



**MARS 2™**  
Microwave Digestion System





## MARS 2 for Digestion

The MARS 2 is a microwave acid digestion system that produces an aqueous solution for elemental analysis by ICP, ICP-MS, or AA. Plants, soil, foods, pharmaceuticals, and more can be digested easily, using preloaded methods. For over 30 years, lab technicians have been using MARS systems for sample preparation. With the latest updates to the MARS 2, the process is even easier.

# Microwave Digestion

Microwave acid digestion is a technique to dissolve metals, bound within a sample matrix, into liquid. This is achieved by exposing a sample to a strong acid, in a closed vessel and raising the temperature and pressure through microwave irradiation. Both the speed of thermal decomposition of the sample, and the solubility of heavy metals in solution are increased. Once these heavy metals are in solution, they can be quantified through elemental techniques. The MARS 2 reduces sample prep time by more than 70%, as compared to traditional techniques.



## Steel Cavity

A solid steel cavity construction, using industry leading 316 stainless steel for durability.



## Compliant Software

Software is 21 CFR Part 11 compliant for electronic records and signatures.



## Reactiguard™

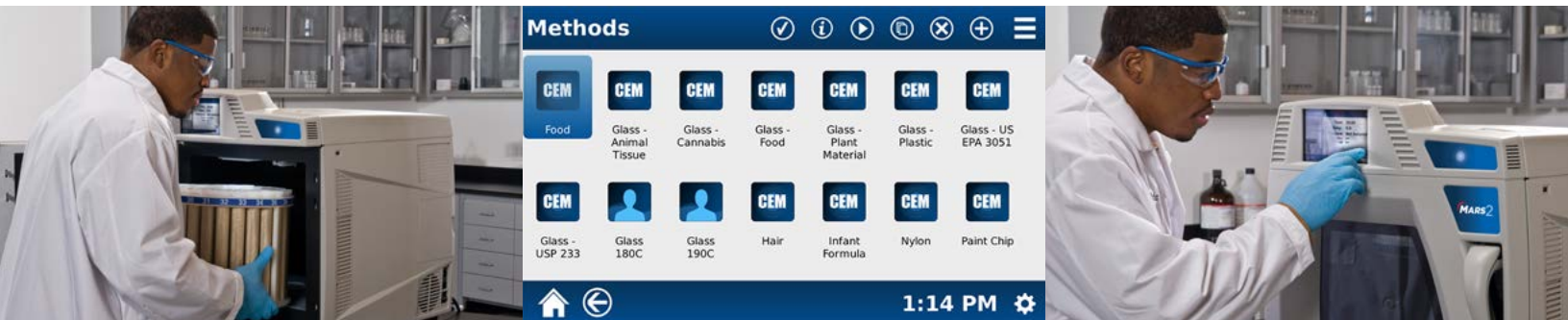
The Reactiguard cavity-sensing device automatically turns off the system if a vessel event occurs.



## Vessel Recognition

MARS 2 counts the vessels prior to starting in order to calculate the precise heating conditions required.

## As easy as...



1

Load your samples.

2

Select your sample method.

3

Press Start.



