CS844 Carbon/Sulfur Determinator

Specification Sheet

Instrument Range*		
Carbon:	0.0006** to 60 mg	
Sulfur:	0.0006** to 60 mg	
Precision†		
Carbon:	0.0003 mg or 0.5% RSD, whichever is greater	
Sulfur:	0.0003 mg or 0.5% RSD, whichever is greater	
Calibration	Standards (single or multipoint); manual; gas dose	
Analysis Time	40 seconds (nominal)	
Cycle Time	130 seconds (nominal)	
Throughput	27 samples per hour (nominal)	
Sample Size	1 gram (nominal)	
Detection Method	Non-Dispersive Infrared Absorption	
Chemical Reagents	• Anhydrous Magnesium Perchlorate ($MgClO_4$)	
	• Sodium Hydroxide on an Inert Base	• Platinized Silica Gel
	• Rare Earth Copper Oxide	• Cellulose
Gas Requirements	Carrier: Oxygen, 99.5% pure, 35 psi (2.41 bar) ±10%	
	Pneumatic: Compressed Air (oil, water free), 40 psi (2.76 bar) ±10%	
	Dosing: Carbon Dioxide, 99.99% pure, 20 psi (1.38 bar) ±10%	
Gas Flow Rates	Carrier: 3 L/min	Pneumatic: 1 L/min
Furnace	Induction, 2.2 kW max (rampable 0 to 100% power), liquid cooled	
Coolant	300 mL LECO Coolant	
Operating Conditions	Operating Temp: 15 to 35°C (59 to 95°F)	Rel. Humidity: 20 to 80% (non-condensing)
Physical Dimensions††	33 in. H x 25.25 in. W x 29.5 in. D (84 x 64 x 75 cm) with touch-screen monitor	
Electrical Power Requirements	230 V~ (+10/-15% at Max Load); 50/60 Hz, single phase, 25 A; 5,500 BTU/hr‡	
Weight (approx.)	308 lb. (140 kg) with monitor	292 lb. (132 kg) without monitor

Part Numbers	
CS844-MC	Carbon/Sulfur Determinator with Windows®-based software, external PC, and flat-panel touch-screen display
CS844-C	Carbon/Sulfur Determinator with Windows®-based software and external PC

**Use the following formula to calculate element concentration:*
*% element concentration = ((absolute element mass in mg)/(sample mass in mg))*100*
***Lower range is calculated as 2 σ instrument blank deviation. Method range may differ due to factors such as sample type and method parameters.*
†Calculated as 1 σ instrument blank deviation. Method precision may differ due to sample inhomogeneity or other external factors.
††Allow for a 6 in. (15 cm) minimum access area around all sides.
‡Average output based on nominal operating parameters.
V~ denotes VAC.

