



CEM

STAR Systems

Rapid Open Vessel Sample Preparation

Simplify Problem Digestions!

Plastics
Polymers
Hazardous Wastes
Metals/Metal Products
Inorganic and Organic Chemicals
Foods
Soils
Sludge
Water/Wastewater
Plant/Animal Tissue
Filters (i.e. Toray)
Pharmaceuticals
Composites
Photoresist
Sulfuric Acid Reduction
Anion/Cation Exchange Resins
Kjeldahl
Feeds and Grains



Expand Your Laboratory Capabilities with the STAR System!

CEM

Innovators in Microwave Technology

CEM STAR Plus Systems

Rapid Open Vessel Sample Preparation



- **Process up to 6 samples independently using different methods at simultaneous or sequential start times**
- **Eliminate handling of hazardous chemicals with automated reagent addition**
- **Automated evaporation of sample and reagent to dryness**
- **Pre-programmable "Time-to-temperature" parameters for rapid optimization of methods**
- **Clean Chemistry! 1 pump per reagent for each individual cell**
- **Digest sample sizes up to 10 grams**
- **Easily digest difficult or highly reactive samples**
- **Meets requirements of USEPA SW-846 Method 3050B**
- **Self-contained vapor scrubber system frees fume hood space**

CEM's innovative STAR System takes open vessel microwave digestion to a new level, offering a flexibility and ease-of-use seldom seen in a laboratory. The STAR System's high performance technology is an established technique that provides unparalleled control for complete digestions. It is the only system that offers a unique patented temperature feedback control, the flexibility to process up to 6 samples utilizing different programmable methods, and the safety and convenience of automated reagent addition. All of the system's parts, which come into contact with reagents are made from inert materials, allowing the use of acids such as sulfuric. The STAR System's versatility also enables the user to evaporate to dryness for redissolution with nitric acid to aid in further analysis. The simplicity of operation and the ability to digest larger sample sizes are a benefit to any laboratory that would like to improve its analytical capability, while expanding its range of applications.

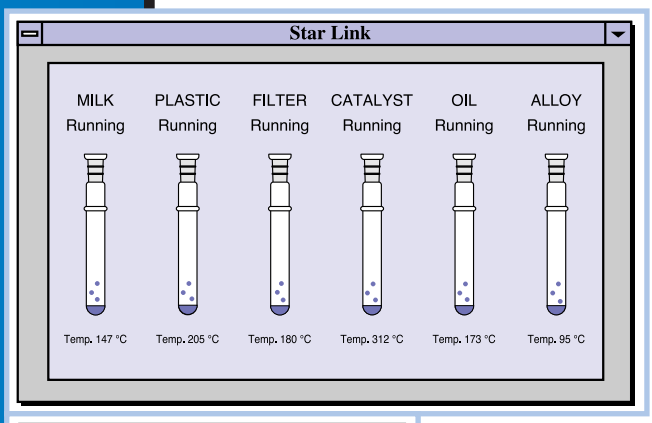
Easy-to-Use

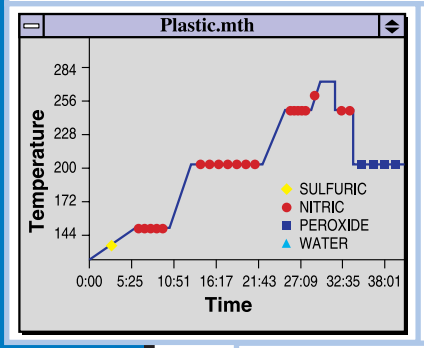
The STAR System™ is designed for convenience and flexibility, freeing the analyst from the time-consuming tasks involved in sample preparation.

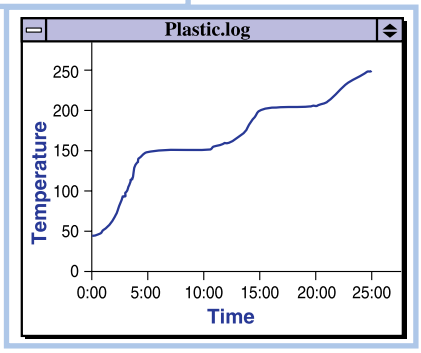
The STAR System automatically adds reagent to the vessels according to the requirements of the programmed method. The reagent is added in aliquots while the digestion is running to prevent cooling the digestate. The system's proprietary pump technology ensures that an accurate measurement of reagent is delivered instantaneously on demand. Each reagent has a dedicated pump for every cell eliminating any mixing or cross contamination of reagents.

The system also allows evaporation to dryness of a sample followed by redissolution, enabling the analytical matrix to be accurately controlled.









Turn Your PC Into a Sample Prep Workstation

Control your STAR System from your PC with CEM's STARLink™ Software. This optional software package connects your STAR System directly to any PC (configured with MicroSoft® Windows® 95 or higher) for method storage, data collection, and graphic display of time and temperature plots of digestions.

