



# DISCOVER SP-D

AUTOMATED MICROWAVE DIGESTION SYSTEMS  
**The SOLUTION IS CLEAR**

# Discover SP-D Series

## Overview

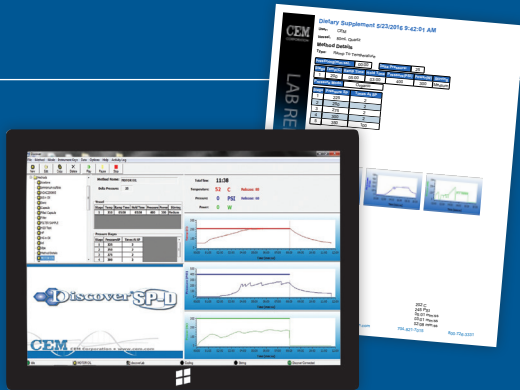
Welcome to a revolutionary advance in pressurized microwave digestion! Fast and remarkably simple, the Discover SP-D changes the laboratory paradigm for microwave digestion. Escape the confines of traditional box-style microwave digestion systems and experience an incredible ease-of-use you've never had before in sample preparation.

## Features

- Complete digests in 10 minutes, including cool down
- Pressurized vessels (10-, 35- or 80-mL) with easy snap-on caps
- Patent-pending ActiVent® Technology automatically controls vessel pressure
- Sample sizes up to 1 g
- Safest technology for microwave digestion
- Individual method programming for each sample
- Full pressure & temperature control for each sample
- Compact - smaller than box-style microwave digestion systems
- Automated sample decks available

## Synergy-D Software

- Real-time display of temperature, pressure, and microwave power
- Pre-installed methods for many sample types
- Sample queues that mix methods and sample types in a single run
- 21 CFR Part 11 Compliant
- Automatically generate a report of run conditions for every sample, not the batch



## Specs

### Power Output

- 300 Watt magnetron

### Power Requirements

- 100-120 VAC, 60 Hz
- 200-240 VAC, 50 Hz

### Pressure

Activent® Self-Venting Technology

### Air Cooling

Min 30 psi/2 bar (3 cfm flow) user-supplied for simultaneous cooling (PowerMax™) and rapid cool down

### Automation

- 24-Position available for SP-D 10/35 and 80
- 36 & 48-Position autosampler is available for SP-D 10/35

### Stirring

Electromagnetic variable speed

# Discover® SP-D™ 80



Max Temp: 260°C  
Controlling Pressure: 400 psi

## Typical Samples

Sample Type	Max Sample Size
Pharmaceuticals	0.5 g
USEPA 3051a	0.5 g
USEPA 3015a	50 ml
Food Matrices	1.0 g +
Plant/Animal Tissue	1.0 g +
Oil	0.5 g
Air Filters	1.0 g
Toray Filter	1 filter
Pet Food	0.5 g
Plastics/Polymers	0.5 g
Al <sub>2</sub> O <sub>3</sub>	0.5 g
Ceramics	0.25 g

## Accurate Results

Folic Acid Sample (with 125 ppb spike of As, Hg, Cd, Pb, and Cr)  
Sample Size: 0.5 grams  
Acid: 9 mL nitric acid, 1 mL HCl  
Total Time: 10 minutes including cooling

	As (ppm)	Hg (ppm)	Cd (ppm)	Pb (ppm)	Cr (ppm)
Average	114.8	118.3	119.3	120.2	122.3
Percent Recovery	92	95	95	96	98
RSD	4.96	0.86	1.05	5.57	1.76

A 0.5 g sample of Folic Acid was digested in the Discover SP-D 80 system with 9 mL of HNO<sub>3</sub> and 1 mL HCl with a quartz vessel in under 10 minutes, including cool down.

# Discover® SP-D™ 10/35



Max Temp: 240°C  
Controlling Pressure: 350 psi

## Typical Samples

Sample Type	Max Sample Size
Pharmaceuticals	0.25 g
USEPA 3051a	0.25 g
USEPA 3015a	N/A
Food Matrices	0.5 g
Plant/Animal Tissue	0.5 g
Oil	0.2 g
Air Filters	0.5 g
Pet Food	0.25 g
Plastics/Polymers	0.2 g
Al <sub>2</sub> O <sub>3</sub>	0.25 g
Ceramics	0.1 g
Toray Filter	N/A

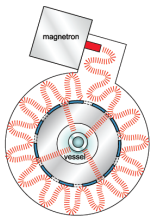
## Accurate Results

Conostan Oil Reference Standard  
Sample Size: 0.25 grams  
Acid: 10 mL nitric acid  
Total Time: 10 minutes including cooling

Certified Value	As (ppm)	Se (ppm)	Hg (ppm)
Average Recovery	51.3	52.9	52.9
Percent Recovery	102	106	106
Standard Deviation	3.46	4.18	0.64

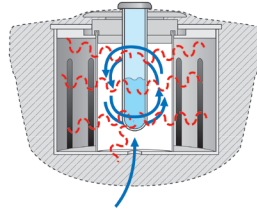
A 0.25 g sample of Conostan Oil was digested in the Discover SP-D 10/35 System with 10 mL of HNO<sub>3</sub> in 10 minutes, including cool down.

