NOVA**WAVE**

A new category of Automated Microwave Digestion

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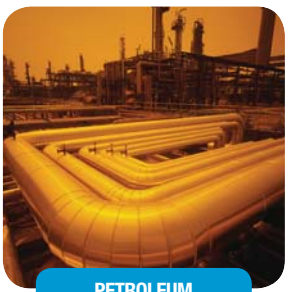
www.scpscience.com/novawave



*NOVA**WAVE***, a microwave digestion tunnel, delivers a dramatic improvement in sample throughput and speed of digestion plus a major reduction in labor and human intervention compared to any other digestion system.

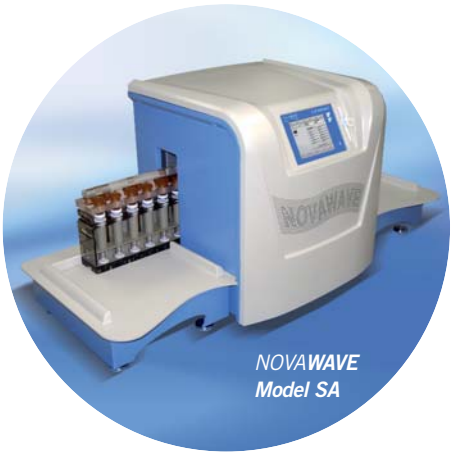
Features

*NOVA**WAVE*** is a new, fully automated, sample digestion tunnel employing 12 dynamically created microwave minicavities (Patent pending) to simultaneously process 12 samples in Quartz or Teflon® vessels. *NOVA**WAVE*** is available in two models:

Model SA: A Stand Alone *NOVA**WAVE*** Microwave Tunnel Digestion System with all available software and operational parameters including the flexibility of unique, individual method assignments for each sample in a 12 sample rack.
For labs with limited samples, the Model SA is the instrument of choice. Speed and flexibility are built-in with the capability of running a rack of samples with individual sample temperature programs. Simultaneously, digest water and soil samples in the same rack with an optimized digestion program employed for each sample! Model SA can be upgraded at any time to a full Model FA through the acquisition of the Transporter and additional racks, vessels and Teflon® caps.

Model FA: A Fully Automated *NOVA**WAVE*** Microwave Tunnel Digestion System with all the software and operational parameters employed in the Model SA; plus the Transporter, Auto Cooling and Auto-Venting Stations to complete the automation. The Model FA provides unattended, automatic processing of up to 14 racks totalling 168 samples. Racks can be left on the Transporter after processing, as in an after-hours run, or removed immediately for sample analysis once the rack leaves the Auto-Venting Station.

Laboratories with a large number of samples can enjoy the same method flexibility as the Model SA throughout the entire 14 racks of 168 samples. Sample vessels are placed in racks which are moved under software control into the microwave tunnel. Dynamically, 12 microwave minicavities (Patent pending) are formed and energy is delivered to each minicavity according to the digestion method selected. On exiting the tunnel, the rack proceeds to the Cooling Station and a second rack enters the tunnel to begin its digestion sequence. Once digestions in the second rack are completed, it moves to the Cooling Station with the first rack moving to the Auto-Venting Station. Here, vessels are safely vented automatically when they reach a pre-assigned temperature pre-set in the method.



*NOVA**WAVE***
Model SA

- *Digest 12 samples simultaneously in 10 minutes or less*
- *Digest, cool and vent 168 samples completely automatically - no human intervention*
- *Control temperature of each sample independently*
- *Use a new or stored method for each sample*
- *Process up to twice as many samples per day compared to conventional microwave digestion systems*
- *Independent and unique sample digestion tunnel, auto-cooling and auto-venting stations*

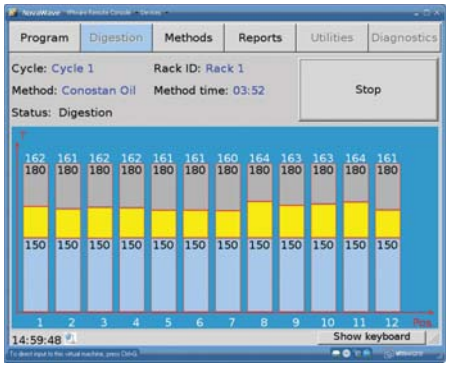

*NOVA**WAVE***
Model FA

THROUGHPUT

High sample throughput with the ***NOVA**WAVE*** FA is achieved through unique design and full automation.
Racks can be prepared with 12 vessels of weighed samples in less than a minute through conveniences and automation built into the rack design. Post digestion, samples are cooled and vented external to the tunnel maximizing the time the tunnel is available for additional samples. Samples are simultaneously digested, cooled, and vented automatically as others are being analyzed providing a continuous, uninterrupted production from sample weighing to analysis. Using calibrated vessels, a sample stays with its tube from weighing until analysis eliminating sample transfer time and potential sample I.D. errors.

