

# Organic Application Note

## Total Mercury in Soils

### Accessories

614-822-102 Small Nickel Boats.

Note: Boats should be pre-baked at 400°C or analyzed (without a sample) before loading a sample.

**Sample Weight** 25 to 80 mg (0.025 to 0.080 g)

### Calibration Standard

NIST SRM 1633b (coal fly ash) and NIST SRM 2709 (soil); or equivalent Certified Reference Materials.

**Furnace Temperature** 550°C

**Analysis Time** ~6 minutes

### Method Profile

Drying Time: 60 seconds

Decomposition Time: 200 seconds

Cuvette Cleaning Cycle: 45 seconds

Peak Used: Auto select

NOTE: Method for Quicksilver Windows® Software Version 2.0.

### Procedure

- Determine the blank as follows:
  - Enter "Blank" from the drop-down menu under the "Name" column.
  - Click "Analyze", the door will open and the nickel loop will be presented.
  - Carefully place a 614-822-102 Small Nickel Boat into the nickel loop using clean tweezers.
  - Click "OK" in the "Load Sample" window, the door will close and the analysis sequence will start automatically.
  - Repeat steps 1a through 1c two more times. The system and boats will be purged of any interfering elements
- Calibrate the instrument as defined in the instructional manual:
  - Weigh various weights in accordance to the absolute amount of mercury required to calibrate an appropriate dynamic range. The calibration samples are weighted into the 614-822-102 Small Nickel Boat.
  - Enter each calibration sample with their appropriate ID code from the drop-down menu, and sample weight from an external balance measurement.
  - Click "Analyze", the door will open and the nickel loop will be presented.
  - If there is a boat in the nickel loop, remove it and keep for later use.
  - Carefully place the calibration sample boat into the nickel loop using clean tweezers.
  - Click "OK" in the "Load Sample" window, the door will close and the analysis sequence will start automatically.
  - Repeat steps 2a through 2f as per the calibration procedures.  
Note: The first analyzed sample after a long delay should be discarded. This sample should be considered a conditioner for the system, and not used for the actual calibration.
  - Complete a calibration by following the calibration procedure as outlined in the manual.
  - Verify the calibration by analyzing one of the calibration samples again. It should be within the expected tolerances. If not, repeat steps 2a through 2i again.



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3. Analyze the samples as follows:
  - a. Weigh ~50 mg of the sample into a 614-822-102 Small Nickel Boat.
  - b. Enter a sample identification in the Name column and the sample weight in the Mass column.
  - c. Click "Analyze", the door will open and the nickel loop will be presented.
  - d. If there is a boat in the nickel loop, remove it and keep for later use.
  - e. Carefully place the sample boat into the nickel loop using clean tweezers.
  - f. Click "OK" in the "Load Sample" window, the door will close and the analysis sequence will start automatically.

### Typical Results

Sample	Weight(mg)	Hg (ng)	Hg (ppm)
NIST 2709	47.3	67.9	1.435
Soil (as is)	50.5	72.5	1.435
	48.1	72.1	1.479
	48.3	69.1	1.432
	49.5	71.1	1.436
	<b>Avg (ppm)</b>	<b>1.44</b>	
	<b>Std</b>	<b>0.02</b>	
	<b>RSD</b>	<b>1.39%</b>	

Sample	Weight(mg)	Hg (ng)	Hg (ppm)
Soil #1	76.8	17.1	0.223
	77.5	16.6	0.214
	75.9	16.5	0.217
	78.4	17.6	0.224
	74.3	16.5	0.222
	<b>Avg (ppm)</b>	<b>0.220</b>	
	<b>Std</b>	<b>0.004</b>	
	<b>RSD</b>	<b>1.96%</b>	

Sample	Weight(mg)	Hg (ng)	Hg (ppm)
Soil #2	23.2	166.5	7.18
	25.8	174.0	6.74
	23.7	171.7	7.25
	22.4	159.9	7.14
	29.2	194.6	6.70
	<b>Avg (ppm)</b>	<b>7.00</b>	
	<b>Std</b>	<b>0.261</b>	
	<b>RSD</b>	<b>3.7%</b>	



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