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Standard Operating Procedure for:

Flash 2000 Elemental Analyzer

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Contents

1. Purpose

The purpose of this SOP is to regulate the operation, usage and maintenance of flash 2000 elemental analyzer.

2. Scope

This SOP applies to all personnel using and managing flash 2000 elemental analyzer.

3. Procedure

3.1 Instrument start-up

3.1.1   Open the valve of He and O_2 gas cylinder (in ES436A). If the total pressure is less than 3MPa, contact Yili.

3.1.2   Open the valve of He and O_2 at the back of bench (fig.1). Make sure the gas supply pressure is 0.3 MPa.

Fig.1 Opening the Gas valve

3.1.3   Switch on analyzer   (at the back of the instrument) and PC.

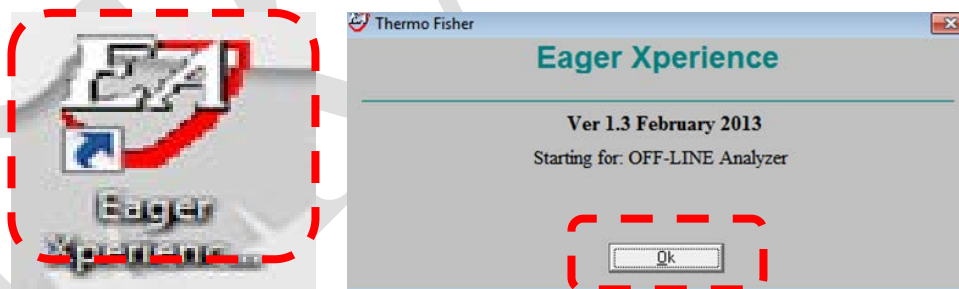3.1.4   Click the icons (fig.2) show below in turn.
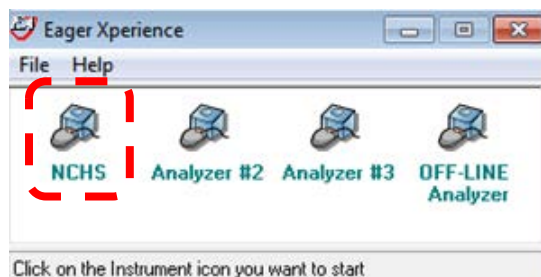

Fig.2 EA icon
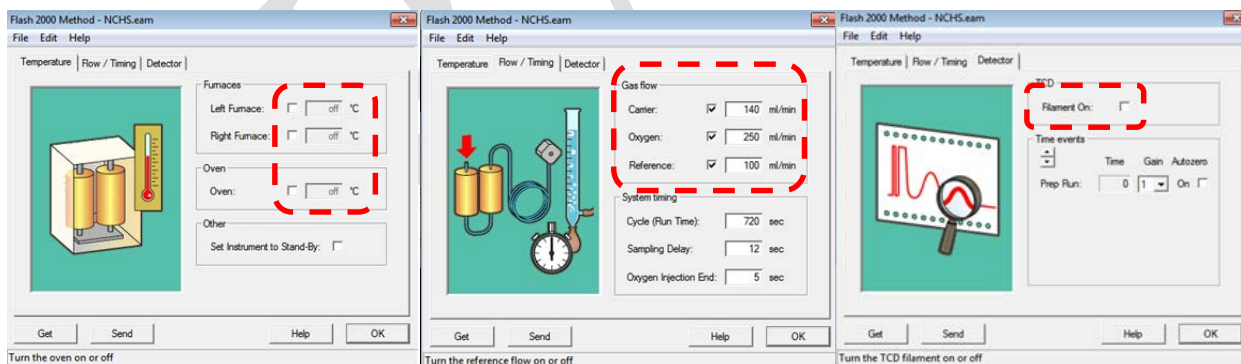
3.1.5   Click on NCHS (fig.3).

Fig.3 Selecting NCHS mode

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3.1.6 Click ![icon] to create a directory to store the operating method.

3.1.7 Maintenance check.

In the main menu select *View> View Maintenance* (fig.4).

Ask LFST to conduct the maintenance if most of the column is in yellow.

Fig.4 Maintenance check

3.1.8 Click ![icon] to edit instrument status. Carrier flow: 140ml/min; oxygen flow: 250ml/ min; reference flow: 100ml/min. Furnace and detector should be off currently. Click **send** to transfer the operating parameters to the instrument. (fig.5)

Fig.5 Setting the gas flow

3.1.9 Click ![icon], select the option *special functions and leak test* (fig.6).

After 300 -360 seconds, Carrier flow and reference flow must be within 0 and 3ml/ min. If not, report to LFST.

