Ash Analysis of Fuel Oil

AW500.0

(Heavy and Light Fuel Oil)

**Method Parameters**

Dwell Time: 30 min -4 hours

Temperature: 250-525 °C

**Recommended Systems**

PHOENIX AirWave

Sample Amount: 20 grams

**Equipment**

PHOENIX AirWave, 100 mL porcelain crucibles, tongs, gloves, desiccator, balance capable of weighing to + 0.1 mg, Disposable pipette

**Sample Preparation**

Mix sample well before sampling.

**Procedure**

1. In the Program Mode program the following:

 **Stage** **Temp°C** **Ramp(min)** **Dwell (min)**

 1 250 01:00 00:30

 2 525 00:00 04:00

1. Weigh up to 20 grams **(Caution: See Note 1)** of sample into the pre-ashed crucibles.
2. With the furnace temperature at 100oC or less, place the crucibles into the furnace chamber, replace the furnace door allowing no gaps, close the microwave cavity door, press the **Start/Stop**.
3. At the end of the Stage 2 Dwell Time, remove the crucibles, allow cooling in a desiccator.
4. Allow the furnace chamber to cool to the starting temperate of 100oC or less.

% Ash = C - A x 100

 B

A=Weight of crucible

B=Weight of sample

 C=Weight of ashed sample; crucible

**Note 1**: Crucibles should be pre-ashed for 10 minutes before they are used for sample ashing to insure results are accurate to + 0.001%. This procedure is for running 2 samples, of no more than 20 grams each. If analyzing four 20 gram samples, add 30 minutes to the dwell time in Stage 2.

**Note 2**: Never place samples into the furnace chamber when the temperature is above 100°C or any temperature that the sample will begin to burn, whichever is the lowest.

**Note 3:** The Phoenix satisfies ALL apparatus requirements for a "muffle" furnace in section 5.7 of IP501. This application is an alternative when the Bunsen burner step is eliminated. If Stage 1 of this method is eliminated and the Bunsen burner is used it satisfies all requirements of IP 501. The fusion in section 7.2.5 using dilithium tetraborate/lithium fluoride flux for fusion prior to elemental analysis may also be done in the Phoenix.

The ashing times may be shorter if the sample is burned off over the Bunsen burner prior to using the muffle furnace. Because we are not burning the sample the same in the Phoenix, some of the carbon may be vitrified which will make it more difficult to oxidize resulting in longer ashing times.

**Results**

**Heavy Fuel Oil, 0.03% Ash**

|  |  |
| --- | --- |
| Sample | Phoenix AirWave |
| 1 | 0.07 |
| 2 | 0.09 |
| 3 | 0.07 |
| 4 | 0.08 |
| Average | 0.08 |
| Standard Deviation | 0.01 |

 **Light Fuel Oil, 0.03% Ash**

|  |  |
| --- | --- |
| Sample | Phoenix AirWave |
| 1 | 0.02 |
| 2 | 0.02 |
| 3 | 0.01 |
| 4 | 0.02 |
| Average | 0.02 |
| Standard Deviation | 0.01 |