MILESTONE
HELPING CHEMISTS



TAKING PRODUCTIVITY AND PERFORMANCE **TO NEW HEIGHTS**

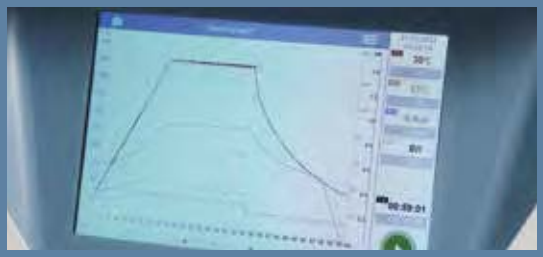


ultraWAVE 3

Single Reaction Chamber
Microwave Digestion System



HIGHEST
PRODUCTIVITY



UNMATCHED
PERFORMANCE



UNCOMPROMISED
SAFETY



UNPARALLELED
USABILITY



LOW COST
OF OWNERSHIP

WE FOCUS ON ADDRESSING YOUR CHALLENGES

CUSTOMER CENTRIC INNOVATION

The many benefits of microwave closed-vessel technology have led to its broad adoption in sample preparation for elemental analysis over the past three decades. At the same time, modern laboratories have been facing more types of samples and more stringent detection limit and accuracy requirements, while also being expected to provide shorter turnaround times and higher productivity - all at a lower cost. Since the late 1990's, Milestone has been a leader in microwave closed-vessel technology innovation and the creation of a new path for addressing the evolving needs of laboratories. Starting with ultraCLAVE and then with ultraWAVE, Milestone has invented and refined Single Reaction Chamber (SRC) technology to better meet the challenges of the modern laboratory. This technology has been successfully implemented by thousands of laboratories across several industries. Today, ultraWAVE 3 represents another significant step forward for SRC technology, embracing our 20+ years of expertise.



ultraCLAVE
(5th generation)



ultraWAVE
(1st and 2nd generation)



THE GAME CHANGER IN MICROWAVE DIGESTION

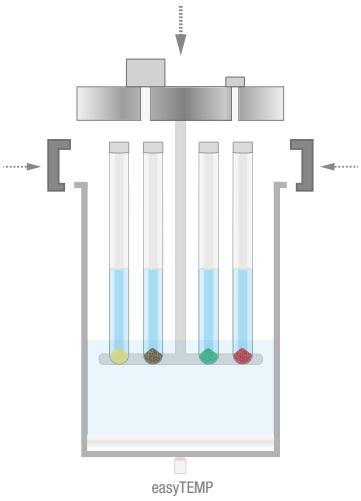
Explore ultraWAVE 3: the latest generation of SRC technology that further elevates the value of this technology for elemental analysis in terms of performance, time, workflow, and cost of ownership.

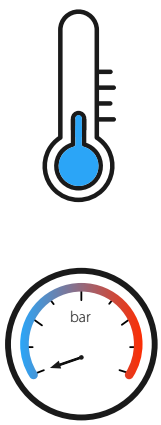
THE MOST ADVANCED TECHNOLOGY EVEN BETTER

SINGLE REACTION CHAMBER TECHNOLOGY

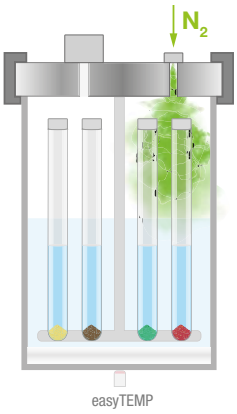
At the heart of ultraWAVE 3 is the Single Reaction Chamber (SRC), a stainless-steel reactor with a high-purity PTFE-TFM liner and cover, which serves as both microwave cavity and digestion vessel. Samples and reagents are placed in vials and racks, lowered into the PTFE-TFM liner containing a water-based solution, and then the reactor is closed (1). The water-based load homogenizes the temperature regardless of the sample and acid mixtures in the vials. After the chamber is closed it is pre-pressurised with inert gas to prevent boiling of the reagents, loss of elements, and sample cross-contamination (2). Microwave heating starts and the digestion cycle is continuously controlled in all vials using an advanced contactless temperature sensor (3). An integrated water-cooling circuit maintains the stainless steel chamber at a reduced temperature. At the end of the heating cycle, it promotes rapid cooling of the digestion vials, which is followed by automatic venting of the chamber (4). The reactor is then opened and the digested sample solutions are ready for dilution and analysis.

