

HUMAN HEALTH

ENVIRONMENTAL HEALTH



THE CLEAR SOLUTION FOR HIGH-THROUGHPUT MICROWAVE-ASSISTED SAMPLE PREPARATION



Multiwave 3000
Sample preparation system

Fast, easy sample preparation



Multiwave 3000

The original Multiwave™ system set the standard for modern microwave-assisted sample preparation. Because of its safe and easy handling, reliable operation and excellent analytical results, it plays a key role in hundreds of laboratories around the world. Building upon this technology, the new Multiwave 3000 provides dramatically improved sample capacity, a more powerful dual-magnetron design, superior sensors requiring no cables or tools and built-in methods to meet EPA/ISO methods.

Precise control with high-power, unpulsed microwave

The intelligent power management of the dual magnetron system in the Multiwave 3000 delivers unpulsed microwave power over its full 1400 W range. Precise regulation of energy is particularly important for:

- Fast and homogeneous heating
- Reduced spontaneous reactions or charring
- Increased reliability

Dual-temperature sensor design for highest accuracy

For temperature controlled reactions, the Multiwave 3000 offers two complementary sensor options: a reference vessel with immersing temperature probe (Figure 1) in the rotor and a remote IR sensor under the oven cavity, which measures each vessel through ports in the rotor base. The immersing probe is an interference-free gas bulb thermosensor for highest accuracy. This dual sensor design ensures:

- Temperature-controlled and documented processes
- Protection against overheating with high boiling reagents
- Remote sensing – no installation, no contamination
- Interference-free temperature probe design



Figure 1. The rugged temperature probe design improves reliability.

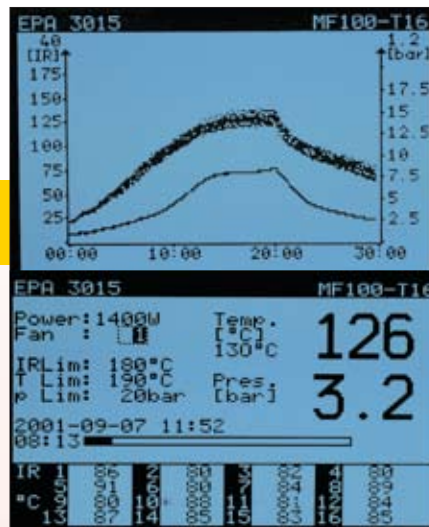


Figure 2. The intuitive software and easy-to-read display make method development easy.

Maximize performance with new, improved technology

PTFE-coated cavity for improved durability

High-quality components make the Multiwave 3000 suitable for demanding laboratory conditions. Its 66-liter stainless-steel cavity is completely protected by a multi-layer PTFE coating to ensure:

- Maximum corrosion resistance
- Easy cleaning and maintenance

Rapid cooling improves productivity

Cooling time is no longer a limiting factor. A built-in forced-air cooling system is standard in each Multiwave 3000 which prevents overheating and cools vessels in minutes after the end of a decomposition. A special air gap design and the use of quartz and ceramics provide efficient heat transfer. This unique vessel cooling system offers:

- Drastically reduced cycle time
- No external cooling or cooling bath required
- No handling of hot pressure vessels
- Improved lifetime of key components

Safety is designed into every Multiwave 3000

Easy handling, a library of tested methods and sophisticated sensors for reaction control all contribute to enhanced

safety. Additionally, numerous active and passive safety measures like multiple over-pressure release devices and protection shields around the reaction vessels ensure safety even in the event of spontaneous chemical reactions. The impact-resistant door with electrical and mechanical interlocks automatically reseals the cavity after a pressure release action. With its superior safety features, the Multiwave has won the confidence of many customers working in the most demanding areas of sample preparation.

Easy, intuitive software

The Multiwave 3000's microcontroller is controlled by an intuitive software interface (Figure 2). A built-in "cookbook" provides a comprehensive library of methods, including U.S. EPA procedures (3015, 3051, 3052). Use the default methods or create customized methods for your samples. Hundreds of methods can be stored, but experience shows that with a few basic programs the majority of sample materials can be decomposed.

The Multiwave 3000 software is operated by a simple spill-proof keypad or the optional external keyboard. The multi-tasking software provides methods management, process control, data collection, service and calibration functions. The bright graphical display shows pressure/temperature curves of reactions and other process parameters, which are controlled on-line via the software.

