

COULOMETRY

Product Catalog

Systems-Modules-Parts & Accessories
for Carbon and Sulfur Measurements



UIC, Inc. has been at the forefront of carbon and sulfur measurements since 1986. Our instruments are based upon the principles of coulometry and Faraday's Law, providing excellent accuracy and precision without requiring costly, time-consuming user calibrations. They are designed to analyze varying concentrations (from low ppm levels to 100%) in most complex matrices.

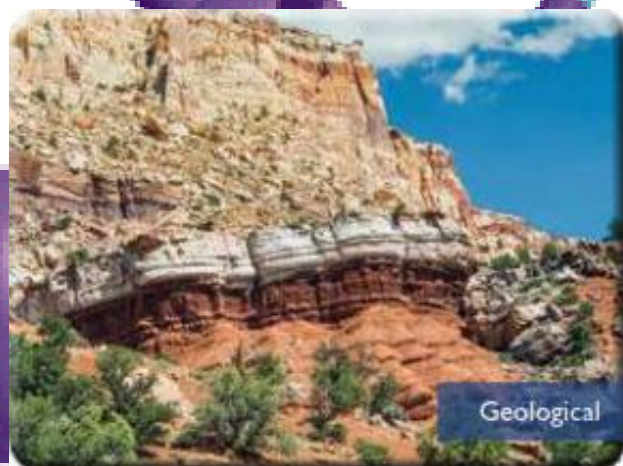


Table of Contents:

Carbon Analyzers -----	4
Total Carbon (TC) / Total Organic Carbon (TOC) Analyzers-----	5-6
Total Inorganic Carbon (TIC) Analyzers-----	7-9
TC / TOC / TIC Analyzers-----	10-11
Surface Carbon Analyzers-----	12
Sulfur Analyzers -----	13
Total Sulfur Analyzers-----	14
Total Sulfites Analyzers-----	15
Simultaneous Carbon & Sulfur Analyzers-----	16
Analyzer Modules	
CM5017 CO ₂ Coulometer-----	17
CM5017S SO ₂ Coulometer-----	18
CM5017O Oceanographic Coulometer-----	19
CM5330 Acidification Module-----	20
CM5240 Auto Acidification Module-----	21
CM5700B TIC Autosampler-----	22
CM5300 Horizontal Furnace-----	23
CM5390 Automated Boat Inlet-----	23
CM5200 Autosampler Furnace-----	24
Published Applications -----	25-27
Ordering Information -----	28

Carbon Coulometer Applications

By Coulometric Detection Only



The UIC Inc Carbon Coulometer, when combined with our High Temperature Combustion Furnace and/or our Acidification Module, offers a flexible system for carbon analysis, which can be tailored to meet a wide variety of solid or liquid sample applications. Complex matrices and a wide range of carbon concentrations are easily handled with our analyzers using an automatic coulometric detector. Whether your application requirements include Total Carbon (TC), Total Inorganic Carbon (TIC), or Total Organic Carbon (TOC), UIC Inc can provide a system which will meet your needs. Below are just some of the applications and materials for which our Carbon Coulometer is presently used.

General TC/TIC/TOC of Liquids, Semi-Liquids, and Solids

Air Filters

Amine Solutions

Animal Feed Additives

Atmospheric Gases

Battery Fibers

Black Liquors

Bone Samples

Boron Carbide

Brewing Off-gas

Building Materials (Wall Board)

Carbonized Fibers

Carbonized Filters

Catalysts

Clays

Cold Rolled Steel Surfaces

Galvanized and Aluminum Surfaces

Gas Scrubbing Solutions

Geological Materials

Glass

Groundwater

Humic Acid

Hydrazine

Hydrobromic Acid

Ocean Sediments

Paper Products

Pharmaceuticals

Process Fluids

Radioactive Materials

Seawater

Silica Carbide

Silica Column Packing

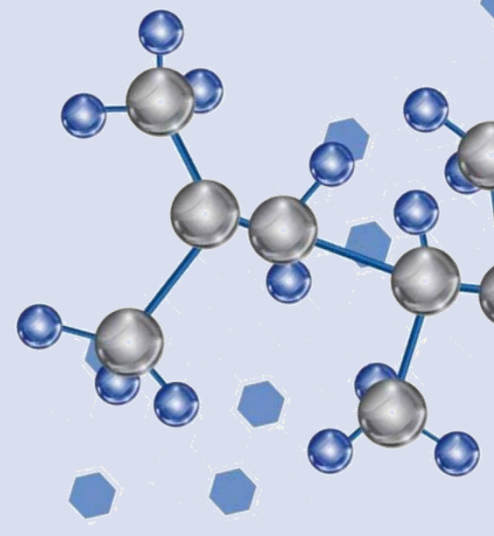
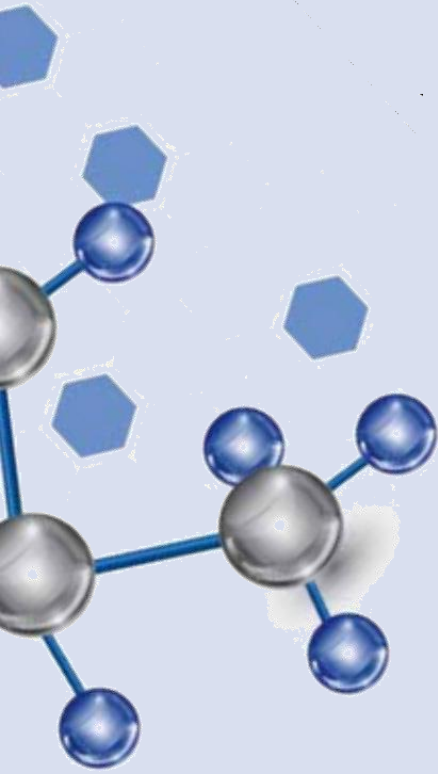
Silica Wafers and Substrate

Soil

Sulfuric Acid

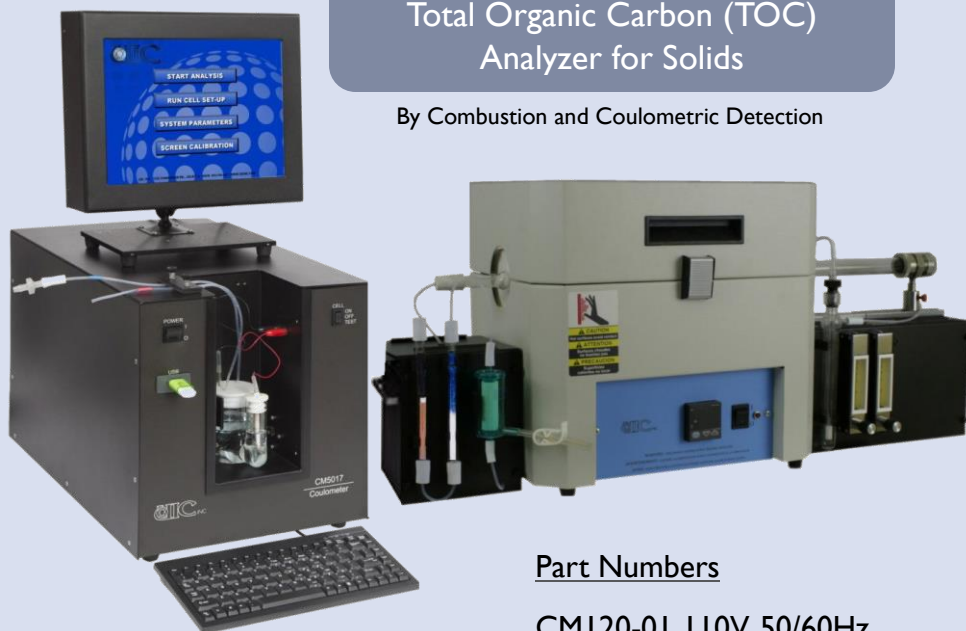
Titanium Turnings

Zinc Chloride



CM120 – Total Carbon (TC) and Total Organic Carbon (TOC) Analyzer for Solids

By Combustion and Coulometric Detection



Part Numbers

CM120-01 110V, 50/60Hz
CM120-02 220V, 50/60Hz

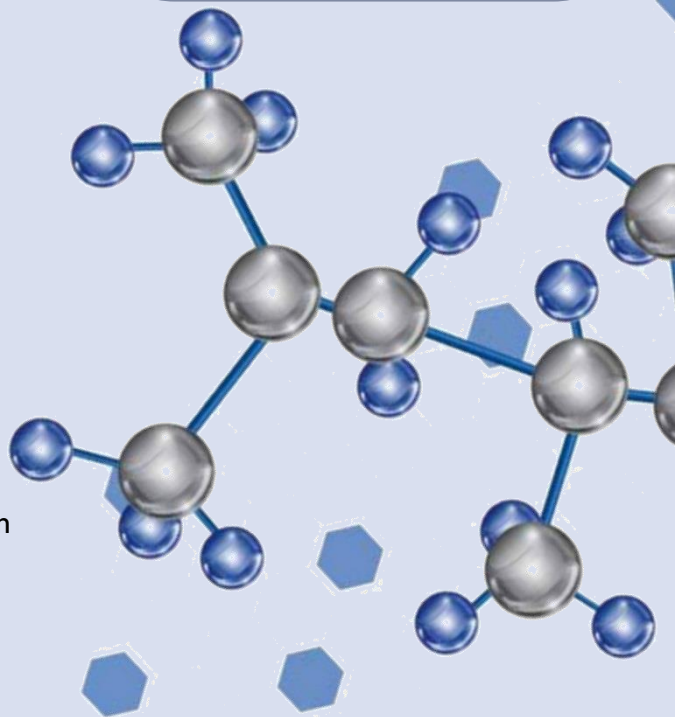
CM120 – TC / TOC Analyzer for Solids includes CM5017 CO₂ Coulometer, CM5300 Horizontal Furnace and CM5122 Furnace Kit with tools and accessories for the analysis of solid samples. Must also choose either Sample Introduction Kit CM5323 (small volume) or CM5324 (large volume) to be included with system.