Assuming a 1 minute weighing time, a 10 minute digestion time, a 1 minute normalization time, and a 1.5 minute analysis time, 276 samples can be processed from weighing, through the ***NOVA**WAVE***, and analyzed by ICP- AES or MS in an 8 hour shift. In addition, 168 samples can be loaded at the end of the day, digested over night, ready for further processing in the morning.

OPERATION, CONTROL and FEEDBACK

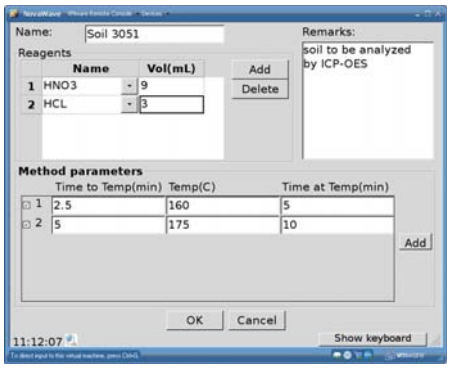


The *NOVAWAVE* Digestion System is operated through the intuitive and informative touch screen interface. Operating parameters and method selection are programmed through simple, single touch entries and dropdown menus.

Security, data and method integrity are achieved through password protected, multi-level access which allows for different permissions for operators, administrators, and service personnel.

The operation starts when a rack of 12 samples enters the tunnel and is identified by the rack reader. This information is transferred automatically to the controller which then assigns the appropriate digestion method to each sample or rack as requested in the program. Power is directed to each sample through individual sample minicavities (Patent pending) in response to the pre-set temperature profile programmed in the method. Each sample temperature is monitored by its respective IR sensor providing feedback to the controller which instructs each minicavity (Patent pending) solid state, power supply module to direct more or less energy as required. Microwave power is continuously variable providing seamless, precise temperature control to each sample independently. A dynamic, visual display of all 12 sample temperatures is provided.

METHODS



The most popular EPA and DIN Methods are pre-installed in the *NOVAWAVE* software package. Operators can edit, copy and add new methods through the user friendly, color touch screen. Methods can be created, changed or modified while samples are in the digestion process adding to process efficiency and improving sample throughput.

Different types of samples may require different methods. To provide maximum flexibility in optimizing methods, multiple "Time to Temperature" and "Time at Temperature" plus "Direct to Temperature" profiles can be included in each method. Methods can be assigned in 3 ways:
CYCLE: All samples in a run of up to 14 racks can be assigned the same method
RACK: All samples in an individual rack can be assigned the same method
SAMPLE: Each individual sample in a rack can be assigned a different method

The software provides automated method switching from rack to rack, or sample to sample using an unlimited number of user-created or pre-installed methods which are assigned to either individual samples or all samples in the rack. When rack identification is made in the tunnel, the information is transmitted to the Run file which then automatically assigns the appropriate method to the individual sample, or all samples, in the rack.

NOVAWAVE

Features

RACK and VESSELS

Racks can accommodate:

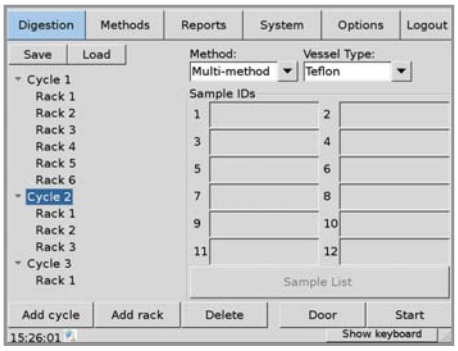
- 12 calibrated Quartz Vessels, 50 or 75 ml, or
- 12 Teflon® vessels, 50 or 75 ml

Calibrated Quartz Vessels can be used throughout the sample preparation process (digestion, normalization, analysis) avoiding labor, time and potential contamination in transferring samples. Compared to Teflon®, Quartz Vessels are more economical, last longer and contribute less potential cross contamination. Teflon® vessels are essential when using HF.