# How it Works



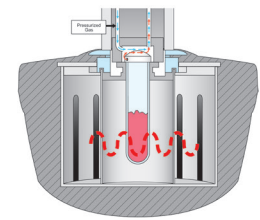
## Precise & Efficient Energy Delivery

The Discover SP-D's Focused™ microwave cavity produces a highly defined and extremely homogeneous microwave field. This cavity design enables the system to process samples faster and more reproducibly than batch style systems.



## Faster Digestions, Rapid Cooling

CEM's patented PowerMAX™ Cooling provides the ability to cool the vessel rapidly and avoid many exothermic reactions that can occur during digestion. In addition, it delivers rapid cooling after digestion, allowing the Discover SP-D to process samples in as little as 10 minutes per sample.



## The Industry's only Actively Venting System

Batch systems use vessels that vent once the vessel reaches a set pressure. With CEM's patented Activent® Technology, the Discover SP-D automatically measures pressure and controls when the vessel vents. This enables discreet venting at pre-set limits, preventing loss of elements, including volatiles such as mercury and arsenic.

# Weigh, Snap, & Load

1

Weigh the sample and add acid



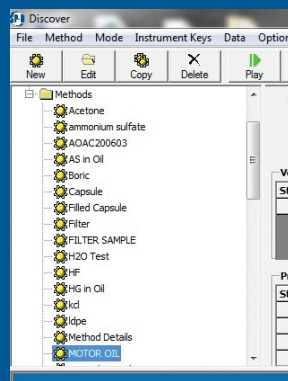
2

Snap on the cap and place in auto sampler



3

Load the Method and press Start



4

The sample is completely digested





# Quick & Easy

1.2.3.

## Easy Operation

It couldn't be simpler. Get clear solutions in 10 minutes. Using CEM's patented Focused™ Microwave Technology and enhanced cooling, most routine samples are digested in 10 minutes or less—including cool down. It is the perfect solution for laboratories that receive "rush" samples for analysis.



## Full Control

CEM's patented snap-on cap technology eliminates the need for tools. Add the sample, the appropriate acid(s), snap the cap on the vessel, and place it into the Discover® SP-D™. Clamps and torque wrenches are not required. The system includes a large library of pre-loaded methods and programming is intuitive.



## Fast Results

Each sample is fully controlled. Every sample has its own method, allowing mixed samples and acid types to be run in a sequence. No more waiting for similar samples for batch processing. Temperature, pressure, and power parameters are captured for every digest and can be graphed for verification.



## Documentation

The Discover SP-D system automatically generates a lab report to verify digestion conditions were met for each individual sample, not of the batch. Temperature, pressure and power graphs are documented, as well as the maximum temperature and pressure, during the digestion.



## Process samples completely unattended.

The Discover SP-D is more than the latest technology for microwave digestion: it is a new concept in sample preparation. Discover SP-D is a sequential, pressurized microwave digestion system that processes samples completely unattended, allowing laboratory staff to tend to other tasks. Just load the autosampler, press play and walk away. The SP-D will do the rest.

# Applications

Many of these applications come preloaded on every Discover SP-D system. To view the Method Notes for more samples, go to [www.cem.com](http://www.cem.com).

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## Animal

- Beef Tallow
- Bone
- Bovine Liver
- Bovine Muscle
- Bovine Serum
- Chicken
- Fish Tissue
- Pork

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## Environmental & Regulatory

- AOAC 200603
- EPA 3051a
- Paint Chips
- RoHS
- Sediment
- Sludge

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## Metallurgical & Mining

- Aluminum
- Aluminum Oxide
- Coal
- Copper
- Gold Nanopowder
- Nickel
- Platinum Carbon
- Steel

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## Pharmaceutical

- Allergy
- Aspirin
- Claritin
- Diclofenac K
- Losartan K
- Metformin
- Magnesium Carbonate
- Magnesium Oxide
- Pyridoxine HCL

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## Clinical & Forensic

- Blood
- Bone
- Hair
- Human Lung Tissue
- Urine

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## Food

- Cereal
- Cheese
- Coffee
- Milk Powder
- Olive Oil
- Peanut Butter
- Soda
- Sugar