CM5017 CO₂ Coulometer

No user calibration
Wide, linear dynamic range
Readability to 0.01 µg Carbon
User selectable display units
12.1" fast-responding touch screen
USB Flash Drive storage
LIMS Compatible

CM5300 Horizontal Furnace

Programmable up to 1100° C
Pre-combustion scrubbers for removal of interferences from oxygen carrier gas
Post-combustion scrubbers for removal of interfering gases formed during sample combustion



CM130 – Total Carbon (TC) and Total Organic Carbon (TOC) Analyzer for Liquids

By Combustion and Coulometric Detection

CONFORMS TO ASTM D 4129



Part Numbers

CM130-01 110V, 50/60Hz
CM130-02 220V, 50/60Hz

Applications include: Water, wastewater, brines, process fluids, corrosive agents and acids. The CM130 Total Carbon Analyzer is a complete analytical system capable of measuring total carbon and total organic carbon in aqueous samples. Combining a high-temperature combustion furnace with a highly sensitive CO₂ detector, the CM130 is capable of analyzing samples containing carbon concentrations from ppm levels to 100% (absolute) without user calibration. UIC's analyzers are rugged, accurate and adaptable to most TC/TOC applications. The CM130 system includes CM5017 CO₂ Coulometer, CM5300 Horizontal Furnace and CM5321 Furnace Kit with sample introduction using constant rate syringe.

CM220 – Total Carbon (TC) and Total Organic Carbon (TOC) Analyzer

By Automated Combustion and Coulometric Detection



Part Numbers
 CM220-01 110V, 50/60Hz
 CM220-02 220V, 50/60Hz

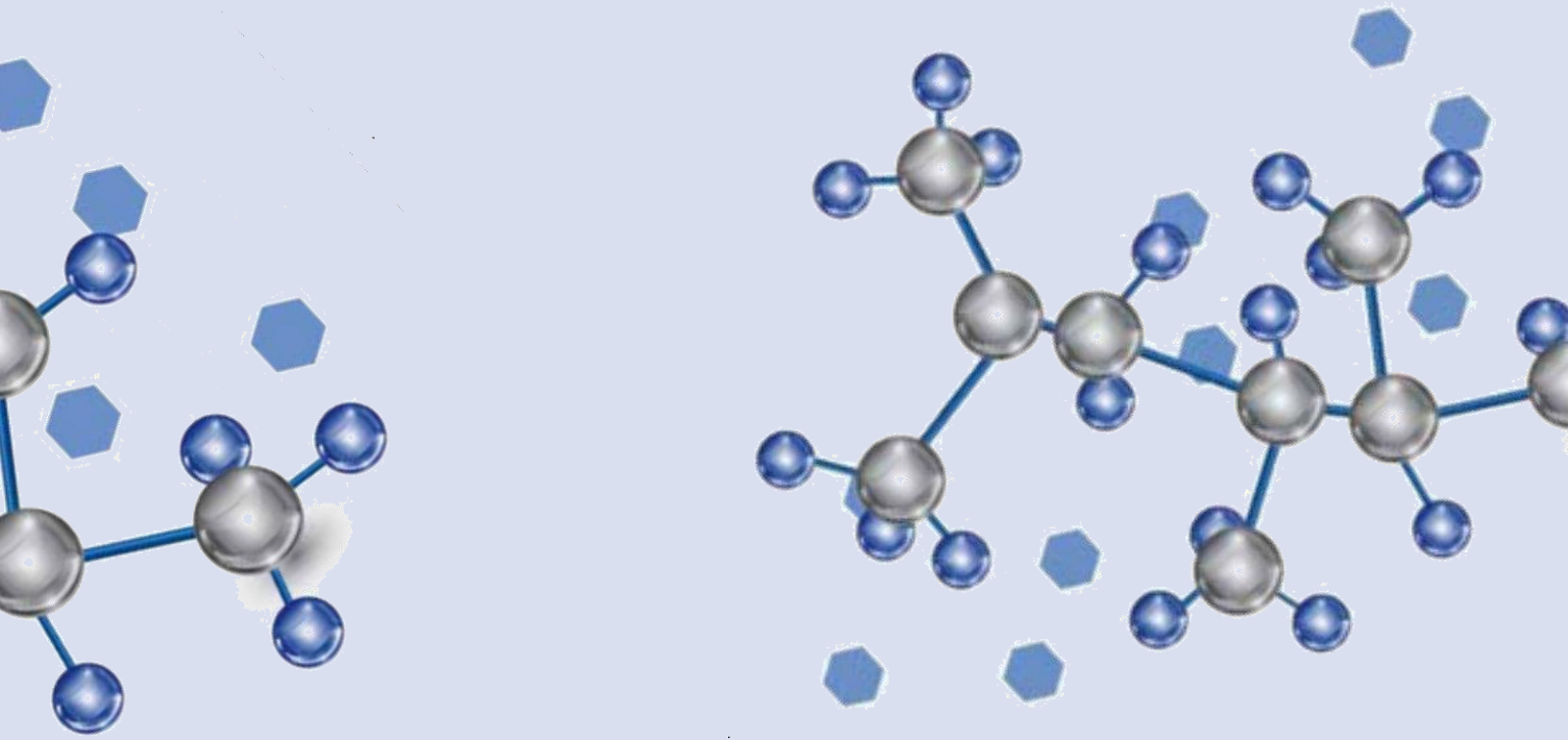
Applications include: Soils, sediments, geological materials, sludges, sulfur, coals, ceramic powders and column packing materials. The CM220 Total Carbon Analyzer is a complete analytical system capable of measuring total carbon in a wide variety of sample types and matrices. Combining a high-temperature combustion furnace with a highly sensitive CO₂ detector, the CM220 is capable of analyzing samples containing total carbon concentrations from ppm levels to 100% without user calibration. The CM220 system includes the following components listed below and pictured to the left.

CM5017 CO₂ Coulometer

- No user calibration
- Wide, linear dynamic range
- Readability to 0.01 µg Carbon
- User selectable display units
- 12.1" fast-responding touch screen
- USB Flash Drive storage
- LIMS Compatible

CM5200 Autosampler Furnace Module

- Two independent combustion zones programmable up to 1100°C
- 29-position sample carousel
- Post-combustion scrubbers for removal of interfering gases formed during sample combustion



CMI40 – Total Inorganic Carbon (TIC) Analyzer

By Acidification and Coulometric Detection



Part Numbers

CM220-01 110V, 50/60Hz

CM220-02 220V, 50/60Hz

No External Carrier Gas Needed!

Applications include:

Carbonates in pharmaceuticals, dissolved carbon dioxide in sea water, carbonates in geological materials, carbon dioxide in amine and hydrazine, carbonates in black liquids, carbonates in food.

CONFORMS TO ASTM D 513

The CMI40 Total Inorganic Carbon Analyzer is a complete analytical system allowing the direct measurements of total inorganic carbon in wide variety of sample matrices and concentrations. Combining a self-contained unit for the acidification of a sample (to evolve CO_2), with a highly sensitive CO_2 detector, the CMI40 easily handles solid or liquid samples with concentration from ppm levels to 100% inorganic carbon without user calibration. UIC's analyzers are rugged, accurate and adaptable to most TIC applications.

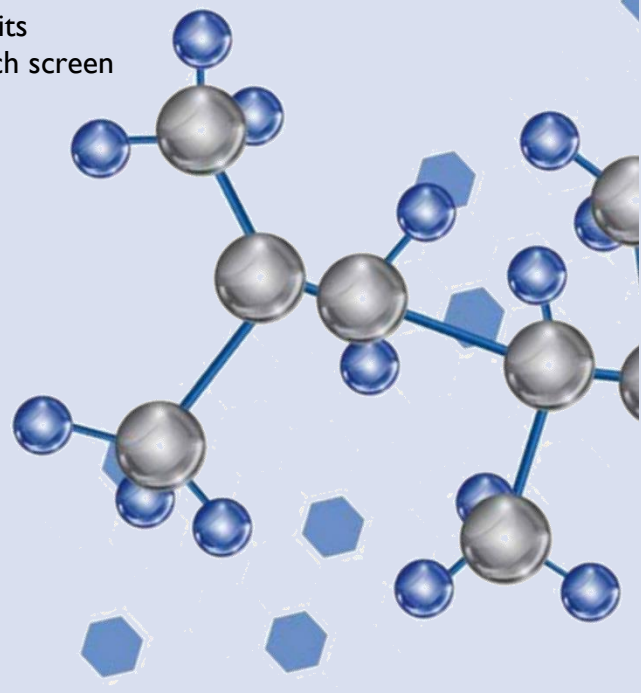
The CMI40 system includes the following components pictured above.

CM5330 Acidification Module

- 10, 25, 50 or 100 ml reaction vessels
- Selectable volume acid dispenser
- Internal air pump with flow controller
- Controlled sample heating and stirring
- Pre-acidification scrubber for removal of CO_2 from carrier gas
- Post-acidification scrubber for removal of interfering compounds released during sample digestion

CM5017 CO_2 Coulometer

- No user calibration
- Wide, linear dynamic range
- Readability to $0.01 \mu\text{g}$ Carbon
- User selectable display units
- 12.1" fast-responding touch screen
- USB Flash Drive storage
- LIMS Compatible



CM245 – Total Inorganic Carbon (TIC) Analyzer

By Automated Acidification and Coulometric Detection

NEW SYSTEM!



CM5245 TIC Autosampler

- 15- or 30-position carousel
- Self-cleaning
- Pre-acidification scrubber for removal of CO₂ from carrier gas
- Post-acidification scrubber for removal of interferences released during sample digestion
- Controlled sample heating and stirring

CM5017 CO₂ Coulometer

- No user calibration
- Wide, linear dynamic range
- Readability to 0.01 µg Carbon
- User selectable display units
- 12.1" fast-responding touch screen
- USB Flash Drive storage
- LIMS Compatible

Applications include: Soils, sediments, geological materials, sludges, water, wastewater, coals, ceramic powders, column packing materials, etc.

CONFORMS TO ASTM D 513

The CM5700B TIC is an automated front-end acid digestion instrument used to convert inorganic carbon species into CO₂ and deliver it to the coulometer cell. It has a built in stirring and heating block, where sample flasks are lowered in one by one, that goes up to 180 deg C.