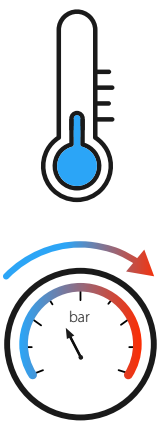
1
REACTOR CLOSING



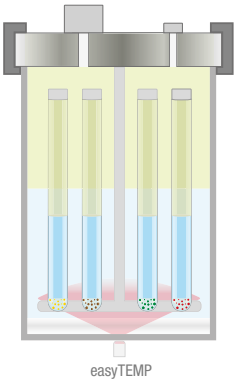


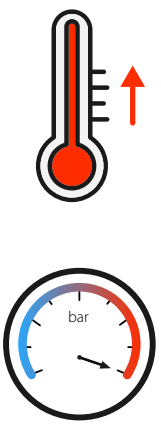
2
PRE-PRESSURIZATION



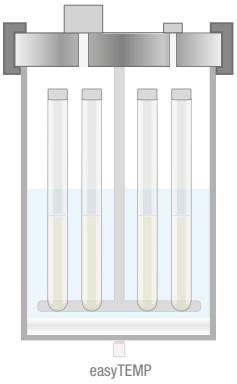


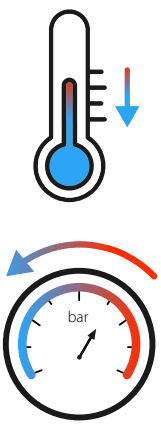
3
HEATING





4
COOLING AND VENTING





ultraWAVE 3 FEATURES

Updated construction that includes several technology advances further enhances the well-proven benefits of the SRC technology. The new features of ultraWAVE 3 merge with those already intrinsic in the technology, so that labs will experience higher performance, greater productivity, and more streamlined workflow, providing them with improved competitiveness and a lower cost of ownership.

RUGGED CONSTRUCTION

Designed with all wetted components made of PTFE-TFM, fully compatible with any acid mixture and ensuring minimal maintenance to lower the cost of ownership.

HIGH-PRESSURE LINES

Made of acid-resistant stainless steel, the two pressure lines, one for inlet and one for outlet, ensure high safety and lower blanks.

RACKS

Available with racks of 7, 20, 27 and 40 vials to provide even higher throughput than previous generations.

TEMPERATURE CONTROL (easyTEMP)

True contactless temperature sensor to directly control the digestion of the samples from the inside out, without reading delays.

ADVANCED HEATING TECHNOLOGY

The noiseless water-cooled magnetron ensures higher heating efficiency along with superior working conditions.