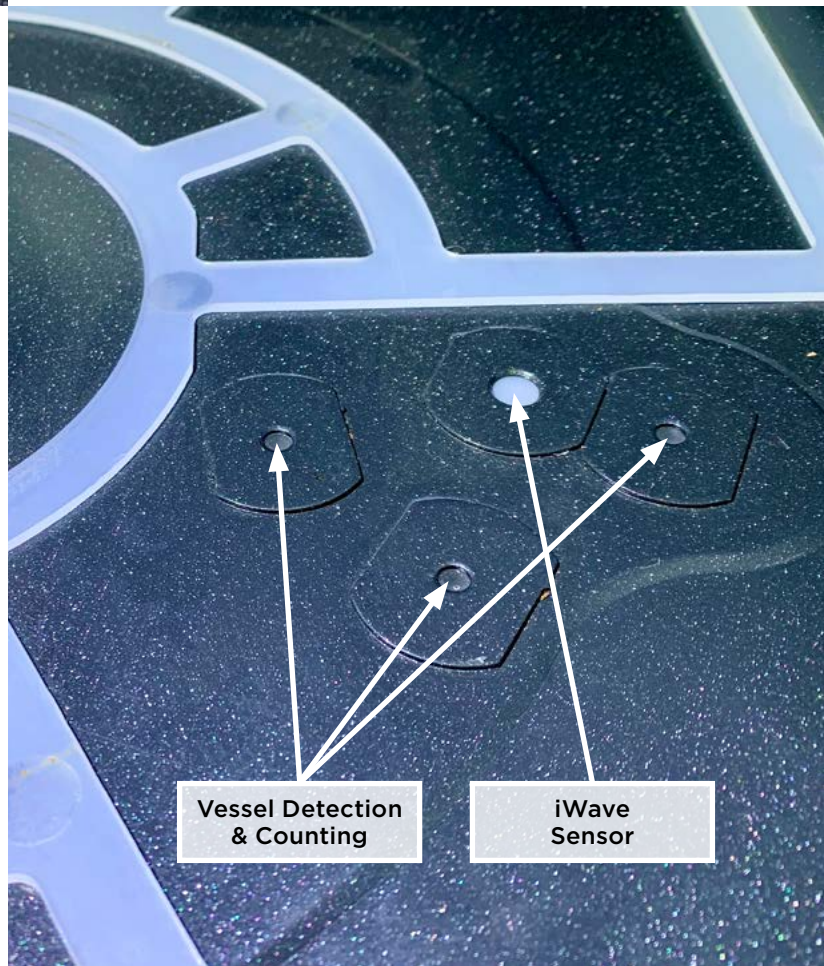
## Preinstalled methods, are one touch away.

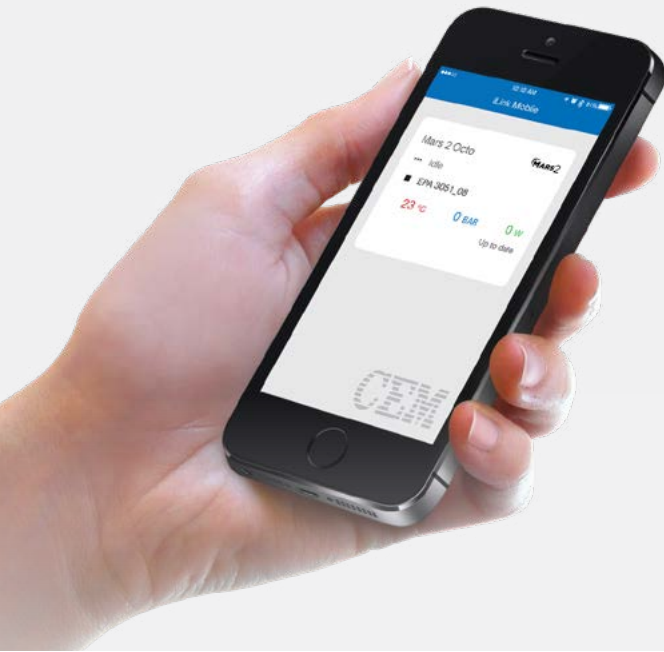
By selecting the One Touch® icon on the MARS 2 touchscreen, you'll be able to choose the sample type from the preinstalled methods. Each method includes the recommended sample size, acid type, and acid volume. The system will automatically detect the type of vessel you are using, count the vessels, adjust the power accordingly, and perform the digestion for you. It couldn't be easier.

### Advanced Sensors

## Better control means better results.

The MARS 2 uses a series of integrated contactless sensors to provide the most accurate power delivery and temperature measurement. Floor mounted sensors are used to count the number of vessels being processed to determine the correct power at start up. When only preparing a few samples the initial power is greatly reduced while large batches will receive more power. This control is unique to the CEM MARS family and provides the finest control available. A second sensor recognizes the vessel type chosen to make certain it is appropriate for your sample type. Finally, the iWave temperature sensor provides the most accurate contactless temperature control available. This combination gives you the unmatched performance of a MARS system.





# Monitor and control your MARS 2 from anywhere.

With the iLink app, you can monitor your MARS 2 and get results on your laptop or mobile device. You'll be free to move about the lab, and free to focus on other tasks.



