



## CS Box Tube Analyzer

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CSBox Tube CS Analyzer is used to determine Carbon and Sulfur in Organic samples like Coal, Coke, fuel oils, soil, Waste samples, Biomass and other Organic samples.

The analyzer provides simultaneous Carbon and Sulfur determination with minimal sample preparation. It consists of two independent IR cells with a wide measuring range of Carbon and Sulfur. The measuring range of each IR cell is modified to the user's specific requirement to ensure optimum measurement conditions for each application.

CSBox Tube is supplied with a comprehensive software package which includes statistical reports, diagnostics features and other functions.



## Theory of Operation - CS Box Tube Analyzer

CSBox Tube CS is computer-controlled instrument used for simultaneous determination of Carbon & Sulphur in a wide variety of Organic materials like coal, coke, oils, feed & biomass, cement, soils & more.

The Analyzer employs high-temperature combustion followed by non-dispersive infrared detection. The sample is weighed (generally 100 mg) into a ceramic combustion boat and is then combusted in a pure oxygen environment where temperatures up to 1500 deg C are maintained.

During combustion the Carbon & Sulphur present in sample material forms Carbon Dioxide ( $\text{CO}_2$ ) & Sulfur Dioxide ( $\text{SO}_2$ ). The Unique design of the Analyzer prevents any atmospheric gases to enter combustion zone.

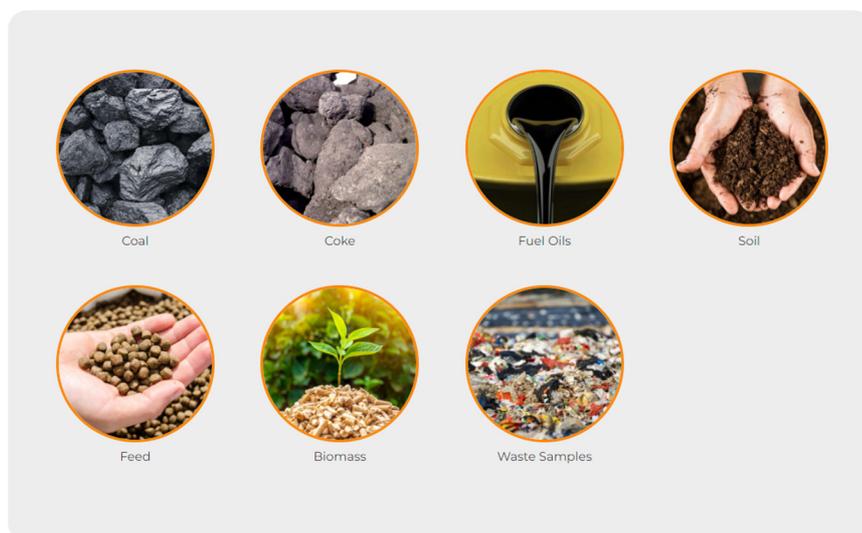


The  $\text{CO}_2$  &  $\text{SO}_2$  gases are selectively passed through glass tubes filled with Magnesium Perchlorate to trap moisture. The sample gases free of moisture are passed through two independent Non-Dispersive Infrared Detectors (NDIR) cells.

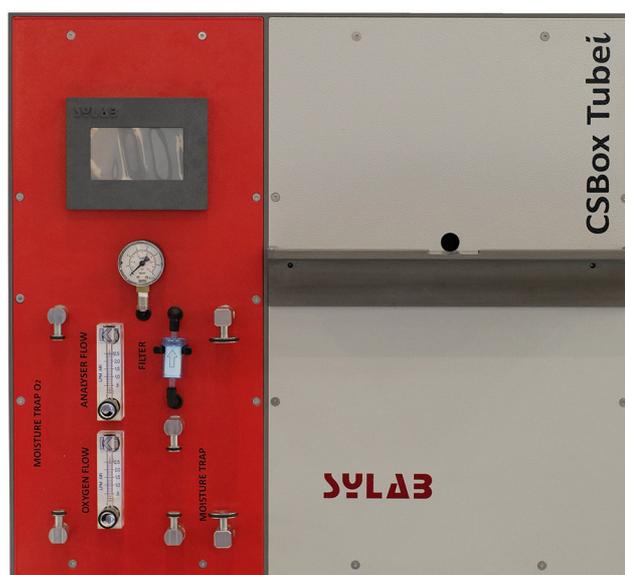
The Sulfur IR cell measures the concentration of  $\text{SO}_2$  gas & Carbon IR cell measures the concentration of  $\text{CO}_2$  gas. The analyzer converts these values to percentages/ppm concentration.