SYSTEM FEATURES AND BENEFITS

- 1400 W microwave power ensures fast heating
- Unpulsed microwave power from 0 to 1400 W provides precise control of critical reactions
- Reliable remote sensors provide convenient operation
- Fast, built-in cooling system reduces total cycle time, improving productivity
- Intuitive software for easy routine operation and documentation
- Large PTFE-coated cavity for rough laboratory environments
- Proven safety system minimizes hazards from violent reactions
- Modular, industrial-type design offers individual choice of configurations

High-performance vessel system for fast and safe decompositions

The Multiwave 3000 system offers a complete range of vessels and rotors with exceptional modularity and interchangeability. Its flexibility allows selection of optimized configurations for a wide variety of organic and inorganic matrices. All Multiwave 3000 vessels have unique, patented features for improved performance: self-sealing lip-type seals, air cooling and remote sensing systems. High-purity quartz glass and microwave-transparent ceramics give excellent temperature and pressure resistance. Compound designs with precisely tooled PTFE-TFM liners show unmatched dimensional stability and service life.

Rotor 16 for routine digestions

A wide selection of samples can be decomposed at moderate temperature and pressure, using the 16-position rotor (Figures 3a and 3b). It perfectly matches the requirements of U.S. EPA methods and other even more demanding tasks. With 16 vessels, maximum sample throughput is achieved without compromising safety aspects. Two types of pressure vessels fit into this magazine-type rotor, the MF100 or the HF100, operating at different working pressures of 20 bar (290 psi) or 40 bar (580 psi), respectively (Table 1).

Reaction control

The 100-mL reaction vessels have a high overpressure tolerance making decompositions safe and efficient. One vessel can be equipped with a combined pressure and temperature sensor for reaction control. Very accurate temperature readings are made with the immersing temperature probe, which is protected by a stable and resistant sapphire tube. The pressure sensor never comes into contact with the sample solution.

The pressure and temperature data are sent to the oven via optical transmission. No electrical or mechanical connections are required. Optionally, all 16 vessels can be temperature-controlled by means of the external IR sensor.



Figure 3a. The 16-position rotor maximizes productivity.



Figure 3b. The 16-position rotor cover can also be used as a vessel rack.

Table 1. Vessel specifications for 16-position rotor.

	MF100 vessel	HF100 vessel
Liner material	PTFE-TFM	PTFE-TFM
Pressure jacket	Fiber reinforced PEEK	Ceramic
Volume	100 mL	100 mL
Controlled pressure	20 bar (290 psi)	40 bar (580 psi)
Maximum pressure	70 bar (1000 psi)	70 bar (1000 psi)
Maximum temperature	200 °C	240 °C

VESSEL SYSTEM FEATURES AND BENEFITS

- Easy, tool-free hand tightening of vessels and rotors makes set-up quick and simple
- Hermetic seal avoids losses of volatile elements or contamination
- Installation-free sensors increase productivity
- Short cool-down times provide high sample throughput
- Pressure release prior to rotor opening minimizes operator exposure to hazardous reaction gases
- High overpressure tolerance provides trouble-free operation

Rotor 8 for advanced digestions

For the most difficult sample types, the best digestion quality can be achieved safely and easily with the 8-position rotor (Figure 4). This rotor is based on the original Multiwave rotor system, which has set the industry standard in reaction parameter control. Two types of heavy-duty reaction vessels fit into the carousel-type rotor: vessel XF100 and vessel XQ80 (Table 2).

The 8-position rotor offers a unique hydraulic system for simultaneously sensing pressure in all vessels. It always uses the highest pressure level or fastest pressure-increase rate in any of the vessels for accurate reaction control. Designed as a closed load cell, the sensor never comes into contact with the sample.

The sensor system does not require hoses or electrical connections. After closing the vessels, they are inserted into the rotor, the rotor is placed into the cavity, and the system is ready to work. No use of heavy tools or tedious sensor installations are necessary. The system allows 360 degree rotation of the rotor, which eliminates the risk of hotspot formation.

Table 2. Vessel specifications for 8-position rotor.

	XF100 vessel	XQ80 vessel
Liner material	PTFE-TFM	Quartz glass
Pressure jacket	Ceramic	N/A
Volume	100 mL	80 mL
Controlled pressure	60 bar (870 psi)	80 bar (1160 psi)
Maximum pressure	120 bar (1740 psi)	120 bar (1740 psi)
Maximum temperature	260 °C	300 °C

