

# Questron's Quest

INNOVATIVE SOLUTIONS FOR ANALYTICAL LABORATORIES

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## Microwave ashing redefined

### *QAsh 1800 – Innovative and speedy sample ashing*

Questron Technologies Corp., Canada

Measurement of ash content or Loss of Ignition (LOI) is a routine procedure carried out in quality control and process laboratories in such diverse fields as petroleum, pharmaceutical, food, plastic and waste management, among others.

Resistively heated muffle furnaces have been in use in analytical labs for the last many years. These conventional muffle furnaces come with their own limitations like longer heating times, high energy costs, low efficiency, unpleasant noxious odours in the lab and poor operator safety. Poor reproducibility, frequent breakdowns and higher costs of maintenance are some other inherent limitations that conventional muffle furnaces carry.

While conventional Pyrolytic methods utilize electrical resistive heating, Questron's QAsh 1800 Microwave Ashing System uses silicone carbide as the heating element. Absorption of over 90% of microwave energy by silicone carbide results in the release of heat in excess of 1000°C. The oven temperature is measured by means of a thermocouple and is maintained by cycling the magnetrons on and off. It uses two magnetrons with a total of 1800 Watts of energy and heats the samples up to 1200°C.

As silicone carbide uses microwave energy to build the interior temperature of the muffle furnace chamber, the ceramic material of the furnace provides very effective insulation. This results in the outside temperature being near-ambient despite the 1200°C temperature inside. The furnace design promotes a large volume of air flow around the heated chamber, providing enough oxygen for rapid, complete combustion of organic materials in the sample.



QAsh 1800 methods employ porcelain, graphite, alumina and platinum crucibles and also lightweight quartz fibre crucibles. The quartz crucibles are lighter and can hold small amounts of sample, allowing faster heating and cooling. Another benefit of the quartz crucible is its porous nature which allows oxygen to get to the sample for rapid oxidation. This plays an important role in reducing ashing times, compared to the relatively static conditions found in conventional muffle furnace/porcelain crucible combinations.

The main method for determining LOI involves heating samples to temperatures at which organic materials decompose and certain inorganic components volatilize. Any resultant loss in weight of the sample is the LOI measurement.

There is a good correlation between muffle furnace methods and microwave LOI methods. The existing methods will likely be applicable to either. The microwave methods are also able to handle various types of foundry materials to which LOI is an applicable process-control indicator.

In providing test results up to 10 times faster than the conventional method, microwave ashing allows technicians to get an early handle on quality problems that might just be creeping into the system. It also saves on time, energy costs and the considerable expense of replacing conventional muffle tubes every time the traditional test is run.

### ABOUT QUESTRON

Questron Technologies Corp. is a Canadian manufacturer of sample preparation equipment for analytical laboratories

Our product line includes:

#### Microwave Digestion Systems

- > QLAB 8000  
*Computer controlled*
- > QWAVE 4000  
*Temperature and pressure control*
- > QWAVE 1000  
*Power-based sample digestion*

#### Microwave Ashing System

- > QAsh 1800  
*Computer controlled*

#### Hot Block Digestion

- > QBlock Digestion System  
*with QBlock Commander Quad-Channel Heating Controller*

#### Automated Hot Block Digestion

- > Vulcan 84  
*Automated Digestion and Work-up Station  
Computer controlled*

QAsh 1800's unique features like dual magnetrons, LED temperature indicator bar, user-friendly software, a large ceramic muffle furnace that accommodates up to 12 x 50ml crucibles and emergency interlock safety switch, set it apart from similar products available in the market. It also has a built-in powerful exhaust blower which removes noxious gases and soot from the oven cavity.

### Ashing times (comparison)

Material	Conventional (Hr:Mn)	Microwave (Hr:Mn)	Time Saved
Butyl Rubber	1:30	0:20	78%
Carbon Black	16:00	1:20	92%
Coal	4:00	0:30	88%
Coke	4:00	0:50	79%
Egg Yolks	4:00	0:15	94%
Feed	2:10	0:10	93%
Graphite Powder	4:00	0:35	85%
Kaolin	2:00	0:30	75%
Lactose	16:00	0:30	97%
Oil Sludge	1:00	0:30	50%
Paper	1:00	0:10	83%
Pet Food (canned)	5:20	0:08	98%
Pet Food (dry)	1:30	0:25	72%
Polyester	8:00	0:15	97%
Polyethylene	1:15	0:15	80%
Pulp	3:00	0:10	94%
Waste Sludge	1:00	0:15	75%

QAsh 1800 is a computer-controlled system which allows the users to collect, store and reproduce the ashing data in tabular or graphical format. Several batch files can be made to accommodate various sample types. It can be connected to a digital balance allowing the weighing data to be transferred automatically to the sample file, thus eliminating the need for manual data entry. QAsh 1800 software also controls the blower motor and the flow of air to the sample, resulting in reproducible ashing.

QAsh 1800 comes with distinct advantages of quicker ashing times, reduced energy costs, high sample throughput, better reproducibility and sample batch documentation. These advantages make it the ideal choice for process and quality control labs around the world.

### CALENDAR OF EVENTS

On-going demonstrations, workshops and training sessions at Questron Technologies Corp.

Please call to book an appointment. We will be glad to demonstrate our complete range of products for you.

Sample Preparation, Treatment and Automation



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