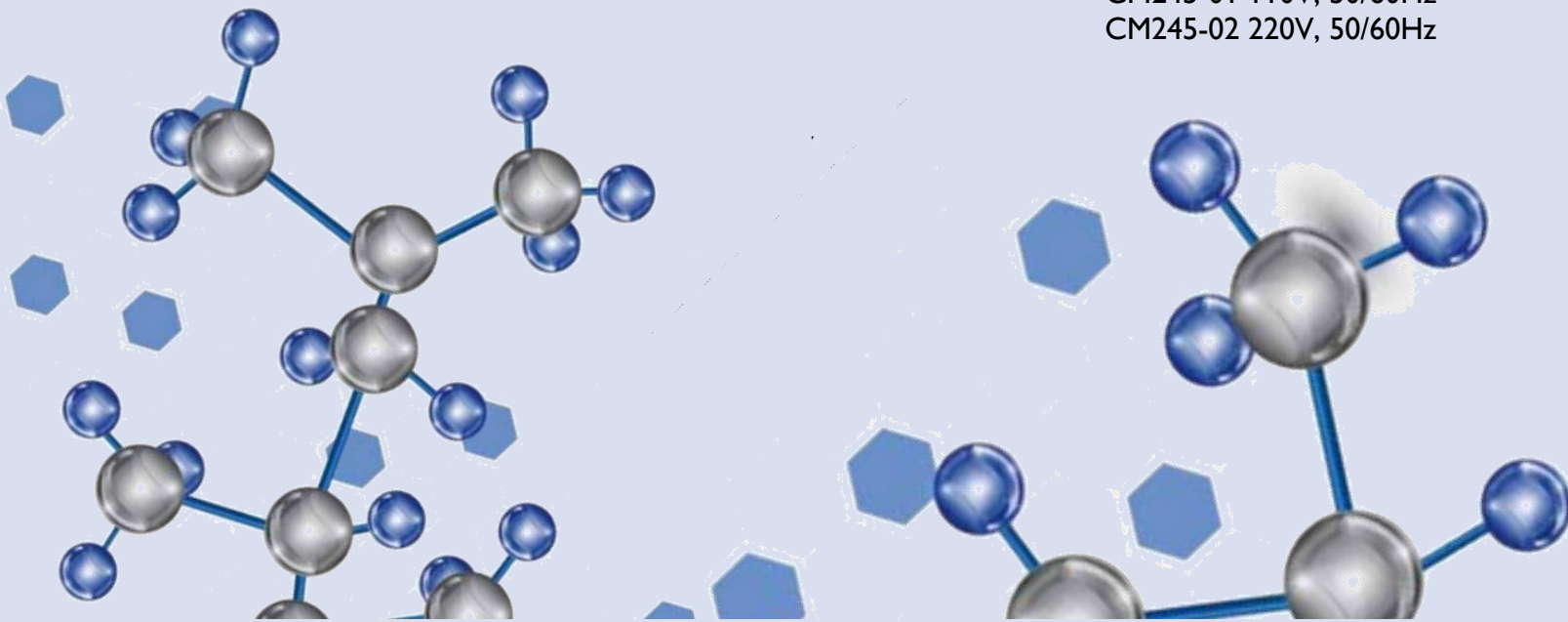
Samples can be either weighed into reusable Teflon™ cups that are thereafter placed into glass sample flasks or weighed directly into the flasks. Up to 15 samples (with 80 ml flasks) or 30 samples (with 20 ml flasks) can be analyzed in a single run.

The CM5700B is interfaced with a CM5017 CO₂ Coulometer but is also compatible with a previous model CM5015.

Part Numbers

CM245-01 110V, 50/60Hz

CM245-02 220V, 50/60Hz



CM240 –Total Inorganic Carbon (TIC) Analyzer

By Automated Acidification and Coulometric Detection



Applications include: Soils, sediments, geological materials, sludges, sulfur, coals, ceramic powders, column packing materials, etc.

CONFORMS TO ASTM D 513

The CM240 Total Inorganic Carbon Analyzer is a complete analytical system allowing the direct measurement of total inorganic carbon in a wide variety of sample matrices and concentrations. Combining a self-contained unit for the acidification of a sample (to evolve CO₂), with a highly sensitive CO₂ detector, the CM240 easily handles solid or liquid samples with concentrations from ppm levels to 100% inorganic carbon without user calibration. The CM240 system includes the following components listed below and pictured to the left.

CM5240 TIC Autosampler

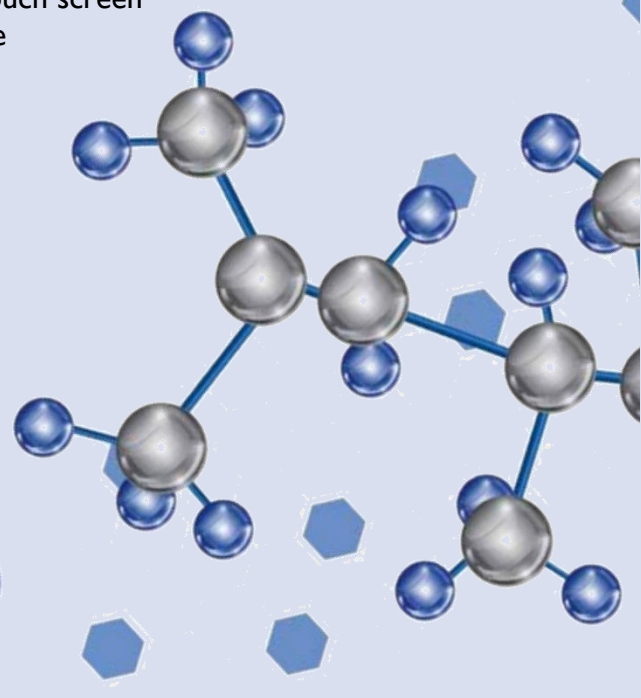
- 45-position carousel
- Low dead volume reaction chamber
- Self-cleaning
- Pre-acidification scrubber for removal of CO₂ from carrier gas
- Post-acidification scrubber for removal of interferences released during sample digestion
- Controlled sample heating

CM5017 CO₂ Coulometer

- No user calibration
- Wide, linear dynamic range
- Readability to 0.01 µg Carbon
- User selectable display units
- 12.1" fast-responding touch screen
- USB Flash Drive storage
- LIMS Compatible

Part Numbers

CM240-01 110V, 50/60Hz
CM240-02 220V, 50/60Hz



CM150 –Total Carbon (TC), Total Organic Carbon (TOC), and Total Inorganic Carbon (TIC) Analyzer

By Combustion, Acidification and Coulometric Detection

Part Numbers

CM150-01 110V, 50/60Hz

CM150-02 220V, 50/60Hz

Applications include: Pharmaceuticals, sea water, amines and hydrazines, black liquors, food, soils, sediments, geological materials, sludges, sulfur, liquids containing particulates, water and wastewater, brines, process fluids, corrosive agents and acids.

CONFORMS TO ASTM D 513 and ASTM D 4129

The CM150 Total Carbon Analyzer is a complete analytical system capable of measuring total carbon, total organic carbon and total inorganic carbon in solid and/or liquid samples. Combining a high- temperature combustion furnace, self-contained acidification module and a highly sensitive CO₂ detector, the CM150 offers the flexibility

to analyze most any sample type and concentration with a precision unmatched by other analytical techniques. The CM150 system includes the following components listed below and pictured here.



CM5330 Acidification Module

- 10, 25, 50 or 100 ml reaction vessels
- Selectable volume acid dispenser
- Internal air pump with flow controller
- Controlled sample heating and stirring
- Pre-acidification scrubber for removal of CO₂ from carrier gas
- Post-acidification scrubber for removal of interfering compounds released during sample digestion

CM5017 CO₂ Coulometer

- No user calibration
- Wide, linear dynamic range
- Readability to 0.01 µg Carbon
- User selectable display units
- 12.1" fast-responding touch screen
- USB Flash Drive storage
- LIMS Compatible

CM5300 Horizontal Furnace

- Programmable up to 1100° C
- Pre-combustion scrubbers for removal of interferences from oxygen carrier gas
- Post-combustion scrubbers for removal of interfering gases formed during sample combustion

CM250 –Total Carbon (TC), Total Organic Carbon (TOC), and Total Inorganic Carbon (TIC) Analyzer

By Automated Combustion and Acidification, and Coulometric Detection

Applications include:

Pharmaceuticals, food, soils, sediments, geological materials, sulfur and coal.

CONFORMS TO ASTM D 513

The CM250 Total Carbon Analyzer is a complete analytical system capable of measuring total carbon, total organic carbon and total inorganic carbon in solid samples. Combining a high-temperature combustion furnace, self-contained acidification module and a highly sensitive CO₂ detector, the CM250 offers the flexibility to analyze almost any sample type and concentration with a precision unmatched by other analytical techniques. The CM250 system includes the following components listed and pictured below.



CM5017 CO₂ Coulometer

- No user calibration
- Wide, linear dynamic range
- Readability to 0.01 µg Carbon
- User selectable display units
- 12.1" fast-responding touch screen
- USB Flash Drive storage
- LIMS Compatible

Part Numbers

CM250-01 110V, 50/60Hz

CM250-02 220V, 50/60Hz



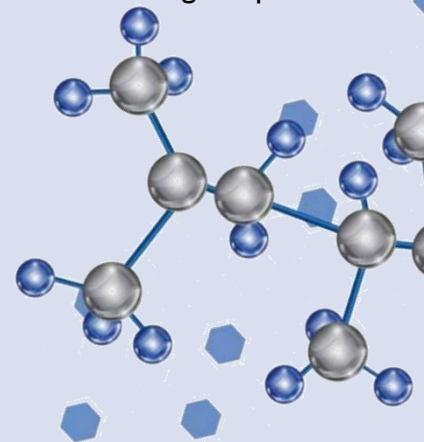
CM5240 TIC Autosampler

- 45-position carousel
- Low dead volume reaction chamber
- Self-cleaning
- Pre-acidification scrubber for removal of CO₂ from carrier gas
- Post-acidification scrubber for removal of interferences released during sample digestion
- Controlled sample heating



CM5200 Autosampler Furnace Module

- Two independent combustion zones programmable up to 1100°C
- 29-position sample carousel
- Post-combustion scrubbers for removal of interfering gases formed during sample combustion



CM185 – Surface Carbon (SC), Analyzer

By High-Temperature Oxidation and Coulometric Detection



Part Numbers
 CM185-01 110V, 50/60Hz
 CM185-02 220V, 50/60Hz

Applications include: Cold rolled steel surfaces, silicon wafers & substrates, galvanized & aluminum surfaces, catalysts and glass.

The CM185 Surface Carbon Analyzer is a complete analytical system capable of measuring surface carbon on a wide variety of non-combustible materials including metals and glass. Combining ABI, a high-temperature oxidation furnace, and a highly sensitive CO₂ detector, the CM185 provides a direct measurement of surface carbon levels without the need for calibration using difficult-to-obtain surface carbon standards. The CM185 system includes the following components listed and pictured here.

