

Ash and moisture analysis with prepASH 340 Series for wood, pulp, paper and paperboard

Most papers consists of celluloses and anorganic fillers. A variety of fillers are used to achieve different paper quality and properties. The amount of 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 organization 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 loading material present.

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

B: Ash Content Upon Ignition at 900°C.”

In prepASH determination of moisture at 105 °C, ash at 525 °C and ash at 900 °C can be done with one single weighing 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

The amount and composition of the ash is a function of the presence or absence of any of these materials or others single or in combination.

(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 semi-quantitative measure of the percentage of such material present in the sample.



Precisa APPLICATION



[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.



Applications available from Precisa

prepASH_O901_paper

prepASH_O902_pulp

prepASH_O802_Cellulose-powder-G250

Working Steps of moisture and ash determination

Standard Method with oven	vs.	prepASH
Heating out crucibles for constant weight before	Dry matter	Possibility to pre-define a "heating out"
Measuring tare of crucible one by one		AUTOMATIC PROCEDURE
Sampling		Sampling
Weighing + documentation of each crucible		AUTOMATIC + entering the sample
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 exsiccator		
Calculation and documentation (ash)		
Back weighing for stable results (repeat?)		

Reference customer: J. RETTENMAIER&SÖHNE, GmbH + Co. KG, 73494 Rosenberg



Today, JRS RETTENMAIER & SOEHNE GmbH+Co is a world-wide, dynamic leader in the fiber industry.

Through intense research and development, the former grain and saw mill has expanded dramatically incorporating specialized, highly technical pulverizing, fractionating and refinement processes. 15 manufacturing facilities supply the international market with wood cellulose, fruit and grain fiber products in a variety of forms including fibers, powders, granules, chips, and agglomerates

JRS is using prepASH mainly in the analysis of different cellulose products.

With 2 runs a day (drying and ashing of 58 samples) prepASH is disburding the staff from handling hot furnaces and samples and safes at least 4 hours manual work per day.

Precisa

■ The Balance of Quality ■



Precisa APPLICATION



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 dessicator but automatic calculation of results. Working in groups of similar samples in a single run will rise efficiency and optimise time of analysis.

Improved safety and efficiency. No more dangerous analysis with the open flame. With prepASH analyses can be done in time slots unused or hardly ever used so far, 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 are retrievable at any moment.

Precisa

■ The Balance of Quality ■

Precisa Gravimetrics AG
Moosmattstrasse 32
CH-8953 Dietikon

Tel. 0041 (0)44 744 28 28

Fax 0041 (0)44 744 28 38

www.precisa.com; info@precisa.ch