Fig.6 Leak test

3.1.10   Click [icon], set all parameters as below. Click send and transfer the setting to instrument.(fig.7)
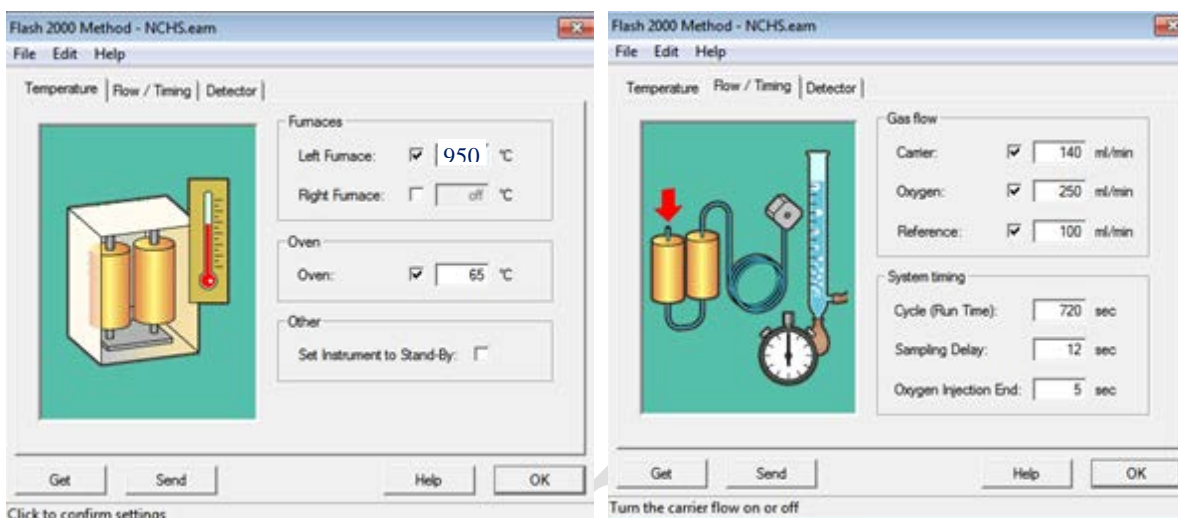

Fig.7 Turning on the furnace, oven and gas supply

3.1.11   Click [icon] to view current elemental status, wait till the flows reach the set value.

3.1.12   Click [icon], select the option *detector*, in the section *TCD*, select *filament on* and click "*send*" (fig.8).
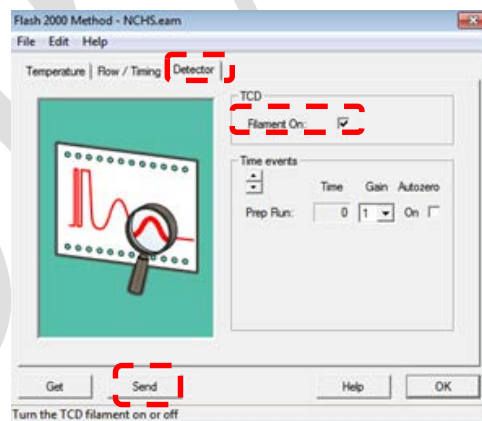

Fig.8 Turning on the detector

3.1.13   After about 50 minutes the instrument furnace reach the temperature settings and the LED Ready

[icon] on the synoptic panel lights up.

3.1.14 Click , select the option **Detector**. In the section **TCD**, click the button **Auto- adjust level at 1000 μV** (fig.9)**.**
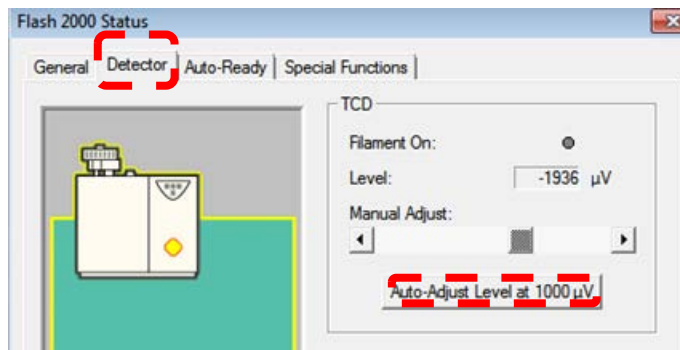

Fig.9 Auto-adjust the detector level

3.2 Determination of the blank value

3.2.1 To fill sample table

Click , enter sample name, filename and weight. Select type and standard name. A typical sample table shows below (fig.10).

Fig.10 Sample table

The standard we usually use for soil is cystine.

Bypass: a standard substance is analyzed to condition the instrument.