CM5017 CO₂ Coulometer

No user calibration
 Wide, linear dynamic range
 Readability to 0.01 µg Carbon
 User selectable display units
 12.1" fast-responding touch screen
 USB Flash Drive storage
 LIMS Compatible

CM5300 Horizontal Furnace with CM5322 and CM5324 Furnace Kits

Programmable up to 1100° C
 Pre-combustion scrubbers for removal of interferences from oxygen carrier gas
 Post-combustion scrubbers for removal of interfering gases formed during sample combustion
 Sample introduction using porcelain boats and manipulator rod

CM5390 Automated Boat Inlet features:

- Improved Sample Introduction
- Solid or Liquid Samples
- Eliminates Ladle Breakage
- Controlled Sample Handling

CM190 – Surface Carbon (SC), Analyzer

By Dual Zone High-Temperature Oxidation and Coulometric Detection



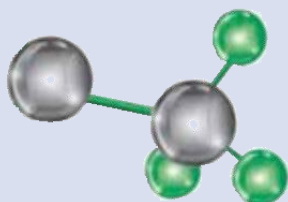
Part Numbers
 CM190-01 110V, 50/60Hz
 CM190-02 220V, 50/60Hz

The CM190 applications and features are the same as the CM180 specifications above except it comes standard with a CM5380 Dual Zone Furnace and 5381 Furnace Kit. The CM190 system is capable of measuring organic and non-organic surface carbon.

By Coulometric Detection Only

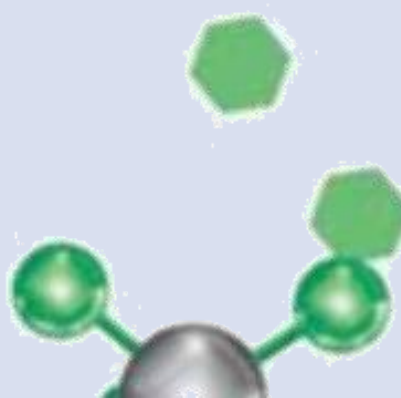
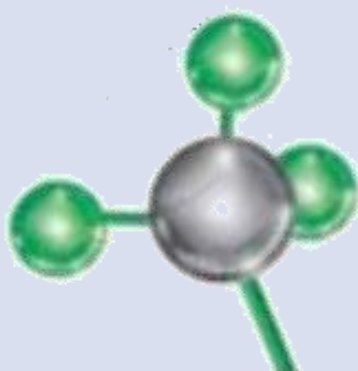


The UIC Inc Sulfur Coulometer, when combined with our High Temperature Combustion Furnace and/or our Acidification Module, offers a flexible system for Total Sulfur (TS) and SO₂/H₂S analysis, which can be tailored to meet a wide variety of solid or liquid sample applications. Employing the principles of Faraday's Law, the CM5017S Sulfur Coulometer automatically measures the absolute mass amount of sulfur dioxide and/or hydrogen sulfide evolved from an acidified sample. No user-calibration is required, and linear detection is available from less than 1 µg sulfur to over 10,000 µg sulfur. Using this 100% efficient coulometric process, relative standard deviations of 0.2% or better are common for standard material. For smaller concentrations, an absolute deviation of approximately 1 µg S is typical. Oxidation times vary with sample type and temperature although 10 to 15-minute analyses are typical.



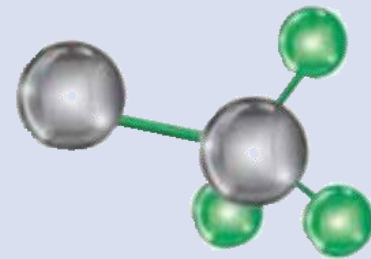
General TS and SO₂/H₂S analysis of Liquids, Semi-Liquids, and Solids

Air Filters	Ocean Sediments
Amine Solutions	Oils
Atmospheric Gases	Organics
Building Materials (Wall Board)	Petrochemical Industry
Coal	Polypropylene
Food and beverages	Production-Scale Brewery Operations
Gaseous hydrocarbon streams	Rubber
Geological Materials	Seawater
Groundwater	Soil
Inorganics	Wines
Manganese Oxide	Zinc Oxide



CM320 – Total Sulfur (TS), Analyzer

By Dual Zone High-Temperature Combustion and Coulometric Detection



CM5380 Dual Zone with CM5382 Sample Introduction Kit

Programmable up to 1100° C
Separate catalyst zone
Automated oxygen dosing
Split-tube furnace design for easy maintenance

Part Numbers

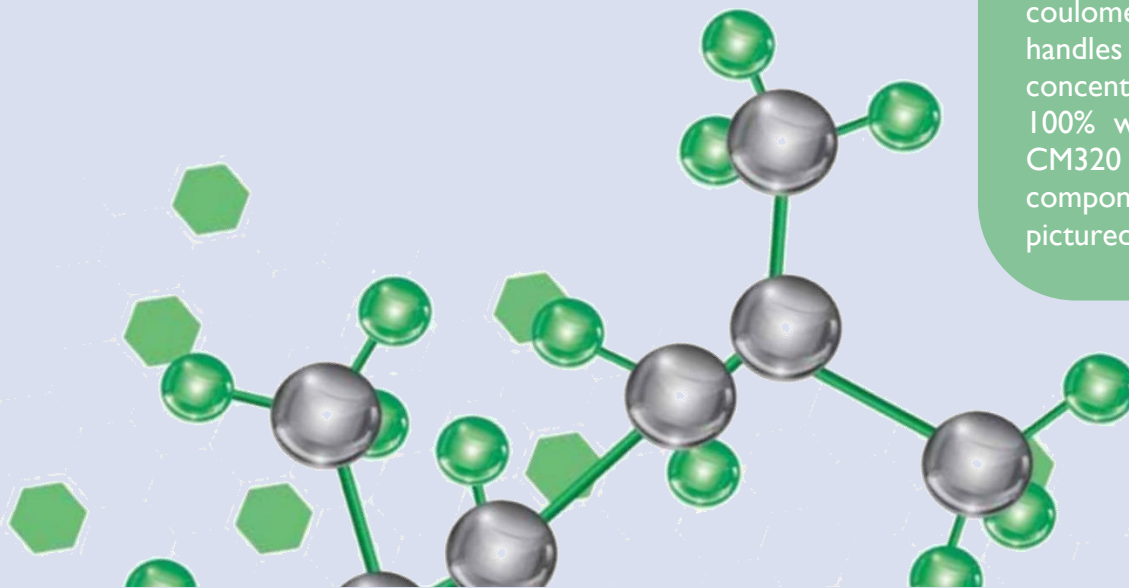
CM320-01 110V, 50/60Hz
CM320-02 220V, 50/60Hz

CM5017S SO₂ Coulometer

No user calibration
Wide, linear dynamic range
Readability to 0.01 µg Carbon
User selectable display units
12.1" fast-responding touch screen
USB Flash Drive storage
LIMS Compatible

Applications include: Total sulfur in organics, coal, geological materials, inorganics, natural products, foods and beverages.

The CM320 Total Sulfur Analyzer is a complete analytical system allowing the direct measurement of total sulfur in a wide variety of sample matrices and concentrations. The CM320 consists of a dual zone, high-temperature furnace and a sulfur coulometer. The CM320 easily handles solid or liquid samples with concentrations from ppm levels to 100% without user calibration. The CM320 system includes the following components listed and pictured above.



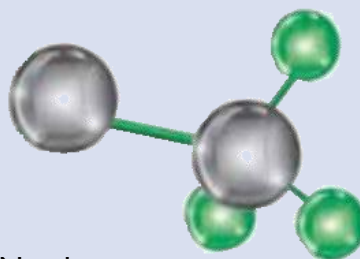
CM340 – Total Sulfite, SO₂ / H₂S Analyzer

By Acidification and Coulometric Detection



CM5017S SO₂ Coulometer

No user calibration
Wide, linear dynamic range
Readability to 0.01 µg Carbon
User selectable display units
12.1" fast-responding touch screen
USB Flash Drive storage
LIMS Compatible



Part Numbers
CM340-01 110V, 50/60Hz
CM340-02 220V, 50/60Hz

CM5330 Acidification Module

10, 25, 50 or 100 ml reaction vessels
Selectable volume acid dispenser
Internal air pump with flow controller
Controlled sample heating and stirring
Pre-acidification scrubber for removal of CO₂ from carrier gas
Post-acidification scrubber for removal of interfering compounds released during sample digestion

CM440 – Total Sulfite, SO₂ / H₂S Analyzer

By Automated Acidification and Coulometric Detection

Part Numbers
CM440-01 110V, 50/60Hz
CM440-02 220V, 50/60Hz

The CM440 applications and features are the same as the CM340 specifications above except it comes standard with a CM5240 Auto-Acidification Module.

CM5240 TIC Autosampler

45-position carousel
Low dead volume reaction chamber
Self-cleaning
Pre-acidification scrubber for removal of CO₂ from carrier gas
Post-acidification scrubber for removal of interferences released during sample digestion
Controlled sample heating



Applications include:

Instrument used to determine dissolved CO₂ and H₂S concentrations in amine scrubbing solutions with coulometric precision. The CM5016 with CM5330 Acidification Module is a complete analytical system typically used for the analysis of amine solutions that are used to remove environmentally controlled emissions from flue gases. This method measures the amount of carbon dioxide (CO₂) and the amount of hydrogen sulfide (H₂S) in the scrubbing solution. This result is used along with other analyses to determine the amine scrubbing solution's efficiency and remaining capacity. This procedure may also be used for the analysis of "sour" water. This system includes the following components listed and pictured here.