## How it works

iLink is your 24/7 connection to CEM. Directly connect to CEM from the iLink home screen. Download manuals, application notes, and reference papers at the touch of a button. You are always connected to CEM support with iLink.



### Home Screen Advantage

Easily view the most important stats on the home screen such as power, pressure, temperature, and run status.



### Run Multiple MARS 2 systems

Control and monitor multiple MARS 2 systems easily from your mobile device. Functions like Remote Start, Stop, Pause, and Run make it simple.

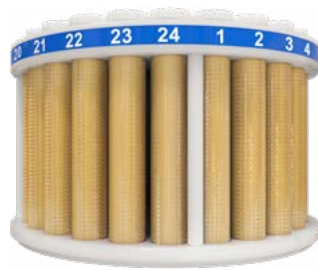


### Lab Reports

Create lab reports with individual vessel statistics, such as Sample ID, Reagents Used, Mass, Volume, Description, and even photos.

# MARSXpress™ Vessels

MARSXpress and MARSXpress Plus vessels are easy to use three-piece vessels that assemble in seconds, yet are rugged enough for most sample types. MARSXpress vessels, with vent and reseal technology, were patented in 2003 and have been the industry standard since that time. These vessels simultaneously run mixed sample types such as foods, tissues, and cannabis in a single batch. This greatly increases productivity in a lab that has varied sample materials. The 55 mL and 75 mL MARSXpress and the 110 mL MARSXpress Plus can all be run in the MARS 2.



**MARSXpress**



**MARSXpress Plus**

	<b>MARSXpress</b>	<b>MARSXpress Plus</b>
<b>Features</b>		
Batch Capacity	Up to 24	Up to 16
Volume	55 mL / 75 mL	110 mL
Disposable Options	Yes	Yes

<b>Typical Sample Sizes</b>		
Animal and Fish Tissue	0.5 g	0.6 g
Environmental Solids	0.5 g	0.5 g
Feeds and Fertilizer	0.5 g	0.6 g
Filter (paper & cellulose)	0.25 g	0.5 g
Foods (dry weight)	0.5 g	0.6 g
Infant/Geriatric Formula (dry weight)	0.5 g	0.5 g
Nutraceutical	0.5 g	0.6 g
Nylon	0.25 g	0.3 g
Pharmaceutical	0.25 g	0.3 g
Plant Tissue	0.5 g	0.6 g
Polypropylene	0.2 g	0.3 g
Waste Oil	0.1 g	0.1 g

# You Have Options

MARS 2, with iWave® temperature sensing technology, has brought tremendous advantages to microwave digestion, including the use of disposable vessel inserts. Vessel inserts offer a convenient way to process samples with little to no vessel cleaning. The choice of insert will depend upon digestion temperature and blank values required, based on the limit of quantification for a particular analysis. For trace metals analysis, it is vital to be aware of any materials coming into contact with the sample, which could contaminate the sample. In general, Teflon® and quartz are considered analytically clean materials for use in nearly any application. Glass, by composition, is higher in certain impurities, which may make it unsuitable for some applications.

Vessel Type	Glass	Quartz	Teflon
MARSXpress 55 mL			✓
MARSXpress 75 mL	✓	✓	✓
MARSXpress Plus	✓		

Insert Material	Max Temp for up to 18 vessels	Max Temp for up to 24 samples
Glass	210 °C	200 °C
Quartz	210 °C	200 °C
Teflon	180 °C	180 °C

## Glass and Quartz Inserts

Glass and quartz inserts offer the greatest ease of use for high-throughput labs. Samples are weighed into the inserts and the acid mixture added. The insert is then loaded into the MARSXpress or MARSXpress Plus vessel and placed in the MARS 2 for digestion. The digested sample is removed from the vessel then diluted directly in the insert. This eliminates the sources of error and contamination associated with multiple transfer steps. After analysis, simply throw the insert away.



## Teflon Inserts

The Teflon insert protects the vessel from batch-to-batch contamination without washing vessels between runs. Simply form a disposable insert and place it into the MARSXpress vessel, cap it, and run. When the digestion is complete, transfer your solution to an appropriate flask or vial and dispose of the insert. You are ready to start your next sample. They can be used for any digestion application run at or below 180 °C for 30 minutes or less.





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