Note:

- ➢ Filename can't be repeated, or your result will be covered.
- ➢ It is recommended to add a blank line after two blanks so that the sequence will stop after the blank samples and you can check the result.
- ➢ Analyze a standard (as a sample) after every 20 samples.

The sample table can be reedited during your analysis.

You can right click the blank before **sample name** to set this sample as actual sample being acquired (fig.11) when the system makes the wrong order.
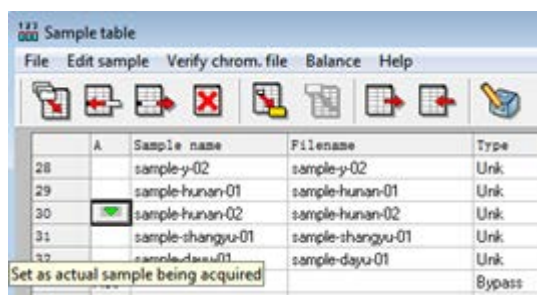

Fig.11 Setting as actual sample being acquired

3.2.2   Click **recalculation > reset calibration factors** to reset the blank value and clear the previous calibrations (fig.12).
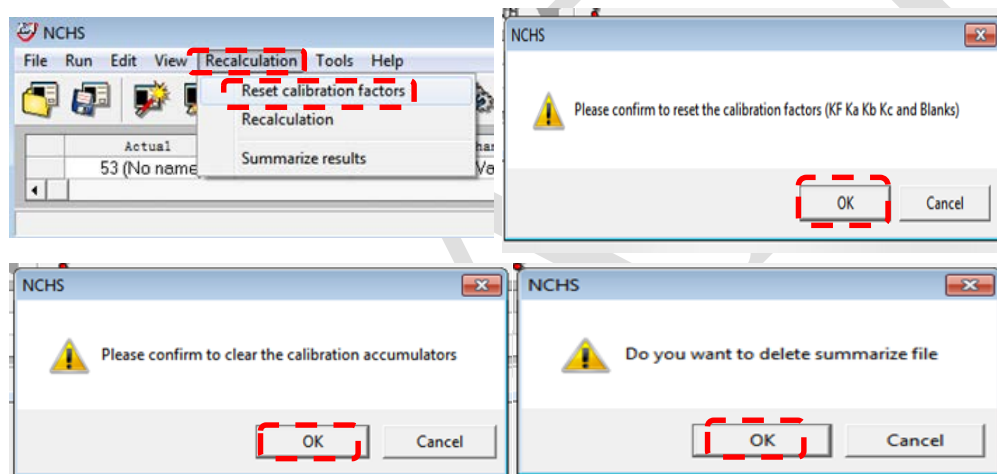

Fig.12 Reset calibration factors

3.2.3   Throw the first sample into the furnace and click to start sequence (fig.13).
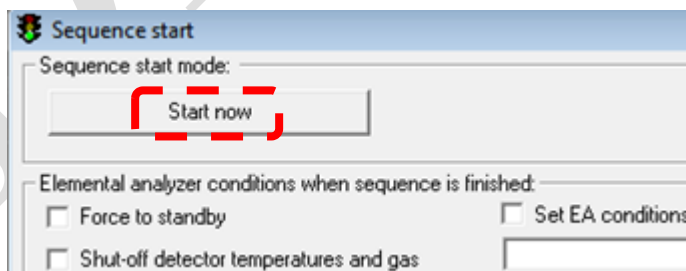

Fig.13 sequence start

3.2.4   Throw the second blank into the furnace before the first blank is finished.

3.2.5   Click ![icon] and then click *select result >area* in the following window to check the blank value (fig.14). **Acceptable limits of blank value: N<3000, C<10000, H<20000, S=0.** Contact LFST if the data don't falls into the limited range.
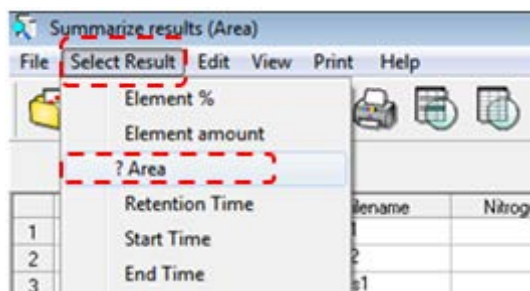

Fig.14 Checking the blank value

3.3 Guide to run analyses

3.3.1   Load bypass, standards and samples on the tray and load the auto sampler tray. Two trays could be used together. The second tray had to be loaded at the beginning if you need to use it or the order maybe wrong when it comes to the second tray.