By Acidification and Coulometric Detection

Part Numbers

CM740-01 110V, 50/60Hz

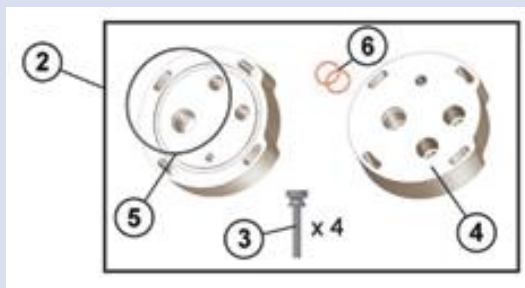
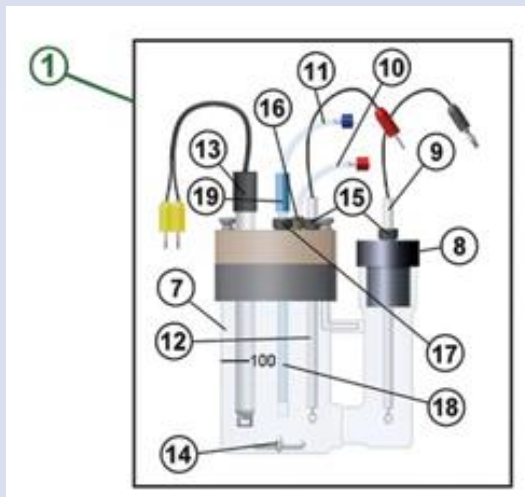
CM740-02 220V, 50/60Hz

**CM5330 Acidification Module**

10, 25, 50 or 100 ml reaction vessels
 Selectable volume acid dispenser
 Internal air pump with flow controller
 Controlled sample heating and stirring
 Pre-acidification scrubber for removal of CO₂ from carrier gas
 Post-acidification scrubber for removal of interfering compounds released during sample digestion

**CM5016 CO₂/SO₂ Coulometer**

- No user calibration
- 100% efficient coulometric detection
- Wide, linear dynamic range
- Readability to 0.01 µg Carbon
- Relative standard deviations of < 0.2% for standard certified materials
- User selectable display units
- 10" LCD Touch Screen
- Typical analysis time of 7-8 minutes
- USB Flash Drive storage
- LIMS Compatible

Part Number Description for simultaneous sulfur cell

1	CM210-031	Complete Simultaneous Sulfur Cell	
2	CM119-078	Anode Top Assembly	
3	CM111-083	Thumb Screws	
4	CM118-442	Anode Top	
5	CM153-035	O-Ring, EPDM, -138	
6	CM153-036	O-Rings, Silicone, -111	
7	CM210-030	Cell with Ring Attached	
8	CM119-077	Cathode Top	
9	CM101-135	Platinum Electrode	
10	CM101-136	Cell Outlet Tube	
11	CM101-209	Cell Inlet Tube	
12	CM101-210	Platinum Electrode w/ Pin Plug	
13	CM101-275	Detector Electrode	
14	CM121-006	Stir Bar, 1-1/2"	
15	CM191-057	Nut, Flangeless, 1/4"	
16	CM191-058	NOT SHOWN- Ferrule, Flangeless, 1/4"	
17	CM191-059	Nut, 5/16-24, PEEK	
18	CM191-060	NOT SHOWN- Ferrule, Flangeless, 1/8"	
19	CM191-061	Nut, Flangeless, 5/16"	
	CM129-120	NOT SHOWN- Ferrule, ETFE, 7mm	
	18	CM200-062	Dispersion Tube
	19	CM191-001	Union, 1/4" x 1/8"

By Coulometric Detection



CM5017 CO₂ Coulometer

No user calibration
 Wide, linear dynamic range
 Readability to 0.01 µg Carbon
 User selectable display units
 12.1" fast-responding touch screen
 USB Flash Drive storage
 LIMS Compatible

Part Numbers

CM5017-01 110V, 50/60Hz
 CM5017-02 220V, 50/60Hz

Applications include: Instrument used to measure carbon as CO₂ in a carrier gas with coulometric precision.

The CM5017 measures carbon as CO₂ in a carrier gas. The gas stream is bubbled into a coulometric titration cell which contains a CO₂-sensitive ethanolamine solution. There, CO₂ reacts to form a strong, titratable acid. That acid, in turn, causes the ethanolamine solution's coulometric pH indicator to fade from blue to clear. The CM5017 photometer recognizes this color change and automatically prompts the instrument to initiate a current within the cell.

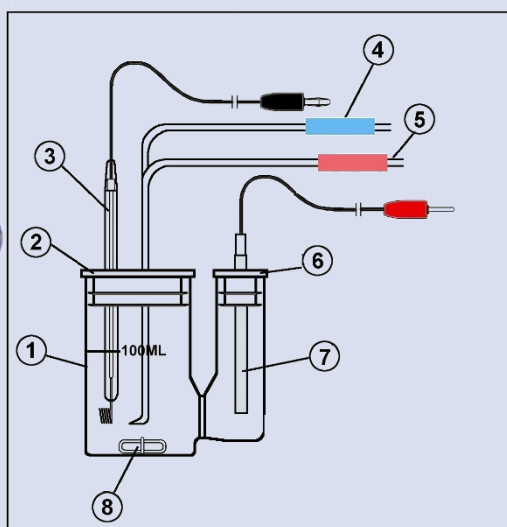
The current electrochemically generates a neutralizing base at a rate roughly comparable to 1500 micrograms of carbon per minute. As base is produced, the pH of the cell solution gradually returns to its initial level and the colorimetric indicator returns to blue. The current generated in this 100% efficient coulometric process is integrated to determine the total energy required. Using Faraday's Law of Electrolysis, the total charge used in the titration is directly proportional to the amount of CO₂ initially absorbed by the ethanolamine solution.

The automatic CM5017 allows the analyst to select the type of analysis to be run, as well as other user selectable parameters. Names, weights, volumes or areas of up to 50 samples can be entered, to be used by the CM5017 in calculating the final result.

Analytical progress is digitally displayed in user selectable units and a detailed data is displayed while each sample is running. A summary report is displayed on the touch screen during and after sample analysis runs.

Detailed analysis data and parameters are automatically saved to USB Thumb Drive. Data can also be transferred through the serial and Ethernet ports located on the left side of the instrument for further data processing.

* An optional printer is available for detailed hard copy of data as well.



CM210-032 – Titration Cell includes:

1. CM200-051 – Titration Cell with Side Arm
2. CM119-027 – Cathode Top, White Teflon
3. CM101-135 – Platinum Electrode (black lead)
4. CM190-020 – Gas Inlet Tube (blue tag)
5. CM190-021 – Gas Exit Tube (red tag)
6. CM119-028 – Anode Top, White Teflon
7. CM101-033 – Silver Electrode (red lead)
8. CM121-001 – Stir Bar

CM310-001 – Cell Reagent Kit includes:

- CM300-001 – Carbon Cathode Solution (1 gallon)
- CM300-002 – Carbon Anode Solution (16 ounces)
- CM300-003 – Potassium Iodide (50 grams)

CM5017S – SO₂ Coulometer

By Coulometric Detection

Applications include:

Instrument used to determine total sulfur, SO₂ and H₂S in a solution with coulometric precision.

The CM5017S quantitatively titrates SO₂ and H₂S. Typical applications include the determination of total sulfur (by combustion) and the determination of SO₂ and H₂S (by acid evolution). The coulometer cell is filled with a solution which initially contains a slight excess of free iodine. When SO₂ or other reducing substances enter the cell, iodine is consumed. The amperometric-sensing circuit detects the deficiency of iodine in the solution and causes iodine to be electrically generated at a rate proportional to the sensed deficiency. When all of the substance has been titrated, the iodine is restored to its initial concentration, and the quantity of the titration is read directly on the display in user-selectable units. Since the coulometric efficiency is 100 percent, sample calibration is not necessary. The linear range and accuracy of the coulometric technique exceeds that obtained by other detection methods.



CM5017S SO₂ Coulometer

- No user calibration
- 100% efficient coulometric detection
- Wide, linear dynamic range
- High reliability
- High sensitivity
- Rapid analysis time of 8-10 minutes
- User selectable display units
- 12.1" LCD Touch Screen
- Keyboard for rapid Sample Data entry
- USB Flash Drive Storage
- LIMS Compatible
- User friendly
- Minimum maintenance

Part Numbers

CM5017S-01 110V, 50/60Hz

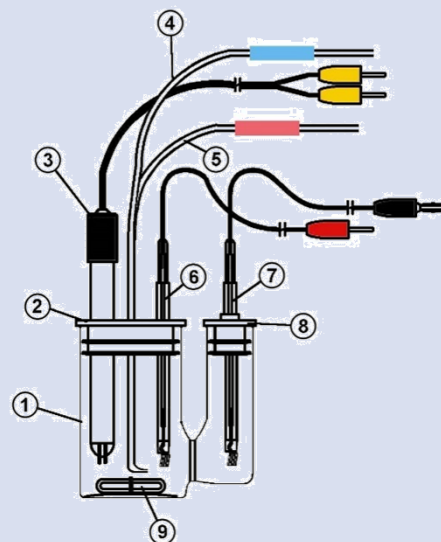
CM5017S-02 220V, 50/60Hz

CM210-032 – Titration Cell includes:

1. CM200-051 Cell w/ side arm
2. CM119-040 Anode Top, Teflon
3. CM101-275 Detector Electrode
4. CM190-020 Cell Inlet Tube
5. CM190-021 Cell Outlet Tube
6. CM101-210 Platinum Anode
7. CM101-135 Platinum Cathode
8. CM101-213 Cathode Top, Teflon
9. CM121-006 Stir Bar, 1.5"

CM310-002 –Cell Reagent Kit includes:

- CM300-026 – Sulfur Anode Solution (4 quarts)
- CM300-027 – Sulfur Cathode Solution (1 quart)



Dissolved Inorganic Carbon (DIC) in Sea Water
For use with SOMMA and VINDTA systems



CM50170 CO₂ Coulometer

- No user calibration
- 100% efficient coulometric detection
- Wide, linear dynamic range
- Readability to 0.01 µg Carbon
- Relative standard deviations of < 0.2% for standard certified materials
- 12.1" LCD Touch Screen
- Typical analysis time of 8-10 minutes

Part Numbers

CM50170-01 110V, 50/60Hz

CM50170-02 220V, 50/60Hz

The Coulometer uses coulometric detection. The carbon Coulometer measures carbon as CO₂. The gas stream resulting from the VINDTA unit is bubbled through the coulometer analytical cell. The carbon coulometer solution contains ethanolamine and a colorimetric pH indicator. The CO₂ from the gas stream reacts with the ethanolamine forming a strong titratable acid, causing the color indicator to fade. The coulometer photometer recognizes this condition and initiates the electrochemical generation of electrons returning the solution to the original color. The current for this 100% efficient coulometric process is integrated and digitally displayed in user selected units. The Oceanographic unit is supplied with the CM5011 Emulation firmware necessary to allow direct connection to the VINDTA software. No other software is required.