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## Nutraceutical

- Antioxidant
- Beta Carotene
- Calcium Carbonate
- Fish Oil
- Folic Acid
- Ginko
- Herbal Supplement
- Multivitamin
- Whey Powder

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## Plant

- Alfalfa
- Apple
- Asparagus
- Banana Leaves
- Blueberry
- Broccoli
- Carrot
- Citrus Leaves
- Tea Leaves
- Tobacco

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## Consumer Products

- Cotton
- Deodorant
- Makeup
- Shampoo
- Suppository

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## Industrial Hygiene

- 37 mm Filter Paper
- 47 mm Filter Paper
- Filter Paper Cellulose
- Polycarbonate Filter
- Paint Chips
- Ghost Wipes

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## Oil

- Crude Oil
- Mineral Oil
- Motor Oil
- Petrolatum
- Petroleum Wax

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## Plastic & Polymer

- ABS
- HDPE
- Polymer
- Polypropylene
- PPS
- PVC
- Tire Rubber
- Kevlar
- Nylon
- PET

# System Flexibility



## Any sample, any acid in the same run.

A Discover SP-D system is fully automated. You can mix different samples that use different acids in the same run. Once you set the preloaded applications and hit play, your work is done. The SP-D finishes the digestion for you and produces a clear digest, ready for analysis.

- Varied Sample Sizes
- Combination of Acids
- Full Pressure and Temperature Control

To the left is an example of how an SP-D could be loaded with higher temperature samples as well as lower temperature samples for the same run. The SP-D can handle it, giving you flexibility in your work.

● Oil	● Aspirin
● Excipient	● Dry Pet Food
● HDPE	● Lipstick
	● Milk Powder

# Accessories

## Vessels

10 mL vessels  
available in Pyrex®

35 mL vessels  
available in Pyrex® or quartz

80 mL vessels  
available in quartz

Snap-on caps  
available for all vessels

## Stir Bars

Multiple options available  
(required for digestions)

## Teflon® Liners

Available for  
35 and 80 mL vessels  
(required when using  
hydrofluoric acid)

## NIST Traceable Calibration Device

Ensures accurate  
temperature measurement  
and complies with the  
requirements of GLP/  
cGMP, ISO, and IQ/OQ/PQ  
documentation







Over 50,000 systems sold worldwide



CEM has been an ISO-certified facility since 1994



All systems serviced & supported by experts with an average of 15 years of experience



CEM invests 11% of annual revenue into R&D, the result... 11 R&D 100 awards



IQ/OQ/PQ Validation by certified CEM Technicians

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*Our commitment to you doesn't end when your system is shipped; it begins.*

~Michael J. Collins  
President & CEO, CEM

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**CEM Corporation:**  
PO Box 200  
Matthews, NC 28106  
United States  
800-726-3331  
704-821-7015  
Fax: 704-821-7894  
info@cem.com  
www.cem.com

**France: CEM  $\mu$ Wave S.A.S.**  
Immeuble Ariane  
Domaine Technologique de Saclay  
4, rue Rene' Razel, 91892 ORSAY Cedex  
33 (01) 69 35 57 80 • Fax: 33 (01) 60 19 64 91  
info.fr@cem.com

**Germany, Austria, Switzerland: CEM GmbH**  
Carl-Friedrich-Gauss-Str.9, 47475 Kamp-Lintfort  
(49) 2842-9644-0 • Fax: (49) 2842-9644-11  
info@cem.de

**Ireland: CEM Technology (Ireland) Ltd.**  
Sky Business Centre, 9a Plato Business Park,  
Damastown, Dublin 15  
+353 (0) 1 885 1752 • Fax: +353 (0) 1 885 1601  
info.ireland@cem.com

**Italy: CEM S.R.L.**  
Via Dell' Artigianato, 6/8  
24055 Cologno al Serio (Bg)  
(39) 35-896224 • Fax: (39) 35-891661  
info.srl@cem.com

**Japan: CEM Japan K.K.**  
2-18-10 Takanawa, Minato-ku, Tokyo 108-0074  
+81-3-5793-8542 • Fax: +81-3-5793-8543  
info@cemjapan.co.jp

**United Kingdom: CEM Microwave Technology Ltd.**  
2 Middle Slade, Buckingham Industrial Estate,  
Buckingham MK181WA  
(44) 1280-822873 • Fax: (44) 1280-822873  
info.uk@cem.com

6,607,920 6,713,739 6,966,226 7,550,560 6,649,889 6,886,406 7,141,769 7,563,865 6,753,617 6,917,023 7,144,739

Worldwide patents issued and pending

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