

AA Furnace Operating Instructions
Version 1.2
10/22/07

- 1) If the autosampler is currently in the accessory mount, skip to step 3. If the autosampler is not currently in the accessory mount, turn on the power to the main AA unit (located in upper right hand corner on the right side). Open Solaar32 software. Remove the flame head, leaving it plugged in, and lay it on the counter. Lower the flame head by selecting *Action→Flame→Burner Park* from the drop-down menu.
- 2) Unplug the flame head and set it aside. Lift the furnace autosampler and place it in the accessory mount, making sure the bottom legs are over the silver bar. Screw the back thumbscrew firmly into the hole in the unit.
- 3) Turn on the power switch to the main AA unit (located in upper right hand corner on the right side) and the furnace (located on the front). Turn on the Argon tank and the fume vent. The Argon tank should be set at 16-20 psi. Turn on the chiller and make sure it is set at 20 degrees. Turn on the computer (if necessary) and launch Solaar32 software. Close the Wizard Launcher.
- 4) Files in which to save data are referred to as “databases” in the Solaar32 software. Make sure the desired database is active before running samples; if not, select *File→Open Results* from the drop-down menu. A new database can be created by selecting *File→New results* from the drop-down menu.
- 5) Parameters used to analyze samples are referred to as “Methods” in the Solaar32 software. Lists of samples to be analyzed are referred to as “Sequences” and are stored within Methods. To display the Method window, click the folder icon from the toolbar or *Edit→Method* from the drop-down menu.
- 6) Click the “General” tab. If an existing method is desired, click “Library” and load the appropriate method. If a new method needs to be created, click “New”. The “Element” dialogue box will be displayed.
- 7) Select the desired element(s), select “Furnace” as the appropriate technique and click “OK” to return to the “General” page.
- 8) Type in a Method Name for the method. Type in a description of the analysis if desired. Autosampler should be set as “FS95/97”. “Shared Standards” should be checked if multiple elements will be analyzed with the same standards.
- 9) Click the “Sequence” tab. Calibration is defaulted to be the first entry in the sequence table. Right-click in the second row of the sequence table, click “Insert Action”, and insert the desired action. If the action is “sample(s)”, the number of samples can be specified on the right-side of the window. Click “OK”. Click on “Sample Details” to rename the sample ID’s, if desired. Reagent information can be filled in, if desired, by clicking on the “Reagent Details” button.
- 10) Click the “Spectrometer” tab. Confirm that “D2 Quadline” is selected for Background Correction. The other default settings are OK but can be modified if desired. In particular, “transient area” may be desired rather than the default of “transient height”. The “Cook Book” button displays a Help window with information on analyzing the element selected.

- 11) Click the “Furnace” tab. Select the cuvette type installed in the furnace. Review the other default parameters and modify them if desired.
- 12) Click the “Calibration” tab. Select the desired calibration method from the drop-down menu. Ensure that the concentration units are set to $\mu\text{g/L}$, then select the desired number of standards. Enter the standard concentrations in the table from lowest to highest. Set the “Stock Standard Conc” field to the concentration of the highest standard. The other default values are OK.
- 13) Click the “Sampling” tab. The working volume can be reduced if desired. If using one master standard for calibration, “variable volume” should be selected, which signals the instrument to create the designated calibration curve by taking variable volumes of the master standard. If a set of standards was created for calibration, “manual” should be selected. The other parameters can be modified as desired.
- 14) Unless QC actions are desired, the “QC” tab can be ignored.
- 15) To save the method, return to the “General” tab. Click “Save”, then “Yes”. Click “OK” to exit the Method window.
- 16) Ensure that the proper lamp(s) is installed in the spectrometer. To install a new lamp, click the lamps icon or select *Edit*→*Lamps* from the drop-down menu to open the “Lamp Configuration and Status” window. Select the Carousel position for the lamp, and make sure the “Automatic Lamp Alignment” checkbox is selected. Line up the pins on the bottom of the lamp and insert it gently into the desired location (it should click into place). The Solaar32 software will automatically recognize the configuration of the lamp. To monitor and record the usage of the lamp, click “Lamp Usage”, then “Add Lamp”, enter the requested information, then click “Add”. In the Lamp Configuration and Status window, click in the serial number box for the lamp just added to import the serial number.
- 17) The furnace should be automatically aligned with the optics of the spectrometer. If in doubt, see lab manager or professor for assistance.
- 18) Confirm that the autosampler wash reservoir is full. If it needs to be filled, unscrew the bottle carefully and fill with DI water. The Argon line may need to be disconnected briefly from the furnace unit to replace the bottle because the gas pressure makes it difficult to screw in the bottle. Empty the autosampler waste reservoir if necessary (the Argon line may need to be disconnected for this as well).
- 19) Select *Edit*→*GFTV* or click the GFTV icon to launch the camera software. Select *Analysis*, then *OK*. Click the Align Capillary Tip icon and watch the GFTV window to make sure the tip enters the hole in the cuvette. If it doesn’t, adjust the 2 black alignment knobs (located on top and on the right side of the autosampler) until it does. If the height of the capillary tip needs to be adjusted, adjust the silver screw located on the autosampler arm.
- 20) Purge the autosampler by clicking the Autosampler Purge icon. This takes approximately 2 minutes.
- 21) View the Autosampler Loading Guide (abbreviated ASLG) by clicking *View*→*ASLG* from the drop-down menu or by clicking the ASLG button on the Sequence page of the Method. Load the standards and samples in the positions

- specified by the guide. These positions cannot be modified by the user. The ASLG can be printed if desired for easier loading.
- 22) Click the Wizard icon and select "Start Analysis". This will prompt through several steps, including Optical Setup and Furnace Optimization. Continue following the prompts to analyze the standards and samples.
 - 23) When all of the solutions have been measured, a prompt will be displayed confirming that the analysis has been completed. Click "OK".
 - 24) Review the number of cuvette firings. If this number is greater than 150, inform the Lab Manager.
 - 25) The results can be viewed in the Results window and the calibration can be viewed in the Calibration window. Different calibration curves can be selected by right-clicking in the Calibration window and selecting "change line fit". When this is done the results are automatically recalculated.
 - 26) Results can be printed to a PDF file or exported as .txt or .csv files for importing into Notepad or Excel, respectively. To print to a PDF, click the Wizard icon and select "Print a Report". Select the items desired in the report, then click "Done". When the print window opens, select "PDFfactory" as the printer and click "Print". The PDF factory window will open. Click "Save" at the bottom of the screen, enter the desired file name and location for the file, then click "OK". To export files, click *File*→*Export* from the drop-down menu, select the desired format (.txt or .csv), then the desired file name and location for the file.
 - 27) Turn off all equipment and the Argon gas cylinder when finished.