Ash Analysis of Paper Coating

AW097.0

(Coating to Binder Ratio may contain: kaolin, TiO2 and latex binder).

**Method Parameters**

Dwell Time: 30-120 minutes

Temperature: 105-550 °C

**Recommended Systems**

PHOENIX AirWave

Sample Amount: 3-5 grams

**Equipment**

SMART System 5 or LabWave 9000,PHOENIX AirWave, quartz fiber ashing crucibles, quartz fiber crucible liners (disks), tongs, gloves, brush, desiccator, balance capable of weighing to + 0.1 mg.

**Method: %Total Residue (Total Solids)**

1. Assemble the Microwave Furnace Workstation as outlined in the assembly and operating instructions.
2. Pre-ash the quartz fiber crucibles and disk for 10 minutes at 550° C, cool to room temperature in desiccator, about 2 minute.
3. In the Program Mode, store a program with the following parameters: Set Point for 105°C, Ramp Time for 10 minutes, and the Dwell Time for 120 minutes.
4. Depress the F1 key, and follow the instructions on the display for initial weighing of the sample. Weigh 3 - 5 grams of sample to the nearest 0.1mg into the quartz fiber crucible and place 1 ashing disk on top of the sample.
5. Open the microwave cavity door and then remove the ashing furnace door. Using metal tongs, place the quartz fiber crucible containing the sample in the furnace chamber.
6. Replace the furnace door, close the cavity door, depress the **START** key.
7. When the instrument completes the program. Open the cavity door, and remove the ashing furnace door. Using metal tongs remove the crucible, place in a desiccator, and allow to cool to room temperature, about 2 minute. Replace the ashing furnace door, close the cavity door.
8. Depress the F2 key, and follow the instructions on the display for weighing of the dried sample.
9. The percent Total Residue is calculated using the following formula:

% Total Residue = C - A

 B - A

**Method: % VOL Residue / % Fixed Residue**

1. In the Program Mode, store a program with the following parameters: Set Point for 550°C, Ramp Time for 0 minutes, and the Dwell Time for 30 minutes.
2. Open the microwave cavity door and then remove the ashing furnace door. Using metal tongs, place the quartz fiber crucible containing the sample in the furnace chamber. Replace the furnace door, close the cavity door, depress the START key.
3. When the instrument completes the program. Open the cavity door, and remove the ashing furnace door. Using metal tongs remove the crucible, place in a desiccator, and allow to cool to room temperature, about 2 minute. Replace the ashing furnace door, close the cavity door.
4. Depress the F2 key, and follow the instructions on the display for weighing of the ashed sample.
5. The percent % VOL Residue and % Fixed Residue are calculated using the following formula:

% Volatile Residue = (C-A) - (D-A) x 100

 (C-A)

% Fixed Residue = (D-A) x 100

 (C-A)

A= weight of dish

B= weight of dish & sample

C= weight of dried sample & dish

D= weight of ashed sample & dish

**Note 1**: Quartz fiber ashing crucibles and disks should be pre-ashed for 10 minutes before they are used for sample ashing to insure results are accurate to + 0.001%.

**Note 2**: Quartz fiber ashing crucibles may be reused until small holes or cracks begin to appear. The crucibles should then be discarded. Used quartz fiber ashing crucibles should be cleaned before reusing by brushing out all ash particles with a soft, bristle brush. Quartz fiber ashing disks are not reusable.

**Note 3:** This method describes the determination of the ratio of coating (kaolin, TiO2) to binder (latex) in a paper coating. The ratio is determined on a dry weight basis using an SMART System 5 or LabWave 9000 Moisture/Solids Analyzer and Microwave Furnace Workstation, Phoenix™ or Phoenix AirWave-7000.