USER INTERFACE

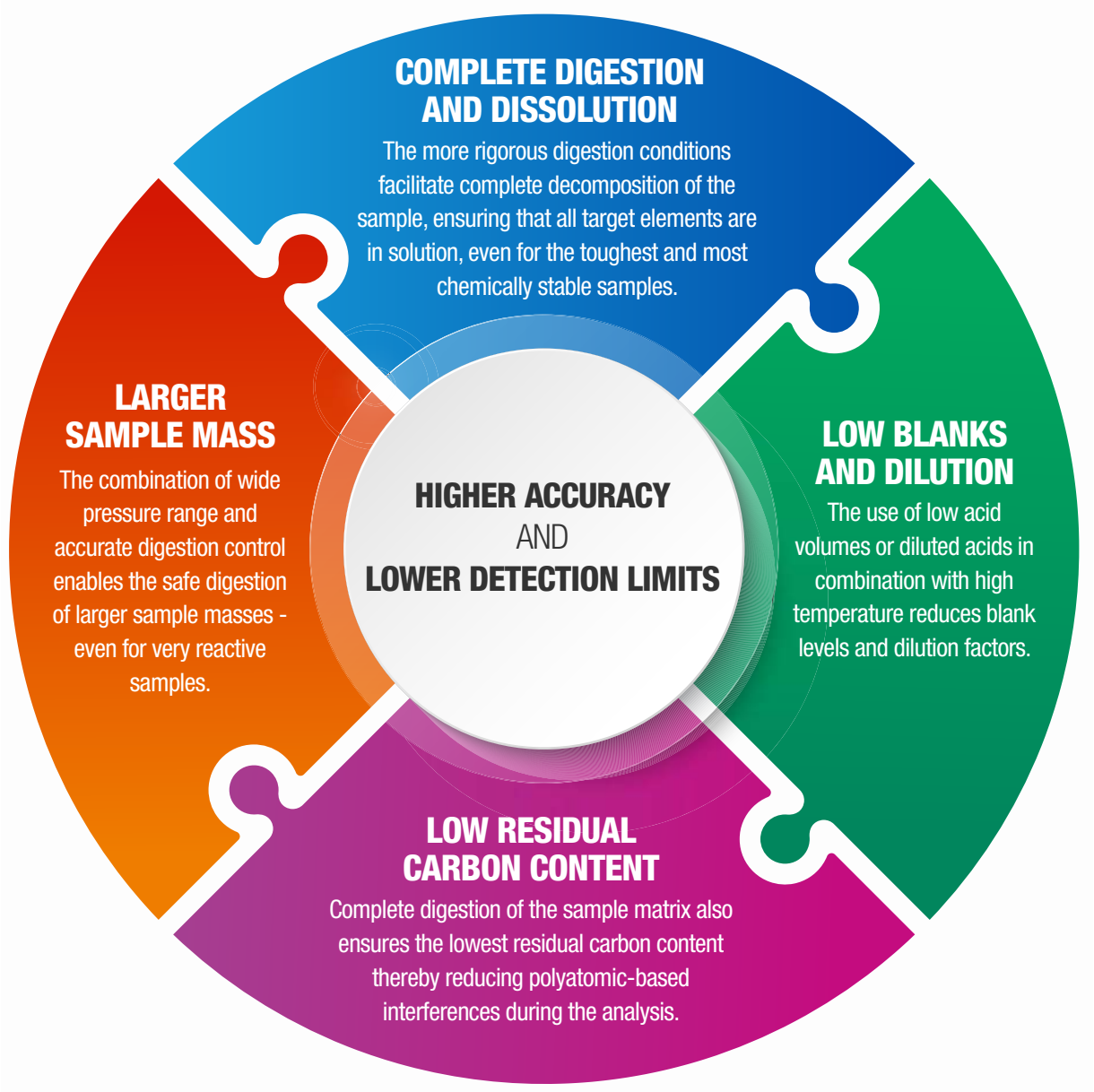
Equipped with the most up-to-date features to bring all digestion information within easy reach of the operator.



THE POWER OF
SRC TECHNOLOGY WITH UNCOMPROMISED SAFETY

UNMATCHABLE SRC CAPABILITIES

Today, the trend in several industries is toward lower detection limits and greater accuracy due to new regulations and evolving production and QC needs. The quality of sample preparation plays a central role in enabling modern analytical instruments to meet these more stringent requirements. Thanks to its superior digestion capabilities that result from its higher temperature and pressure capabilities, ultraWAVE's unique SRC technology provides greater digestion efficiency, making it an ideal solution to address these challenges.



DIGESTION ALWAYS UNDER CONTROL

Temperature plays a critical role in the digestion process. ultraWAVE is equipped with the advanced easyTEMP contactless temperature sensor and feedback mechanism to control the digestion process, ensure high safety, and optimize ease of use. The built-in easyTEMP sensor continuously communicates with the system to adjust the microwave energy and follow the pre-set method. Even in the case of an exothermic reaction, easyTEMP quickly reduces the power emission to control and limit the reaction, ensuring a safe process and superior digestion quality.