- **Create, store and recall methods, data plots and detailed sample information**
- **Supports bar code readers, foreign language keyboards and Internet connections**
- **Plot and print projected time and temperature of digestions**
- **Transport data to popular spreadsheet programs**
- **Allows easier and faster programming of methods**
- **Stages can be inserted or deleted from methods easily**
- **Software has a security administrator reducing user access to stored methods**
- **Automatic report generation**

Accessories



250-mL Pyrex Vessels - Standard vessels used for routine applications

250-mL Quartz Vessels - Designed for high temperature applications and acid concentration

250-mL Teflon Vessel - Used for HF and phosphoric acid digestions

Volumetric Pyrex Vessels - Eliminate transfer steps by digesting and bringing sample to volume in a single vessel. Available in 50 and 100-mL capacities.



Reagent Pumps – Pump 30-mL of reagent per minute! All parts of the pumps which come into contact with reagents are composed of inert materials. Additional reagent pumps can be linked to expand the number of reagents that can be added by the automated reagent addition system or to separate acid from the system and other reagents.

Reagent Evaporation/Reduction Condenser - For rapid reduction of reagents (i.e. sulfuric acid volume).

Superior Instrumentation Engineering

Though the STAR System is versatile and easy-to-use, it is designed to be rugged, safe and dependable as well. The system has a small footprint and does not require fume hood space, making it suitable for virtually any laboratory.

- **"Vessel-in-position" sensor prevents cell activation until a vessel is properly placed in the cell**
- **A built-in vapor containment system scrubs the vapors produced during the digestion eliminating the need for fume hood space**
- **1 pump per reagent per cell – parts that contact with acids are made of inert materials**
- **System software tracks reagent supply to prevent depletion during digestion**
- **Corrosion-resistant outer body**
- **Small footprint fits into virtually any laboratory**
- **ISO 9000 accountability**

System Specifications

	STAR System 2	STAR System 6
Dimensions (WxDxH), Main Microwave Unit	18 x 13.15 x 14 in 45.72 x 33.4 x 35.5 cm	29.5 x 13.13 x 14 in 74.93 x 33.4 x 35.5 cm
Dimensions (WxDxH), Vapor Containment/ Reagent Addition Module	6.5 x 9 x 12 in 16.54 x 22.86 x 30.48 cm	20.5 x 9 x 12 in 52.07 x 22.86 x 30.48 cm
Weight (microwave unit only)	48 lbs (21.77 kg)	67 lbs (30.39 kg)
Power Requirements (separate line recommended)	120 ± 10% VAC, 60V Hz 220/240 ± 10% VAC, 50 Hz	208/230 ± 10% VAC, 60 Hz 220/240 ± 10% VAC, 50 Hz
Program Storage	20 methods	20 methods
Operating Temperature	Ambient - 500 °C	Ambient - 500 °C
Readout Temperature	Ambient - 430 °C	Ambient - 430 °C
Temperature Control	Individual sample feedback per cavity	Individual sample feedback per cavity
Sensors, Temperature	2	6
Sensors, Vessel-in-Position	2	6
Sensors, Arm-in-Position	2	6
Vessel Capacity	250, 100, 50mL	250, 100, 50mL
Number of Vessels Per Unit	Maximum 2	Maximum 6
Number of Simultaneously Run Programs	Maximum 2	Maximum 6
Number of Staggered Start Times	Maximum 2	Maximum 6
Vapor Containment Module	Standard	Standard
Automatic Reagent Addition *	Maximum of four reagents per pump module Maximum of five pump modules per instrument	Maximum of four reagents per pump module Maximum of five pump modules per instrument
Automatic Vacuum Pump Switch	Optional	Optional
Keypad Type	Membrane	Membrane
Printer Port	Parallel	Parallel
Communication Port	RS 232	RS 232

* Optional

CEM STAR Systems are covered by U.S. Patents: 5,796,080; 5,840,583; 5,972,711.

CEM Corporation
P.O. Box 200
Matthews, NC 28106

Tel: (800) 726-3331
Tel: (704) 821-7015
Fax: (704) 821-7894
e-mail: info@cem.com
web: http://www.cem.com

CEM Microwave Technology Ltd.
2 Middle Slade
Buckingham Industrial Park MK18 1WA
United Kingdom
Tel: 011-44 1 280 822873
e-mail: info.uk@cem.com

CEM µWave S.A.S.
Immeuble Ariane
Domaine Technologique de Saclay
4, rue Rene' Razel
91892 ORSAY Cedex France
Tel: (33-1) 69 35 57 80
e-mail: info.fr@cem.com

CEM GmbH
Carl-Friedrich-GauB-Str. 9
47475 Kamp-Lintfort Germany
Tel: 011-49-2842-9644-0
e-mail: info@cem.de
web: http://www.cem.de

CEM SRL
Via Dell Artigianato, 6/8
24055 COLOGNO AL SERIO (BG) Italy
Tel: 011-390-35-896224
e-mail: info.srl@cem.com