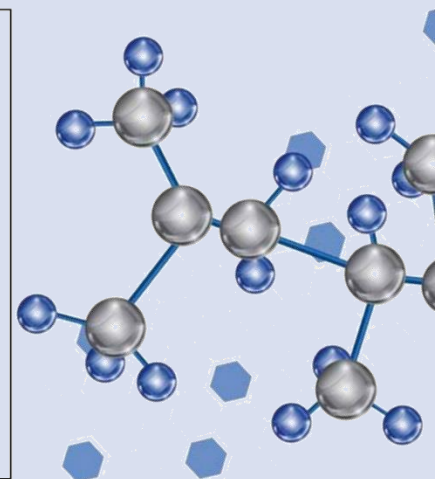
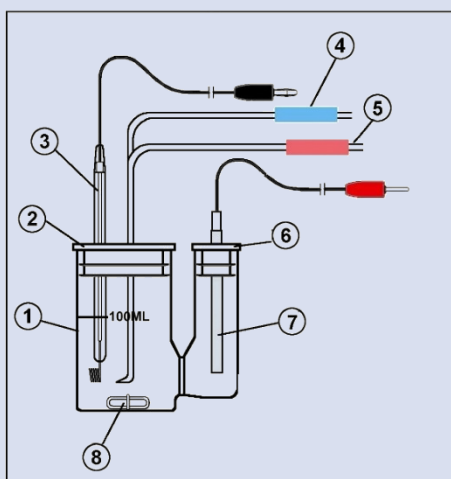
The CM50170 Coulometer sits on a conventional lab bench capable of supporting 40 lbs. The Coulometer stands 12" wide by 12" high by 19.2" deep. The instrument is constructed of aluminum and steel. The unit is designed with a cell compartment, power switch, cell current switch, and a 13.3 x 12.1" LCD touch screen to act as the user interface to the instrument. The instrument is supplied with an analytical cell assembly, power conditioner, power cord with a NEMA 5-15 plug and an RS232 serial cable. The unit is also supplied with a set of cell reagents and operation manual. The unit when supplied for 110-120V 50/60 HZ operation requires one AC circuit capable of supplying 1.5 amps.

CM210-032 – Titration Cell includes:

1. CM200-051 – Titration Cell with Side Arm
2. CM119-027 – Cathode Top, White Teflon
3. CM101-135 – Platinum Electrode (black lead)
4. CM190-020 – Gas Inlet Tube (blue tag)
5. CM190-021 – Gas Exit Tube (red tag)
6. CM119-028 – Anode Top, White Teflon
7. CM101-033 – Silver Electrode (red lead)
8. CM121-001 – Stir Bar

CM310-001 –Cell Reagent Kit includes:

- CM300-001 – Carbon Cathode Solution (1 gallon)
- CM300-002 – Carbon Anode Solution (16 ounces)
- CM300-003 – Potassium Iodide (50 grams)



Technical Differences between CM50170 and CM5017 Oceanographic CO₂ Coulometers

1. Touch screen - New touch screen streamlined for Oceanographic application.
2. Emulation Standard - CM50170 is supplied with CM5011 Emulation as standard and only program.
3. 50 mA Optimization – Instrument is supplied with 50 mA cell current. Instrument is optimized so that the full analytical measuring range of the A to D converter is used for the 50mA cell current. Instrument can only be used with a 50-mA cell current.
4. Open Cell Compartment- Instrument is supplied with an external open style cell compartment and associated Cell assembly for ease of use and compatibility to older style CM5011 configuration.

CM5330 – Acidification Module

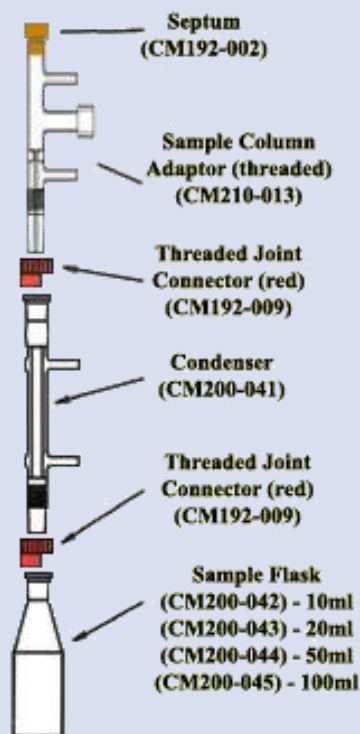
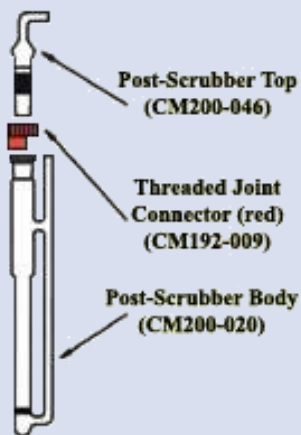
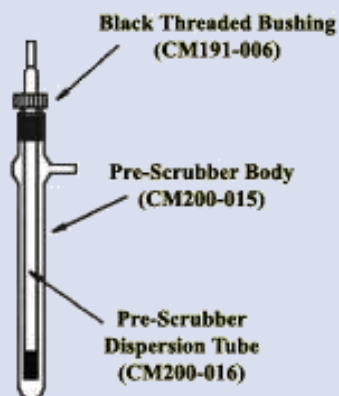
Applications include:

Analysis begins with the introduction of a solid or liquid sample into the sample flask located at the base of the sample column assembly. While pre-weighted solid samples are typically introduced directly into the sample flask, liquid samples are usually introduced by syringe injection through the septum located at the head of the sample column assembly.

Following sample introduction, a CO₂-free carrier gas is used to purge the system of any atmospheric CO₂ that may have been introduced with the sample. A pre-scaled volume of acid is then added to the sample flask through a single pump of the acid dispenser and sample acidification is complete.

Using the built-in heater and magnetic stirrer to facilitate more efficient digestion of the sample, pre-scrubbed carrier gas transports all volatile digestion products through a post-scrubber and into the reaction cell of a CM5017 CO₂ coulometer. There inorganic carbon present as CO₂ is measured automatically by a 100% efficient coulometric titration.

When used for the determination of sulfur (by the Monier-Williams procedure), similar steps are taken to achieve the evolution of sulfur as SO₂ which is, in turn, automatically titrated in the reaction cell of a CM5017S coulometer.



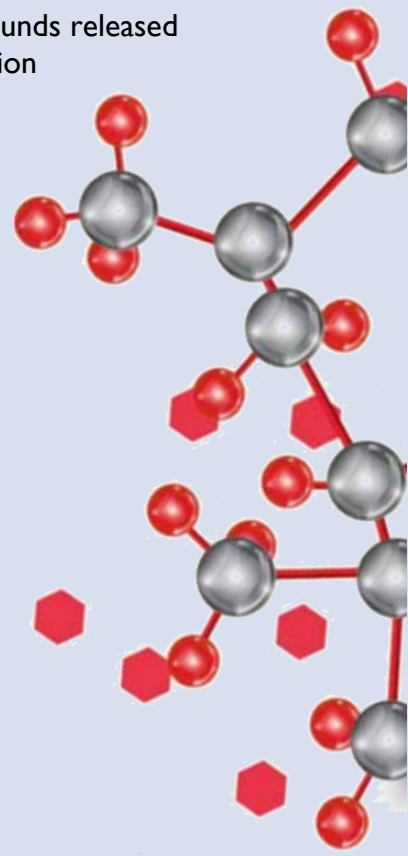
Part Numbers

CM5330-01 110V, 50/60Hz

CM5330-02 220V, 50/60Hz

CM5330 Acidification Module

- 10, 25, 50 or 100 ml reaction vessels
- Selectable volume acid dispenser
- Internal air pump with flow controller
- Controlled sample heating and stirring
- Pre-acidification scrubber for removal of CO₂ from carrier gas
- Post-acidification scrubber for removal of interfering compounds released during sample digestion





CM5240 TIC Autosampler

- 45-position carousel
- Low dead volume reaction chamber
- Self-cleaning
- Pre-acidification scrubber for removal of CO₂ from carrier gas
- Post-acidification scrubber for removal of interferences released during sample digestion
- Controlled sample heating

Applications include:

Samples are initially weighed into disposable Teflon cups and loaded into a 45-position sample carousel. For more volatile liquid samples, the carousel compartment can be purged with nitrogen. As the carousel rotates, each sample drops from the carousel into a small slider valve where it is purged with inert carrier gas to eliminate atmospheric CO₂.

Once purged, the sample moves automatically into the acidification chamber where it is digested. A second stream of carrier gas transports the digestion products through a series of post-scrubbers to remove potential interferences

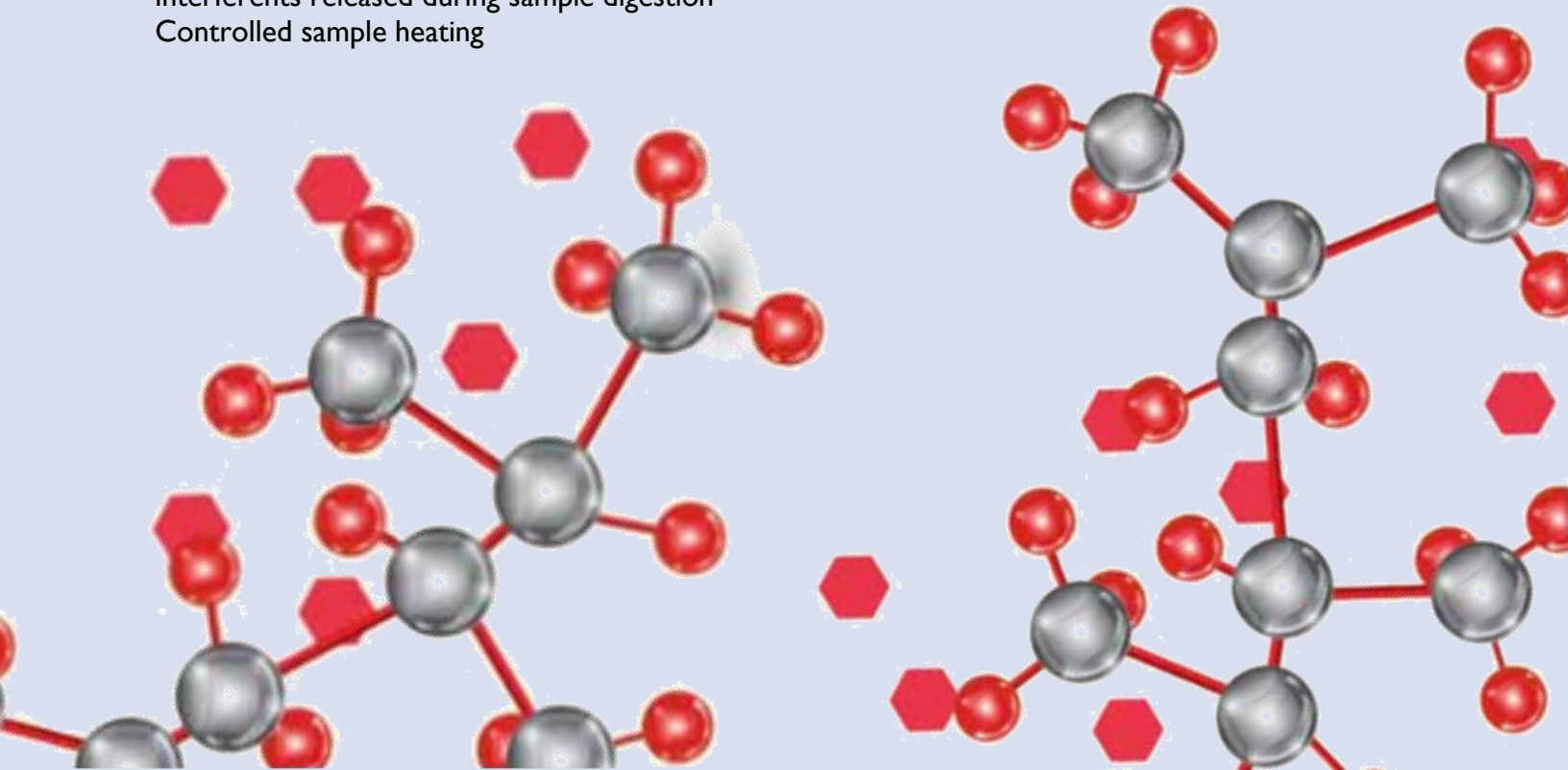
and ultimately into the reaction cell of a CM5017 CO₂ or CM5017S coulometer where inorganic carbon evolved as CO₂ or sulfur as SO₂ is automatically measured by a 100% efficient coulometric titration.