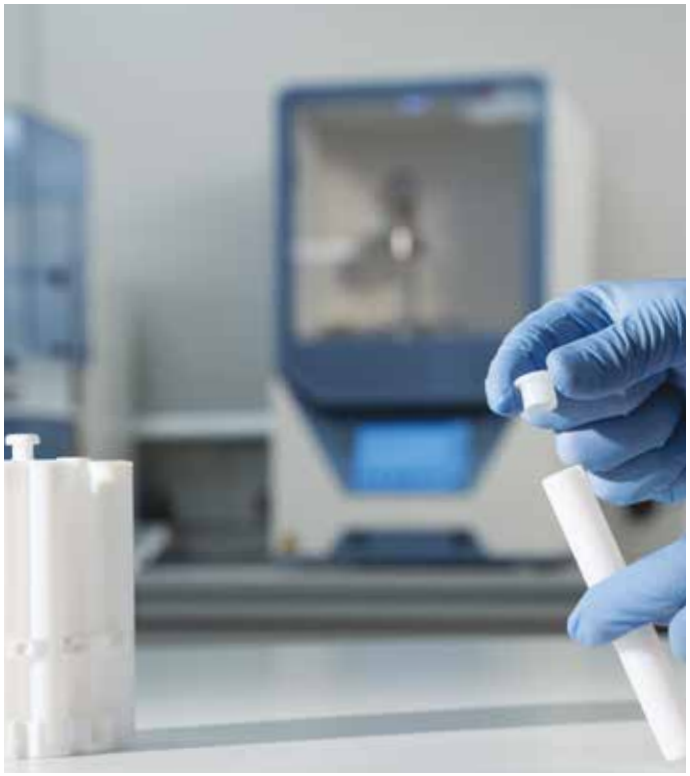
UNCOMPROMISED SAFETY

Microwave closed-vessel digestion operates at elevated temperature and pressure with concentrated acids; therefore safe operation of the system is of critical importance. ultraWAVE 3 has been designed and tested to the highest safety standards. The stainless steel reaction chamber as well as all high-pressure lines are designed for and tested at pressures far above their regulatory limits. Several components, key for safe operation, are made of a special stainless steel that is highly resistant to corrosion. The built-in exhaust prevents operator exposure to acid fumes, which are diverted into the lab extraction system during the chamber venting and opening processes. Several position and reaction sensors ensure proper closure of the system and full control of the digestion process.

ACCELERATING ELEMENTAL ANALYSIS WORKFLOW

ELIMINATE SAMPLE PREP BOTTLENECKS

ultraWAVE 3 is designed to simplify and expedite lab workflow in elemental analysis. Its use improves productivity without increasing operator time. Several aspects of the system, such as reduced handling and cleaning and the ability to process any samples simultaneously, streamline the daily routine of the lab, reducing turnaround time and increasing lab efficiency.



SIMPLIFIED HANDLING

The vials and racks of ultraWAVE 3 are specifically designed to reduce assembly and disassembly time. The operator has only to place loose-fitting caps on the vials and the rack is ready for the digestion process. This approach eliminates the operator time required for closing and opening of the vessels, typically involved with the rotor-based systems.

The wide selection of racks and vials enables to match the detection limit, productivity, and application requirements of modern laboratories. Racks are available with different capacities to fit any sample type and mass. Vials are available in high-purity PTFE-TFM, high-purity quartz, and common laboratory glass (disposable) to address the detection limit and application needs of every lab.

# of position	Volume (mL)	Vials material
7	40	PTFE-TFM, Quartz, Disposable glass
20	15	
27	8	
40	4.5	Glass



AVOID VESSEL CLEANING

Rotor-based systems require digestion vessels with a complex construction to contain the elevated pressure within each vessel. Conversely, the SRC approach ensures equal pressures between the inside and outside of the vials, so vials can withstand elevated pressures using a much simpler construction. Thanks to this unique capability, the SRC technology even enables the use of inexpensive disposable glass tubes. This approach is commonly implemented for more routine applications and allows complete elimination of the tedious vessel cleaning step and concern for potential memory effects.

RUN ANY SAMPLES SIMULTANEOUSLY

Traditional microwave digestion systems work with similar samples and the same acid mixture in a given run to ensure homogenous digestion. SRC technology overcomes this limitation and ensures the same digestion conditions regardless of the sample and the reagents used. This is made possible by the combination of the SRC technology, the use of a water-base load, and accurate temperature control. With ultraWAVE 3, laboratories don't need to batch similar samples, but instead, all types of samples can be processed simultaneously, while ensuring complete digestion, avoiding sample re-processing, and making the workflow more efficient.





REDUCED OPERATOR TIME

Laboratories are more often than not seeking ways to make sample preparation less labor-intensive. ultraWAVE 3 is a major advancement in this direction and reduces hands-on labor time up to 50%. Several steps are done automatically by the system, such as the closing and venting of the chamber and automatic sealing of the vials, which reduces the operator time, raises the productivity and the safety of operation.