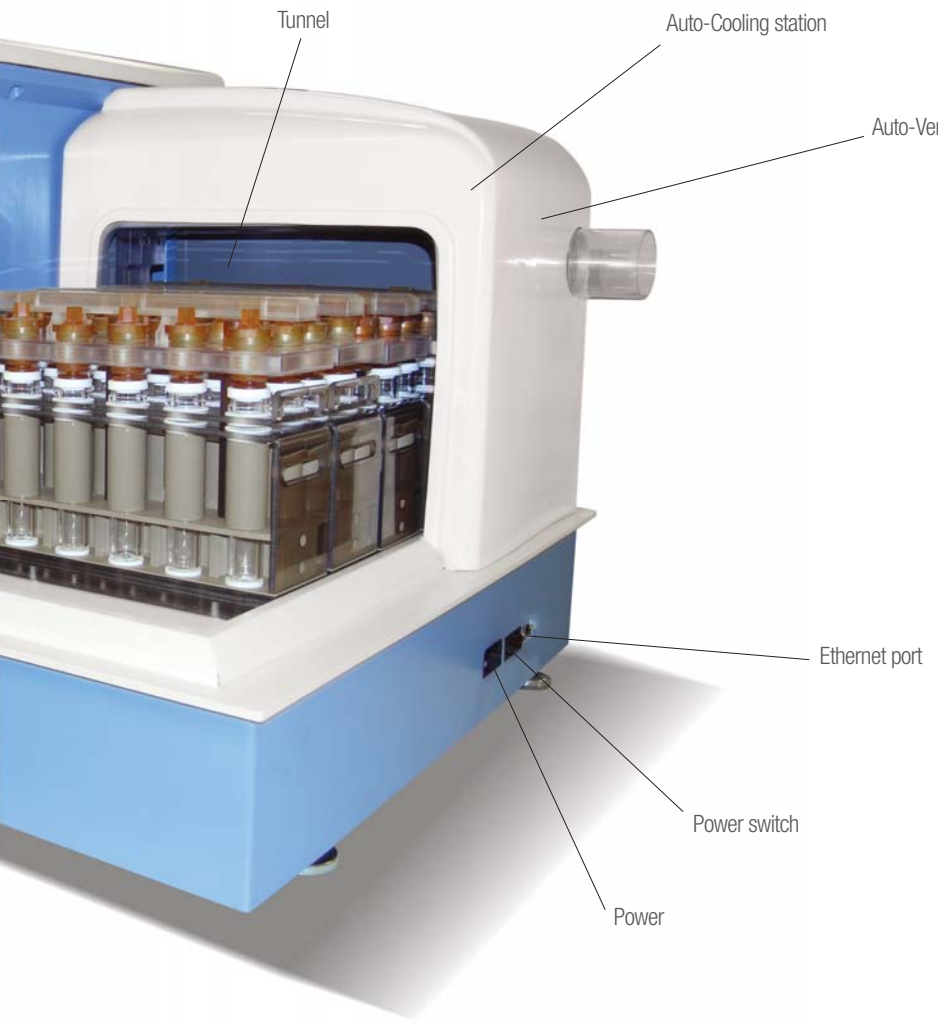
Rack set up is accomplished in 5 simple steps in under a minute:

1. Insert 1 to 12 vessels into a rack
2. Place a Teflon® Cap on each vessel
3. Insert the Safety Cap Plate on the 3 uprights to rest on the Teflon® Caps
4. Adjust the Safety Caps to touch the Teflon® Caps
5. Slide the Auto-Venting Bar forward securing the vessels

The rack is ready for processing!



The functionality of the ***NOVAWAVE*** vessels and rack save considerable time compared to other systems and enhance the total sample throughput time through automation while dramatically reducing operator involvement.


Tunnel
Auto-Cooling station
Auto-Venting station
Ethernet port
Power switch
Power


Auto Venting
Release Bar
(Patent Pending)
Safety Cap
Plate
Teflon®
Caps
Quartz
Vessels
Minicavity
Extension
Minicavity
(Patent Pending)