A heated condenser is provided for the more efficient digestion of difficult samples.

Part Numbers

CM5240-01 110V, 50/60Hz

CM5240-02 220V, 50/60Hz





CM5700B TIC Autosampler

- 15- or 30-position carousel
- Self-cleaning
- Pre-acidification scrubber for removal of CO₂ from carrier gas
- Post-acidification scrubber for removal of interferences released during sample digestion
- Controlled sample heating and stirring

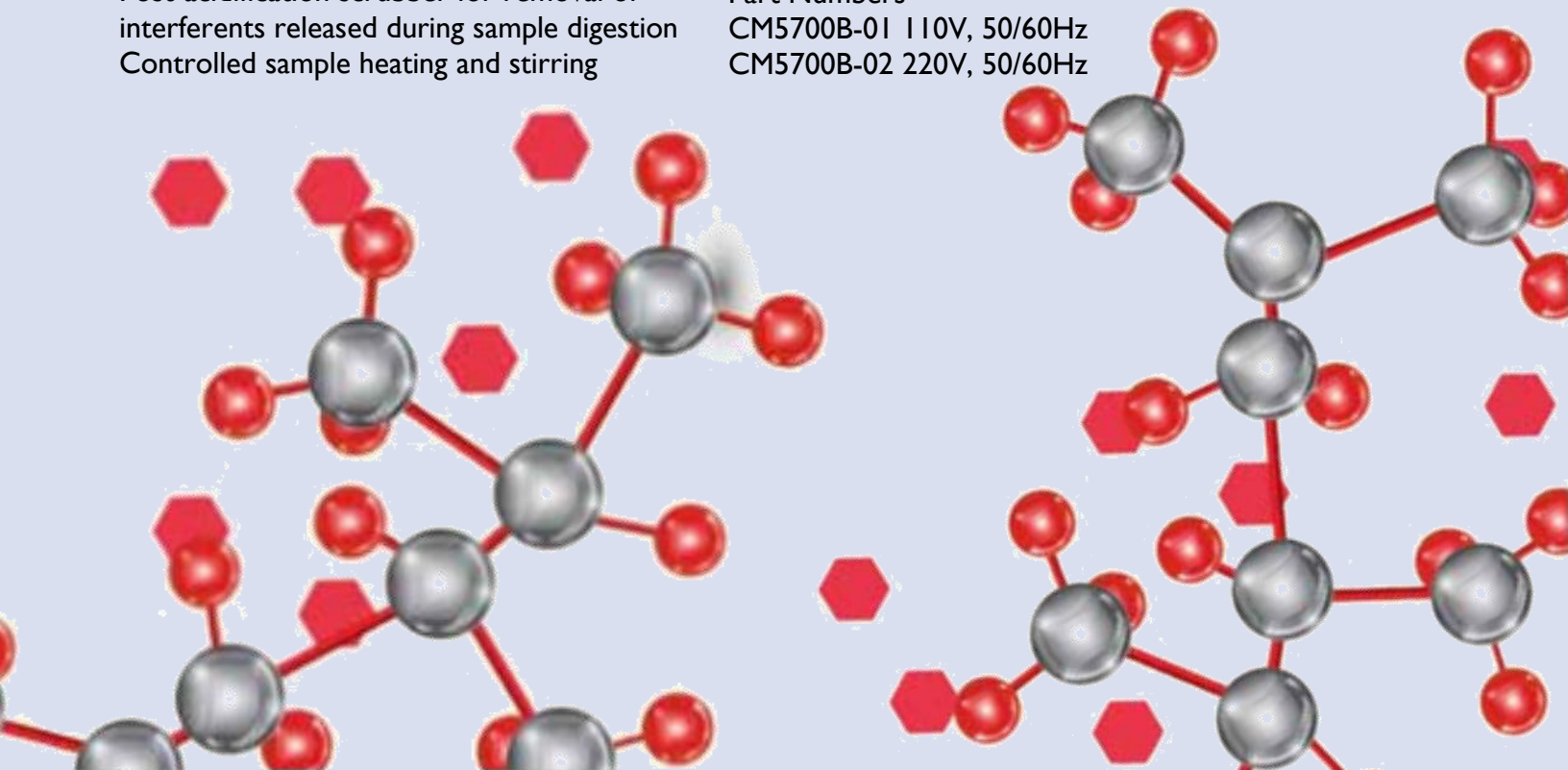
- Part Numbers
 CM5700B-01 110V, 50/60Hz
 CM5700B-02 220V, 50/60Hz

Applications include: Soils, sediments, geological materials, sludges, water, wastewater, coals, ceramic powders, column packing materials, etc.

CONFORMS TO ASTM D 513

The CM5700B TIC is an automated front-end acid digestion instrument used to convert inorganic carbon species into CO₂ and deliver it to the coulometer cell. It has a built in stirring and heating block, where sample flasks are lowered in one by one, that goes up to 180 deg C.

Samples can be either weighed into reusable Teflon™ cups that are thereafter placed into glass sample flasks or weighed directly into the flasks. Up to 15 samples (with 80 ml flasks) or 30 samples (with 20 ml flasks) can be analyzed in a single run. The CM5700B is interfaced with a CM5017 CO₂ Coulometer but is also compatible with a previous model CM5015.

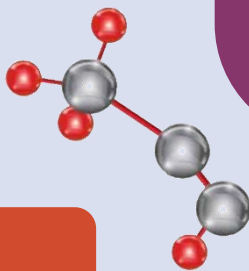




Part Numbers
 CM5300-01 110V, 50/60Hz
 CM5300-02 220V, 50/60Hz

CM5300 Horizontal Furnace:

Programmable up to 1100° C
 Pre-combustion scrubbers for removal of interferences from oxygen carrier gas
 Post-combustion scrubbers for removal of interfering gases formed during sample combustion
 Sample introduction using porcelain boats and manipulator rod



Applications include:

Total sulfites in foods, dissolved SO₂ and H₂S in amine scrubbing solutions, and sulfites in geological materials and wallboard. Solids and slurries are initially weighed into platinum or porcelain “boats” which are then placed into a quartz ladle. Liquid samples up to 200 µl are drawn into a constant rate syringe. The analysis is initiated by introducing the sample into the oxygen rich atmosphere of the high-temperature (typically 950°C) sample combustion zone. In that environment, all carbon within the sample is rapidly oxidized to CO₂.

A pre-scrubber removes any trace CO₂ from the carrier gas, while interfering combustion products (including sulfur oxides, halides, water and nitrous oxides) are removed by a series of post-combustion scrubbers. The resulting carbon dioxide is then swept into the reaction cell of a CM5017 CO₂ analyzer where it is automatically titrated by a 100% efficient coulometric process.

CM5390 – Automated Boat Inlet

Applications include:

The Automated Boat Inlet has a large, easy to access sample entry box, user selectable sample entry speeds, variable purge time setting and an integrated flowmeter. The CM5390 replaces the traditional “dog houses” and breech block assemblies found on UIC’s standard analytical systems. The CM5390 eliminates the need to remove and replace breech block caps to insert and retrieve sample ladles. This also eliminates the chance of breaking any sample ladles. Sample is weighed, place it into the sample entry box, lid is closed & latched, and the analysis is then started. The system is automatically purged of atmospheric CO₂. The sample is then automatically introduced, analyzed and retracted with no user input. The CM5390 Automated Boat Inlet is designed to provide enhanced ease-of-use and analytical reproducibility. It is used in conjunction with the CM5300 high-temperature furnace and either the CM5017 or CM5016 coulometer to provide an improved method of sample introduction.

CM5390 Automated Boat Inlet features:

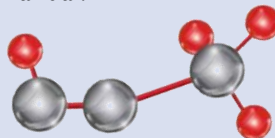
- Improved Sample Introduction
- Solid or Liquid Samples
- Eliminates Ladle Breakage
- Controlled Sample Handling



CM5390

CM5390-01-Includes:

- CM5390 base unit
- CM211-019 combustion tube
- CM201-040 ladle entry tube
- CM201-042 hook ladle
- 3 x CM251-005 large porcelain boats
- Accessories
- Power cord for 115V operation and operation manual.



CM5390S-01-Includes:

Same as CM5390-01, except equipment for use with total sulfur systems.

