

## Total Sulfur Analysis

**By Combustion and Coulometric Detection**

*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. UIC's analyzers are rugged, accurate and adaptable to most applications. They are used extensively in industrial, research and educational laboratories worldwide. The CM320 system includes the following components pictured above:

### CM5014S SO<sub>2</sub> Analyzer

- No user calibration
- Wide, linear dynamic range
- Readability to 0.01 ug Sulfur
- User selectable display units
- Floppy disk drive for archiving data

### CM5380 Dual Zone Furnace with CM5382 Sample Introduction Kit

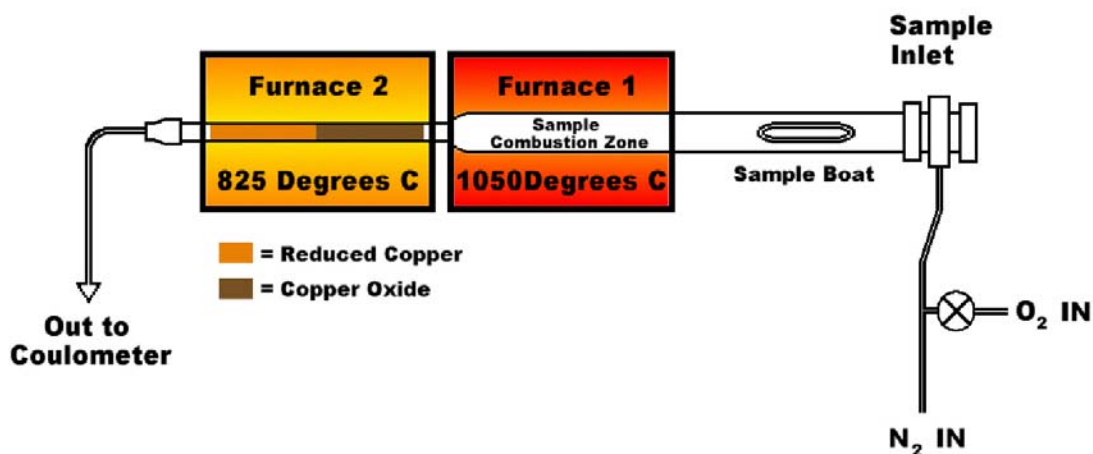
- Programmable up to 1100°C
- Separate catalyst zone
- Automated oxygen dosing
- Split-tube furnace design for easy maintenance

### Instrument Capabilities

A major advantage of the CM320 Total Sulfur Analyzer is the use of coulometric detection. Employing the principles of Faraday's Law, the CM5014S SO<sub>2</sub>/H<sub>2</sub>S Analyzer automatically measures the absolute mass amount of sulfur dioxide and/or hydrogen sulfide evolved from a combusted sample. No user-calibration is required and linear detection is available from less than 1 ug sulfur to over 10,000 ug sulfur. Using this 100% efficient coulometric process, relative standard deviations of 0.2% or better are common for standard reference materials. For smaller concentrations, an absolute deviation of approximately 1 ug S is typical.

Sample sizes can range from 0.5mg to 10 grams with concentrations from 1ppm to 100%. Analysis times of 5-7 minutes are typical

## Principles of Operation



### Total Sulfur

Samples are weighed into a ceramic combustion boat, covered with a vanadium pentoxide accelerator, and transferred into the combustion furnace at 1050°C. The sample, in the presence of the accelerator and added oxygen, combusts to form SO<sub>2</sub> in equilibrium with SO<sub>3</sub>. This mixture is then conveyed by the nitrogen carrier gas into a second furnace at 825°C and passed over reduced copper, quantitatively converting all SO<sub>3</sub> to SO<sub>2</sub>, which is subsequently conveyed to the coulometric cell of the detector. There, the resulting sulfur dioxide and/or hydrogen sulfide is automatically measured using absolute coulometric titration.

### Data Handling

Names, weights, volumes or areas of up to 50 samples can be entered, to be used by the CM5014S in calculating the final result. Analytical progress is digitally displayed in user-selectable units. A detailed report is printed while each sample is running that includes the final result. Upon completion of a series of samples, a one page report will print, summarizing the analysis of all 50 samples. The results can also be stored to diskette for further data handling.

## Ordering Information

### CM320 - Total Sulfur Analyzer

**Includes:** CM5014S SO<sub>2</sub> Coulometer, CM5380 Dual Zone Furnace, and CM5382 Sample Introduction Kit with tools and accessories for the analysis of solid samples. (P/N CM320-01 110V, 50/60Hz) (P/NCM320-02 220V, 50/60Hz)

### Optional Equipment:

**CM5390 Automated Boat Inlet** – Automates the sample purge and introduction/withdrawal cycles of the sample combustion process. See the CM5390 specification sheet for more details.



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