NDIR cells work on the principle that the  $\text{CO}_2$  &  $\text{SO}_2$  gases absorb Infrared(IR) energy at unique wavelengths of the IR spectrum.

### Typical Sample Materials



## CS Box Tube Analyzer



For Organic Samples by High Temperature Resistance Furnace

## Highlights of the CSBox Tube CS Analyzer

- **High temperature horizontal resistance tube furnace for wide range of sample combustions**

Temperature ramp rates are programmable for faster heating. Concentric ceramic furnace tube with ceramic lance directing the oxygen to the sample to ensure complete combustion and rapid analysis times. Better gas flow control to increase the furnace life and reliability of combustion.

- **High throughput. Fast analysis times**

The CSBox Tube CS guarantees long lifetime of the individual components. High throughput, fast analysis times and an easy-to-use software help you reduce costs and increase productivity.

- **Measurement across a broad concentration range**

Customized IR cells provide a wide, dynamic measuring range. The "Stainless steel" IR path provides increased cell lifetime for analysis of halogen or acid-containing samples. The analyzer uses static emitters and static detectors for a better signal-to-noise ratio. The detector is pyroelectric, 100% static and non-dispersive.



## Product Details

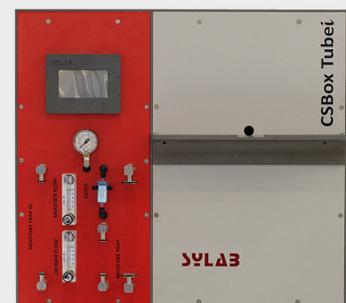
### Features

- Unique user-friendly design where the furnace is isolated from the Infrared analyzer to improve the life of the NDIR analyzer.
- High-efficiency horizontal resistance tube furnace.
- Programmable furnace temperature and ramp rate.
- Customized IR cells provide a wide, dynamic measuring range.
- Fast and simultaneous analysis of Carbon and Sulphur  
Wide measuring range from 50 ppm to 100%.

### Modes / Configurations

CSBox Tube is available in multiple modes/configurations based on the application and samples.

- CSBox Tube S (Only Sulphur Analysis)
- CSBox Tube C (Only Carbon Analysis)
- CSBox Tube CS (Both Carbon & Sulphur Analysis)



## Software

- CS software provides a complete solution for measurement of Carbon and Sulfur.
- It allows the user to have complete access to analysis control like method setup, reports, diagnostics, data analysis, graphs and other functions in a highly organized manner.
- It allows easy method setup with automatic sample weight transfer from analytical balance and leak check features
- Capable to capture weights from all reputed analytical balances.
- Software allows to set up different methods and user profiles with password protection facility.
- Instrument can be provided with external balance, printer and LIMS with customizable features.



## Technical Specification Sheet

<b>Furnace</b>	Horizontal Tube furnace
<b>Heating Elements</b>	Resistance type Silicon Carbide Heating Elements
<b>Maximum Temperature</b>	Up to 1500°C
<b>Temperature Accuracy</b>	± 2°C
<b>Detector</b>	Non-Dispersive Infrared Detection
<b>Measuring Range</b>	Carbon: 0.005 to 100% using 1g to 40 mg Sample Sulfur: 0.005 to 100% using 1g to 40 mg Sample
<b>Analysis Time</b>	60 Sec to 180 sec
<b>Sample Weight</b>	20 to 2000 mg Nominal Sample Weight is 100 mg (coal)
<b>Required Chemicals/Reagents</b>	Magnesium perchlorate (Anhydron) Glass Wool
<b>General Requirements</b>	
<b>Ambient Conditions</b>	15 to 35°C
<b>Relative Humidity</b>	20-80% (not condensing)
<b>Power Supply</b>	230V AC ± 10%; 50/60Hz; 16 A
<b>Gases</b>	Oxygen 99.95% purity

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