental Analyzer Status] > [General]

- Temperature of left furnace should be decreasing Log Out and Sign Log Book

## Contacts:

Steven Guillen	xxx-xxx-xxxx	<a href="mailto:steven.guillen@usc.edu">steven.guillen@usc.edu</a>
Mattia Di Niro (MET Group)	208-982-5399	<a href="mailto:diniro@usc.edu">diniro@usc.edu</a>
Sunil Kandappa (MET Group)	701-793-2770	<a href="mailto:kandappa@usc.edu">kandappa@usc.edu</a>

## Consumables:

Create an account at CE Elantech (<https://www.ceelantech.com/customerlogin.php>) to purchase consumables (tin containers and standards).

Consumable	Part Number
Standard Kit (all four standards)	338 40010
BBOT Standard	338 35210
Cystine Standard	338 40018
Methionine Standard	338 35220
Sulphanilamide Standard	338 25100
Tin Containers 5 x 9 mm (box of 100)	240 064 00