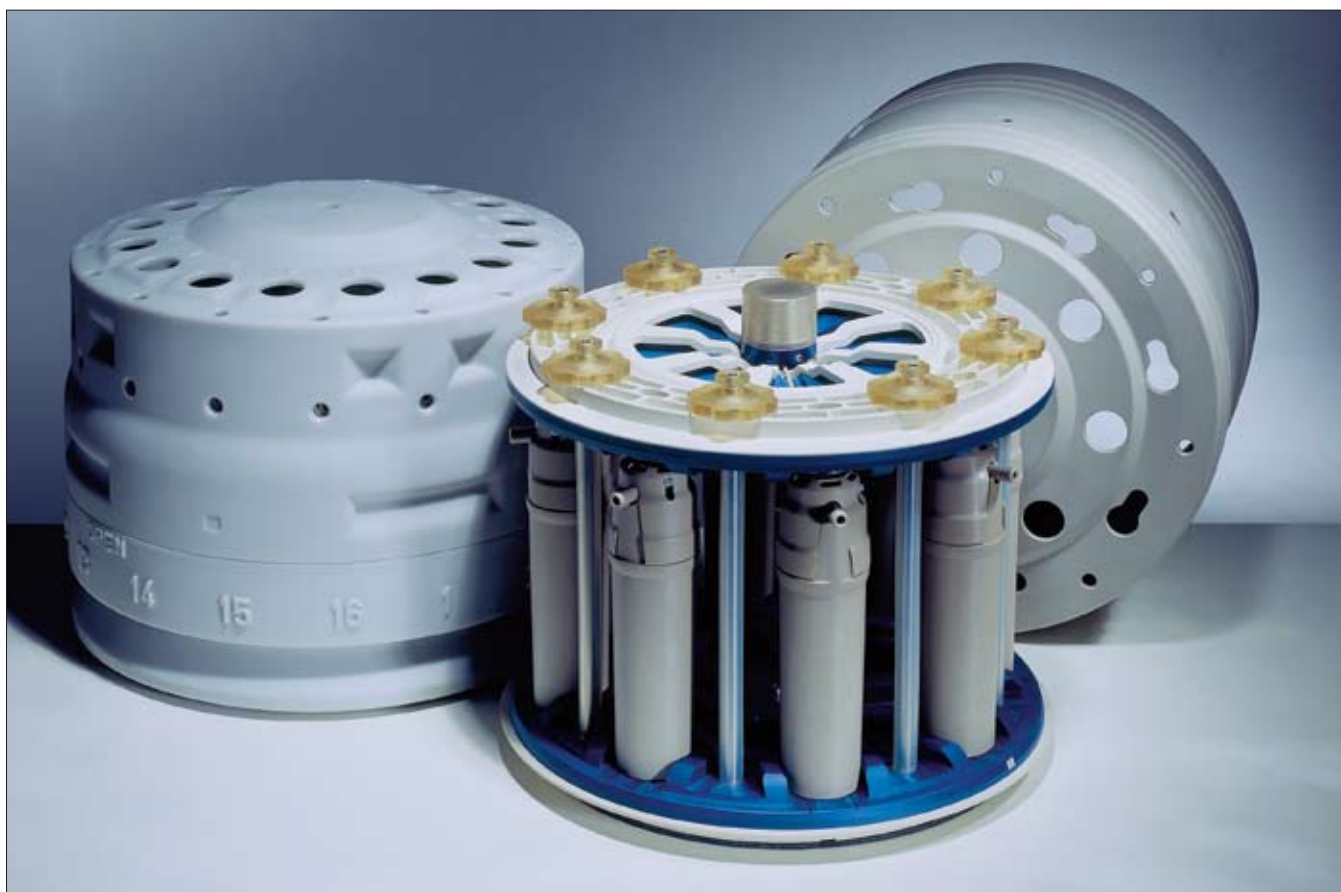


Figure 4. Rotor 8 for advanced digestions offers simultaneous pressure sensing in all vessels. Rotor 16 also shown on left.

Comprehensive service and support for today's results-driven lab

With over 70 years of experience, and as a world leader in analytical instrumentation, PerkinElmer is the right partner to meet your application needs. In concert with global distribution of instruments, turnkey systems and consumables, we provide factory-trained global service and support.

PerkinElmer provides you with a comprehensive worldwide service capability that lets you take care of business and set your sights on what matters most – results. With over 1000 factory-trained professionals serving more than 125 countries worldwide, PerkinElmer is your source for instrument care and repair, validation services, software and hardware upgrades, education and more.

Whatever you're looking for, we've got it

PerkinElmer is a leading provider of scientific instruments, consumables and services to the chemical, pharmaceutical, biomedical, environmental testing, forensics and general industrial markets, providing integrated solutions, from sample handling and analysis to communication of test results.

Look to partner with PerkinElmer to provide a full range of analytical solutions for your business, for the long term.

PerkinElmer, Inc.
940 Winter Street
Waltham, MA 02451 USA
P: (800) 762-4000 or
(+1) 203-925-4602
www.perkinelmer.com



For a complete listing of our global offices, visit www.perkinelmer.com/ContactUs

Copyright © 2003-2009, PerkinElmer, Inc. All rights reserved. PerkinElmer® is a registered trademark of PerkinElmer, Inc. All other trademarks are the property of their respective owners.

006575G_01