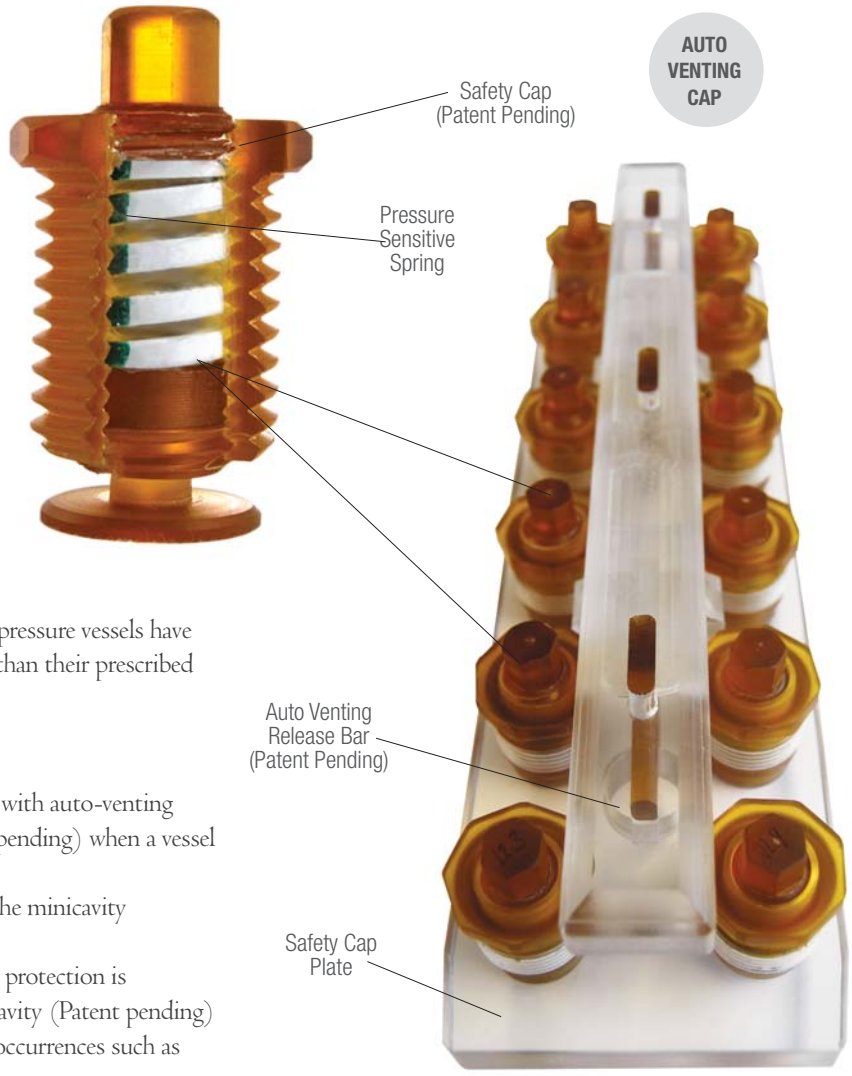
NOVAVE

Features

SAFETY and PROTECTION

Safety features for both operator and instrument have been employed throughout.

Safety Caps (Patent pending), positioned above each vessel, are set at a predetermined pressure safeguarding against vessel over-pressurization. During a digestion, should the internal pressure in a vessel reach the pre-set value, the Safety Cap (Patent pending) releases and the vessel will vent automatically. To prolong their useful life, most exposed instrument and accessory components are Teflon® coated or manufactured with materials resistant to corrosion and acid attack. All pressurized containers and components involved in pressure vessels have been pressure tested and are rated 3.5 - 4 times greater than their prescribed use.



Safety features include:

- Safety Cap (Patent pending) over-pressure detection with auto-venting
- Automatic power shutdown of a minicavity (Patent pending) when a vessel is not present
- In the event of tube breakage, power is shutdown to the minicavity (Patent pending) in milliseconds
- In the event of a "runaway" sample, over temperature protection is assured with automatic power shutdown to the minicavity (Patent pending)
- Safety messages and auto shut down for mechanical occurrences such as blocked doors, etc.

COMMUNICATION

Sample identification can be uploaded directly to the Rack file via a PC connection or directly linked bar code reader. Sample ID's can be matched with the quartz vessel bar codes if appropriate vessels have been selected.

Reports can be downloaded to a USB flash drive or through the system's Ethernet port to a laboratory computer or LIMS for data processing and storage.

Sample digestion reports include for each sample:

- Rack and Sample I.D.
- Digestion method used
- Sample Weight or Volume
- Temperature vs. time profile
- Maximum temperature achieved

The Ethernet and USB ports can also be used for remote diagnostics and software upgrades.

SPECIFICATIONS

Certifications
CSA, FCC, EMC and CE.

Electrical Requirements
210-230VAC, 50-60Hz, 25A.
Detachable power cord, I.E.C.
and UL approved.