3.3.2   Rotate the bottom tray clockwise (to the left) for one step.
Note: there should always be one sample in the cavity (the waiting area) in advance before it will be analyzed. So either throw it into the cavity or rotate the plate manually. (When the plate is loaded and sequence is in process, next sample will plunge into the waiting area automatically at the beginning of analyzing the current sample.)

3.3.3   Click ![icon] to start sequence.
   You can tick the box "*shut-off detector temperatures and gas*" (fig.15) before click "*start now*" if the experiment will be finished late in the night or it is not convenient for you to operate the instrument.
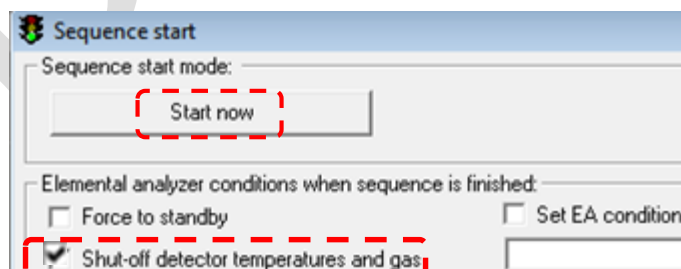

Fig.15 Automatically shut-off detector temperatures and gas when sequence is finished

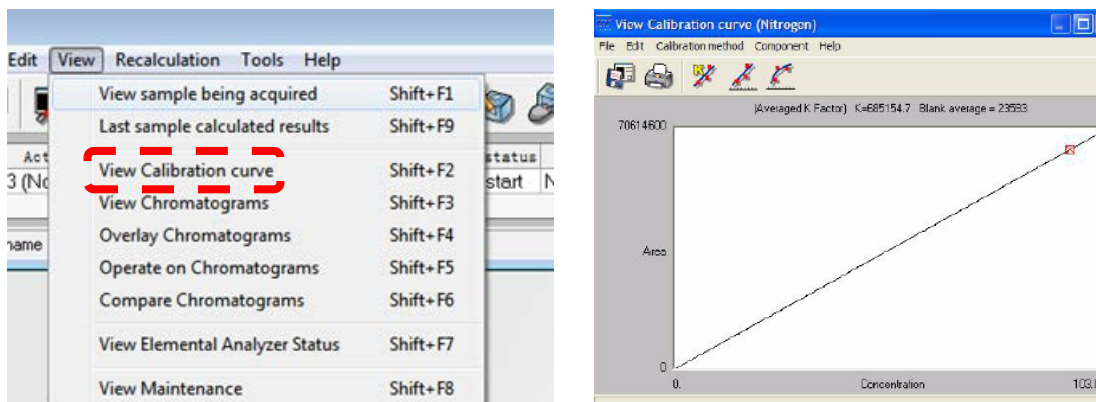3.3.4   Click **View> View calibration curve** to check the calibration (fig.16).

Fig.16 View calibration curve

3.3.5   Click to check the result. Click to export result.

3.4 Shut off instrument

3.4.1   Click , tick the box furnace, oven, flow and filament to enable the off condition. Click **send** to send the command to the instrument.(fig.17)
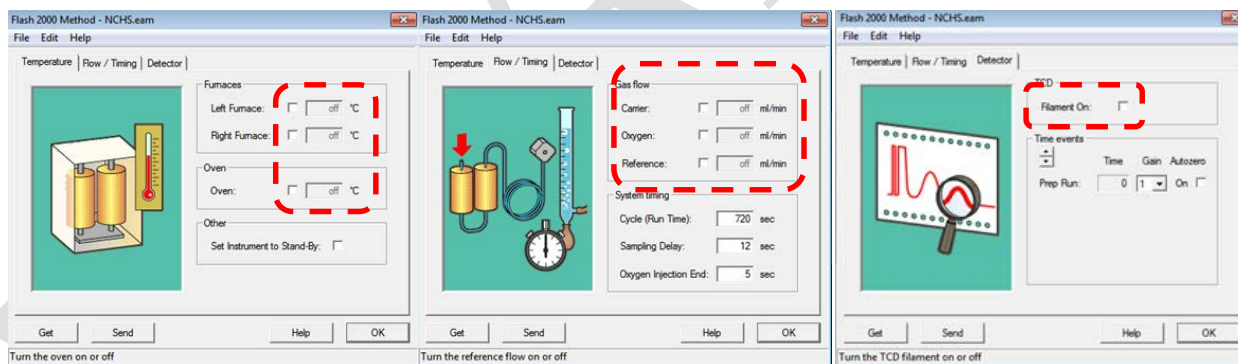

Fig.17 Shut-off detector temperatures and gas

Caution: TCD must be shut off when cut off gas flow.

3.4.2   Wait till the temperature is below 200ºC. Close the software. Turn off PC, analyzer and gases.

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