

Ash and Moisture Analysis with prepASH 340 Series for wood, pulp, paper and paperboard

prepASH 390 Series



Burning



High Temperature



Improved Safety



Weighing Samples



Most papers consist of celluloses and inorganic fillers. A variety of fillers are used to achieve different paper quality and properties. The amount in the filler is determined by ashing the paper. Ashing is therefore an important analysis in paper production and recycling.

The organisations TAPPI* and ASTM** do have standards to determine the ash of paper*

**TAPPI is the leading association for the worldwide pulp, paper, packaging, and converting industries and publisher of Paper360°. Through information exchange, trusted content, and networking opportunities, TAPPI helps members elevate their performance by providing solutions that lead to better, faster, and more cost-effective ways of doing business.*

***ASTM International (ASTM), originally known as the American Society for Testing and Materials, is an international standards organisation that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services.*

Tappi T211: ashing at 525 °C

Tappi T413: ashing at 900° C (recommended for paper with filler)

Methods for combustion at temperatures other than that of TAPPI T 211 or T 413 are published. These may give different results, based on present loading material.

ASTM D 586: A: Ash Content Upon Ignition at 525°C

B: Ash Content Upon Ignition at 900°C.

In prepASH, determination of the moisture should be at 105 °C, ash at 525 °C and ash at 900 °C which can be done with one single weigh-in - automated calculation of losses and residues on chosen base.

Automation of the moisture and ash analysis brings efficiency, quality and security into the laboratory.

The ash content of the sample may consist of:

- (1) various residues from chemicals used in its manufacturing process
- (2) metallic matter from piping and machinery
- (3) mineral matter in the pulp from which the paper was made
- (4) filling, coating, pigmenting and/or other added materials

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(1) The combustion of cellulose to form volatile combustion products occurs at about 300°C. For papers or pulp containing no added fillers or coatings, ignition at either 525°C or 900°C will yield essentially identical results of a few tenths percent ash or less. Examples of such papers include “ashless” filter papers manufactured for chemical analysis, or dissolving grade pulps.

(2) For samples containing fillers, coatings or pigments which undergo negligible change in weight upon ignition of either 525°C or 900°C, such as the oxides of silicon or titanium, and where other fillers, coatings or pigments are known to be absent, ignition at either temperature may be taken as a semi-quantitative measure of the percentage of such material present in the sample.

(3) In most cases, the ash content of paper and paperboard will contain inorganic residues from the pulp, inorganic residues from paper making chemicals, and loading or filling materials deliberately added. In such cases, the significance of the ash level determined will vary depending upon which ashing temperature is used and the identity of the materials added.

(4) For papers containing only cellulose and calcium carbonate, ignition at 525°C will remove cellulose, and moisture, but will leave as ash the calcium carbonate essentially intact. Ignition at 900°C will convert the calcium carbonate to calcium oxide. In such cases, these methods may be used in conjunction to provide a good estimate of added calcium carbonate levels.

prepASH – optimal solution to determine ash

Reduced time and effort: prepASH is a fully automatic drying and ashing equipment, so no multiple weighing back after time consuming cooling down in the desiccator but automatic calculation of results. Working in groups of similar samples in a single run will increase efficiency and optimise time of analysis.

Improved safety and efficiency: No more dangerous analysis with the open flame. With prepASH, analysis can be done in time slots unused or hardly ever used, e.g. at night.

Increased quality: Up to 20% of each ash determination has to be re-analysed because of faulty/undefined results. prepASH is highly repeatable and reliable!

Detailed analysis reports: Due to the permanent recording of measurements during the entire process and the automatic saving of the final results, all data is retrievable at any moment.



Standard Method with Oven	Vs.	prepASH
Burning off of crucibles for constant weight before	Dry Matter	Possibility to pre-define “burning off” crucibles
Measuring tare of crucible one by one		AUTOMATIC PROCEDURE
Sampling		Sampling
Weighing + documentation of each crucible		AUTOMATIC + sample addition by operator
Samples in drying oven + START		START PROGRAM
Removing samples from oven + cool down		RESULTS (moisture)
Back weighing samples, calculation (moisture)		
Pre-ashing with rapid incinerator or hot plate	ASH	RESULTS (ash)
Samples in muffle furnace		
Removing samples + cooling down in exicator		
Calculation and documentation (ash)		
Back weighing for stable results (repeat?)		