Microwave Energy
2455 MHz,
12x250 Watts,
Continuous linear power levels
delivered to 12 microwave minicavities
under software control using IR
temperature sensor feedback.

Ports/Printer
USB/ Ethernet.

Overall Instrument Dimensions (Width x Height x Depth)
Stand Alone: 26.0"x29.5"x24.4"
(66cm x 75cm x 62cm)
Fully Automated: 64.5"x29.5"x31.0"
(164cm x75cm x 79cm)

Weight
Stand Alone: 148 lb (67 kg)
Fully Automated: 254 lb (115 kg)

Patents
The *NOVAWAVE* systems, the concept, rack design and safety features are covered under a number of patents pending.

APPLICATION NOTES LIBRARY

Are you digesting environmental, metallurgical, food, plant or oils samples in your laboratory and not obtaining good results? Our Applications Specialist - Dr. R. Nguyen – may answer your questions and provide insight on how to increase sample throughput, optimize recovery levels or improve your methodologies. At **SCP SCIENCE** we are dedicated to finding a solution to your sample digestion needs.

A growing library of *NOVAWAVE* application notes is becoming available. Each of the notes demonstrates the ease of use and effectiveness of *NOVAWAVE*. Recent application notes include:

- The Digestion of Bovine Liver
- The Digestion of Polypropylene Plastic
- The Digestion of Lead in Paint
- The Digestion of Peach Leaves

Contact your local sales representative or distributor for more information.

PATENTS PENDING

A patent application has been made for the global design. In addition, other patents pending include:

- Individual sample minicavities, each with a software controlled microwave generator
- Revolutionary reflective power protection circuit
- Automated, safety pressure release vessel caps
- Automatic and simultaneous venting of 12 vessels
- Program up-to-twelve different methods simultaneously in one rack of samples

NOVAWAVE

Ordering Information

Two ways to purchase a *NOVA**WAVE***:

*NOVA**WAVE*** SA

Stand alone Microwave Tunnel Digestion System with software and hardware to digest 12 samples simultaneously. Racks and Vessels ordered separately.

*NOVA**WAVE*** FA

Fully Automated Microwave Tunnel Digestion System with software and hardware to digest up to 168 samples automatically in a single run; includes the Model SA, Transporter with a capacity of up to 14 Racks, Auto-Cooling and Auto-Venting Stations. Racks and vessels ordered separately.

NOVA**WAVE can be purchased as a Stand Alone SA and converted at any time to a Fully Automated FA model by purchasing the Transporter Accessory and additional racks, vessels and Teflon® caps.

ITEM	DESCRIPTION	QUANTITY	CATALOGUE NUMBER
*NOVA**WAVE*** SA	Stand Alone SA Microwave Tunnel System, complete with entry/exit platforms	Each	010-600-001
*NOVA**WAVE*** FA	Fully Automated system complete with Transporter, Auto-Cooling and Auto-Venting stations	Each	010-600-002
Transporter	Transporter with Auto-Cooling and Auto-Venting stations (required to upgrade model SA to FA)	Each	010-600-003
Racks*	50 ml Rack includes components to accept 50 ml Teflon® or Quartz Tubes (Requires vessels)	Each	010-600-050
Racks*	75 ml Rack includes components to accept 75 ml Teflon® or Quartz Tubes (Requires vessels)	Each	010-600-070
Vessels	Quartz vessel, 50 ml, calibrated	(Pk/6)	010-600-051
Vessels	Quartz vessel, 75 ml, calibrated	(Pk/6)	010-600-071
Vessels	Teflon® vessel, 50 ml	(Pk/6)	010-600-053
Vessels	Teflon® vessel, 75 ml	(Pk/6)	010-600-073
Support Sleeves	Support Sleeves for 50 ml Teflon® vessels	(Pk/6)	010-600-054
Support Sleeves	Support Sleeves for 75 ml Teflon® vessels	(Pk/6)	010-600-074
Caps	Teflon® caps for all vessels	(Pk/6)	010-600-030
Spacer Rack	Required if 14 racks are not ordered	Each	010-600-017
Sample ID	Barcode reader and probe	Each	010-600-034
Rack	Transfer Rack Stand, self-standing	Each	010-600-040
Rack	Transfer Rack, non self-standing, connects on top of item 010-600-040	Each	010-600-038

** Note: Racks can also be converted from 50 to 75 ml or vice versa with appropriate kit.*

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