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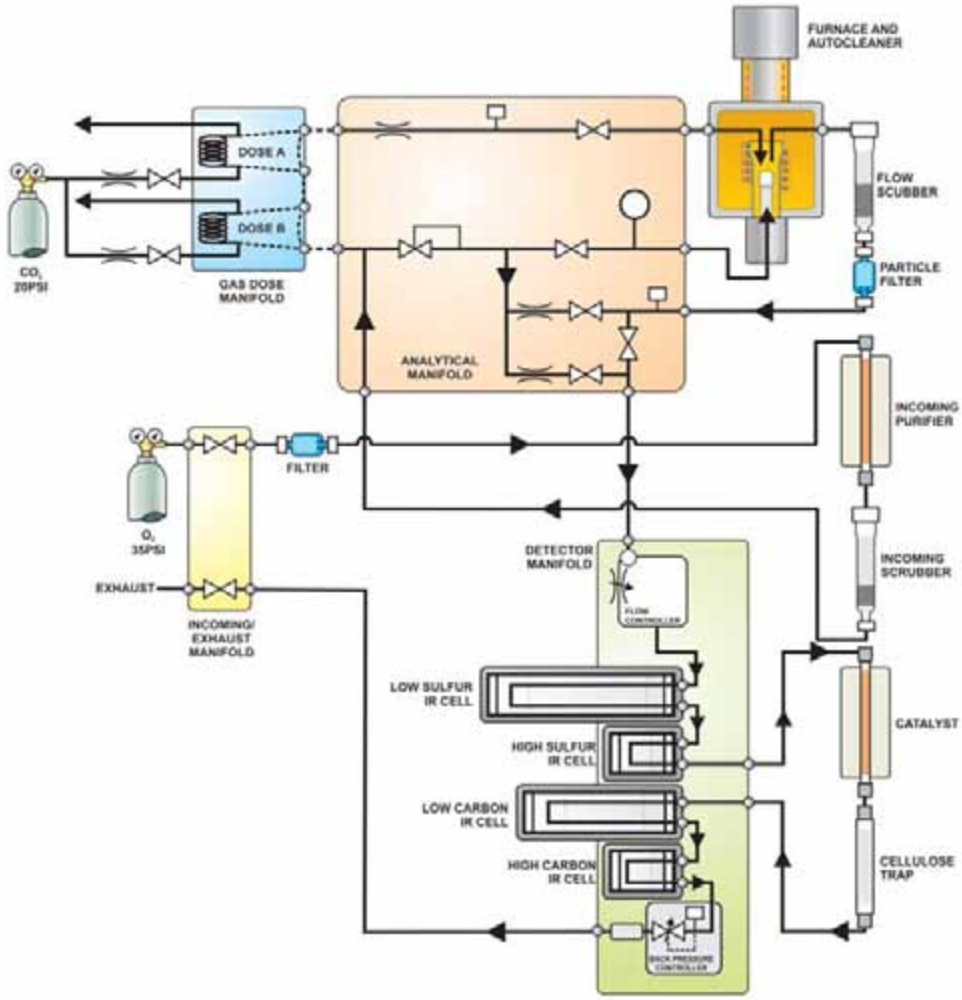
Theory of Operation

The CS844 Carbon/Sulfur system is designed for wide-range measurement of carbon and sulfur content of metals, ores, ceramics, and other inorganic materials.

A pre-weighed sample of approximately 1 gram is combusted in a stream of purified oxygen. Carbon and sulfur present in the sample are oxidized to carbon dioxide (CO_2) and sulfur dioxide (SO_2), and swept by the oxygen carrier through a heated dust filter, a drying reagent, and then through two non-dispersive infrared (NDIR) cells, where sulfur is detected as SO_2. The gas flow continues past a heated catalyst, where carbon monoxide (CO) is converted to CO_2 and where SO_2 is converted to sulfur trioxide (SO_3), which is subsequently removed by a filter. Carbon is then detected as CO_2 by a second pair of NDIR cells. A pressure controller is used to maintain constant pressure in the NDIR cells so as to reduce interference from natural variations in atmospheric pressure. The final component in the flow stream is an electronic flow sensor, which is used for diagnostic purposes to monitor the carrier flow.

Non-dispersive infrared cells are based on the principle that CO_2 and SO_2 absorb infrared (IR) energy at unique wavelengths within the IR spectrum. Incident IR energy at these wavelengths is absorbed as the gases pass through IR absorption cells. Since absorption is dependent upon the path length, short and long path-length IR cells are provided for measurement of high and low range signals. The software automatically selects which cell to use for optimum measurement. The concentration of unknown samples is determined relative to calibration standards. To reduce interferences from instrument drift, reference measurements of pure carrier gas are made prior to each analysis.

Flow Diagram



Specifications and part numbers may change.
Consult LECO for latest information.

LECO Corporation
3000 Lakeview Avenue • St. Joseph, MI 49085 • Phone: 800-292-6141 • Fax: 269-982-8977
info@leco.com • www.leco.com • ISO-9001:2008 HQ-Q-994 • *LECO is a registered trademark of LECO Corporation.*

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