Part Number:

- CM5390-01 for 115V / 50/60Hz
- CM5390-02 for 230V / 50/60Hz
- CM5390S-01 for 115V / 50/60Hz
- CM5390S-02 for 230V / 50/60Hz



CM5390S

Applications include:

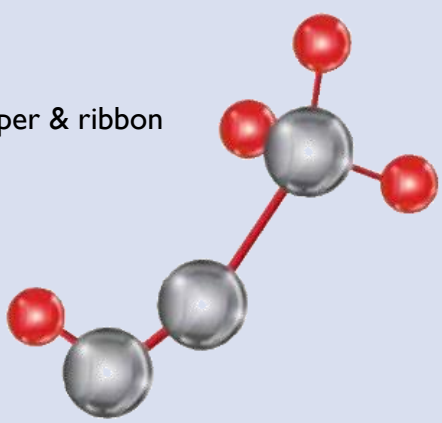
Total Carbon or Total Organic Carbon can be determined using a high-temperature combustion process. Using the CM5200 Autosampler Furnace, samples are encapsulated in tin boats and introduced via the 29-position auto sampler. At a typical temperature of 950°C, all carbon in the sample is oxidized to form CO₂. At lower furnace temperatures, organic carbon can be selectively oxidized. Inorganic carbon can be determined by difference. A pre-scrubber removes any trace CO₂ from the carrier gas, while interfering combustion products (including sulfur oxides, halides, water and nitrous oxides) are removed by a series of post-combustion scrubbers. The resulting carbon dioxide is then swept into the reaction cell of a CM5017 CO₂ analyzer where it is automatically titrated by a 100% efficient coulometric process. When necessary, a second heated zone can be used to control the temperature of combustion catalysts independently.

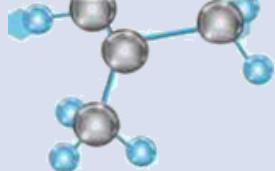

CM5200 Autosampler Furnace Module

Two independent combustion zones programmable up to 1100°C
 29-position sample carousel
 Post-combustion scrubbers for removal of interfering gases formed during sample combustion

Part Numbers
 CM5200-01 110V, 50/60Hz
 CM5200-02 220V, 50/60Hz

**Printers:**

- CM124-078 – Printer, 3" format impact printer, cable, power supply, paper & ribbon
 - CM199-006 – Printer paper for CM5014 (250 sheets)
 - CM199-007 – Ribbon, KXP2130 printer for CM5014
 - CM199-009 – Printer ribbon for CM124-078 printer
 - CM199-010 – Paper 3" wide roll for CM124-078 printer
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cart at www.uicinc.com

SHIPMENT:

Orders are shipped F.O.B. Joliet, Illinois, USA. Shipping charges will be prepaid and added to the invoice or may be billed "collect" to a customer's shipping account. Unless rush delivery or specific handling is requested, UIC will ship via the shipper of our choice. Please specify within the purchase order whether freight insurance is desired.

CLAIMS:

Although great care is taken to package your order, we realize that a package may be lost or damaged in transit. If this occurs, please note the damage on the delivery receipt and obtain an inspection report from the shipper immediately. Within 10 days of receipt, please contact UIC Inc. to arrange for the return or replacement of the part(s).

PAYMENT:

U.S.A. & Canada orders from existing customer accounts in good standing will be accepted at net 30 days from the date of invoice. UIC, Inc. reserves the right to modify these terms in the case of payment delinquency. Additional handling charges may be added to orders totaling less than \$50.00. Outside the U.S.A. & Canada, please contact UIC Inc. for specific details.

LOCAL SAFETY STANDARDS AND REGULATIONS:

Products sold by UIC, Inc. are designed to meet stated U.S. safety standards and regulations. Because local safety standards and regulations vary significantly, UIC Inc. cannot guarantee that our products meet all applicable requirements in each locality. The purchaser assumes responsibility for compliance with such safety standards and regulations in those localities in which the products will be shipped, sold and used.

OSHA HAZARDOUS SUBSTANCE PRODUCT INFORMATION:

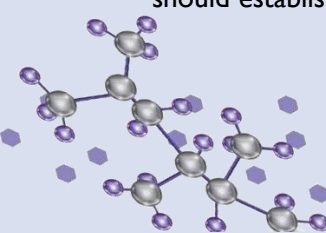
For your convenience, Material Safety Data Sheets are enclosed with all orders that require and MSDS under the Hazard Communication Standard (1910.1200). If you would like a specific Material Safety Data Sheet before you order, please contact UIC Inc. with your request.

LIMITED WARRANTY:

UIC Inc. warrants its "Coulometrics" instruments for one year from the date of shipment unless specifically stated otherwise. This includes the cost of repair or replacement, at UIC's option, of any equipment that proves to be defective during the warranty period. Consumable parts are warranted for defects in materials and workmanship for a period of 30 days. Please contact UIC Inc. for a complete copy of our warranty statement.

CUSTOMER ACCOUNTS:

New customers should contact UIC Inc. to obtain credit approval and establish an account number. This account number should be used on subsequent inquiries in order to avoid processing delays. Companies with multiple sites should establish a separate account for each site which intends to order from UIC Inc.





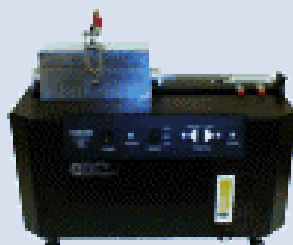
CM5017



CM5300



CM5330



CM5390



CM5200



CM5380



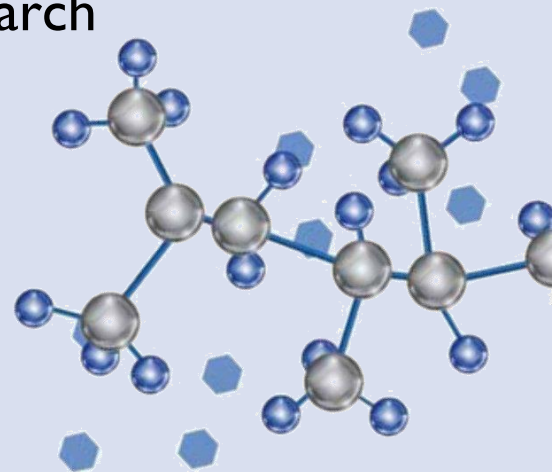
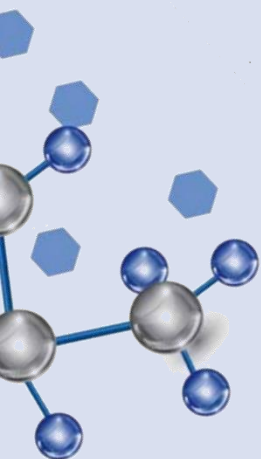
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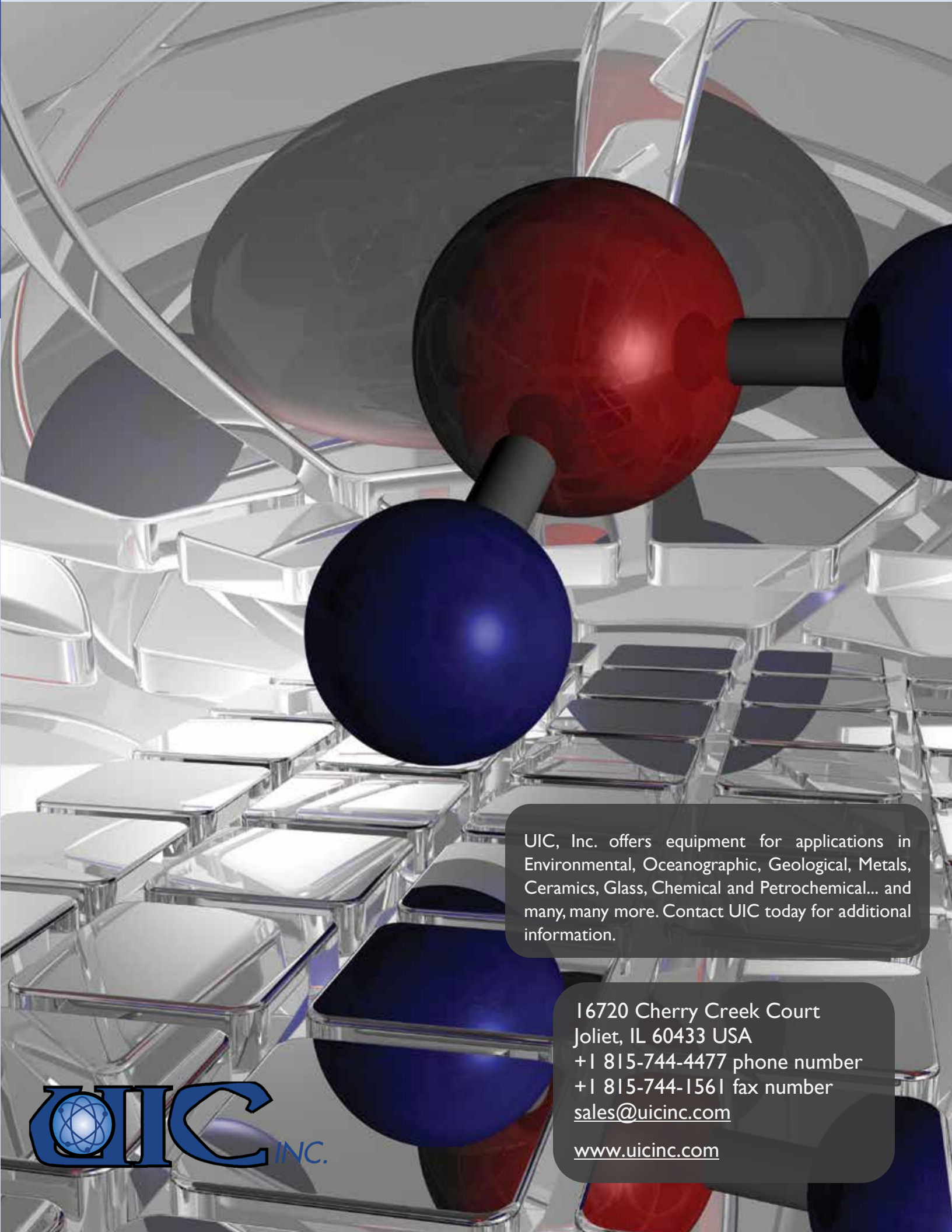


CM5700B

UIC offers additional instrumentation, equipment and services for applications in:

- Geology
- Oceanography
- Marine and freshwater research
- Environmental Analysis
- Cleanliness Verification
- And many other fields...





UIC, Inc. offers equipment for applications in Environmental, Oceanographic, Geological, Metals, Ceramics, Glass, Chemical and Petrochemical... and many, many more. Contact UIC today for additional information.

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