THE IDEAL MATE FOR YOUR DAILY WORK

UNPARALLELED USABILITY

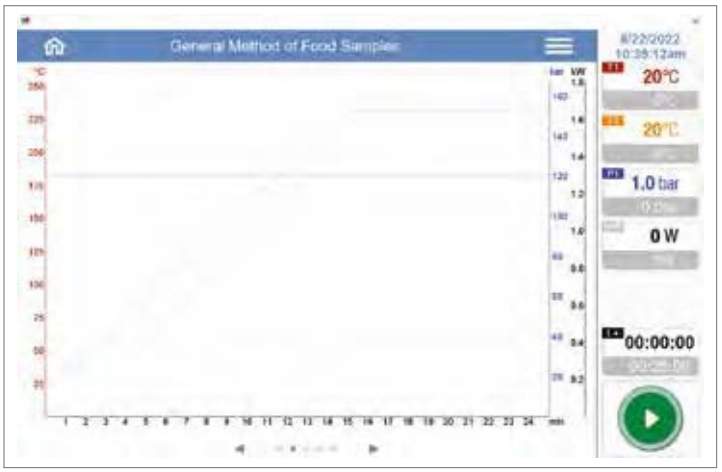


The ultraWAVE 3 user interface provides the operator with all the information they need at their fingertips. The large integrated touchpad with the all-new easyCONTROL 3 software facilitates a streamlined workflow for routine operations and offers an extensive library of user-support resources. The Home page give quick access to all functions and information, such as the recent methods listed in the bottom line or the chamber paramenters shown in the right sidebar. The easyCONTROL software integrates the world's first on-line platform for additional digestion resources, the Milestone Connect, which includes tutorial videos, tips and techniques, an application library, and lists of accessories and spare parts. Moreover, Milestone Connect allows remote control of the system from other devices to see the progress of the digestion process or to view other information displayed on the touchpad.



ONE METHOD FITS ALL

The ultraWAVE 3 user interface supports fast and easy operation. For a routine digestion, beginning the process only requires few seconds: open the method and press “start”. Single Reaction Chamber technology enables the use of a single method for the majority of sample types encountered in a typical lab. All the digestion parameters are automatically controlled by the system through a PID algorithm and are reported in the graph page as well as listed on the side bar present in all display pages.



The system incorporates a comprehensive list of methods, including official and standard methods, that guides the operator in the optimization of parameters based on specific matrices, so that the time for any method development and refinement that is called for can be minimized. Customized methods can then be easily created and stored on the system. At the end of the process the run can be saved on the terminal or on the lab server. The software complies with FDA regulation 21 CFR part 11 requirements to match several regulator bodies requirements. Moreover, a comprehenesive Milestone Validation Package, which incorporates several protocols, is available to fullfill the GMP requirements and ensure the highest quality standards.



REDUCED MAINTENECE COSTS FOR GREATER RETURN ON INVESTMENT

LOW COST OF OWNERSHIP

The evaluation of a new investment often includes the costs involved with maintenance as well as operation. ultraWAVE’s Single Reaction Chamber technology introduces a completely new approach to sample preparation that impacts both of these cost areas. The consumables costs have been significantly reduced, moving from complex and expensive digestion vessels to simple and less expensive vials or even disposable glass tubes. Moreover, ultraWAVE 3 leverages Milestone’s 20+ years of experience with SRC technology to further reduce the maintenance costs of the system. The new system construction ensures limited costs that together with a usage-based preventive maintenance program minimize lab costs. When combined with an increase in productivity and the lower operator time required, your ROI has never been higher.



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Established in 1988, Milestone is headquartered in Italy with its R&D and manufacturing centre in Germany and Switzerland and offices in the United States, China, Japan and Korea. We operate worldwide through a network of over 100 exclusive distributors, all providing our customers with premium application and service support. Milestone's mission is to help chemists by offering them the most advanced instrumentation for sample preparation and direct mercury analysis in the world. Our industry-leading technology, in combination with fast, responsive service and applications support, allows Milestone to support our goal of giving you the highest return on investment possible.

ADDITIONAL MILESTONE SOLUTIONS FOR ELEMENTAL ANALYSIS



ETHOS UP

High Performance Microwave Digestion System



duoPUR/subCLEAN

Acid Purification System



traceCLEAN

Acid Steam Cleaning System



DMA-80 *evo*

Direct Mercury Analyzer

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