CS600 Carbon/Sulfur Determinator
Specification Sheet

Instrument Range at 1 g*

Carbon:	0.6 ppm to 6.0%
Sulfur:	0.6 ppm to 0.4%

Precision**

Carbon:	0.3 ppm or 0.5% RSD; whichever is greater
Sulfur:	0.3 ppm or 0.5% RSD; whichever is greater

Readability†

Carbon:	0.001 ppm
Sulfur:	0.001 ppm

Calibration Standards (single or multi-point); manual; gas dose

Analysis Time 40 seconds nominal

Sample Size 1 g 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, 99.6% pure, 35 psi (2.4 bar) ±10%
Pneumatic:	Compressed Air, 40 psi (2.8 bar) ±10%, *source must be oil and water free*
Dosing (optional)	
Carbon:	Carbon Dioxide, 99.99% pure, 20 psi (1.4 bar) ±10%

Gas Flow Rates

Carrier:	3 liters/minute
Pneumatic:	1 liter/minute

Furnace Induction; 18 MHz, 2.2 kW maximum (rampable; 0 to 100% power)

Data Storage

Weight List:	No practical limit
Result List:	No practical limit

Printer (external) Color Deskjet Printer (optional)
Dot Matrix Printer (optional)

Environmental Conditions

Operating Temp:	50 to 86°F
Rel. Humidity:	20 to 80%, non-condensing

Single Furnace/Determinator Dimensions††
32 in. H x 28 in. W x 27 in. D (81 x 71 x 69 cm)

Electrical Power Requirements 230 V~ (±10%; at max load), 50/60 Hz, single phase, 20 A, 15,700 BTU/hr

Weight (approximate)

CS600	355 lb. (161 kg)
Total Shipping	405 lb. (184 kg)

Part Numbers

CS600C	Carbon/Sulfur Determinator with Windows®-based software, free-standing PC, and flat panel display

Options

618-430	Batch Loader Kit
625-511	Shuttle Loader Kit (SN 3185 and below)
625-512	Shuttle Loader Kit (SN 3186 and above)
621-434-110	Deskjet Printer Kit (110 V)
612-917	Dot Matrix Printer Kit (110 V); Serial
751-300-160	L-250 Balance and Interface Kit (0.1 mg)
750-000-160	L-050 Balance and Interface Kit (1.0 mg)
501-291	Oxygen Regulator
768-593	CO_2 Regulator
766-036	Air Regulator
615-763	SmartLine® Modem-Based Remote Diagnostics
710-198-B/O	SmartLine Internet-Based Remote Diagnostics
604-570-110	ADA-200 Automatic Accelerator Dispenser (120 V~, 60 Hz, 15 W)
604-570-120	ADA-200 Automatic Accelerator Dispenser (220 V~, 50/60 Hz, 15 W)
603-620	ADM-10 Manual Accelerator Dispenser
TF10	Dual-Tube Resistance Furnace (crucible burn-off)
TF-1	Single-Tube Resistance Furnace (crucible burn-off)

**The range may be extended beyond listed values.*
***One sigma, conformance tested by gas dose analysis.*
†Display capability.
††Allow a 6-inch (15 cm) minimum access area around all units.
V~ denotes VAC.

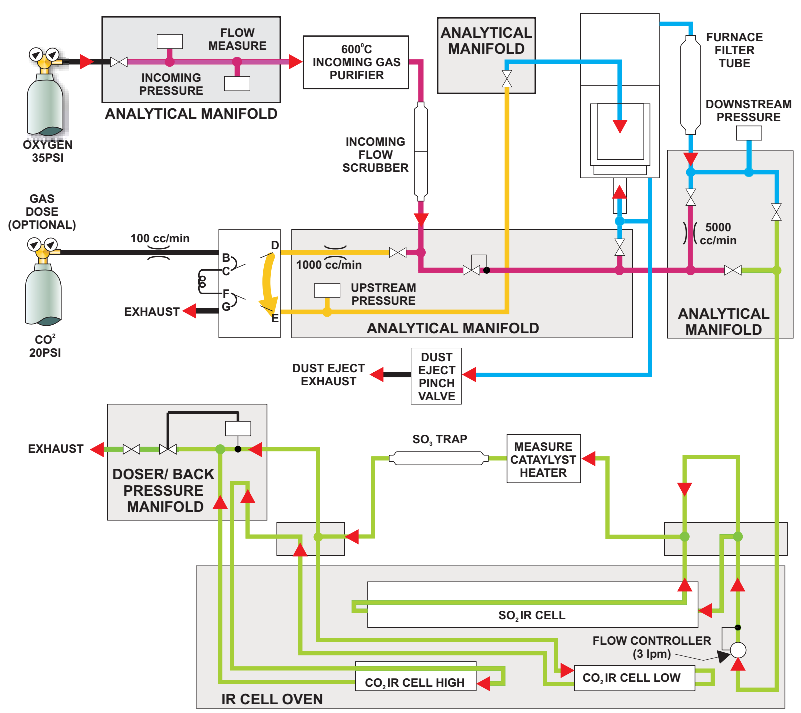
Theory of Operation

The CS600 Carbon/Sulfur system is designed for wide-range measurement of carbon and sulfur content of metals, ores, ceramics, and other inorganic materials. The instrument features a Windows®-based operating system.

A pre-weighed sample of ~1 gram is combusted in a stream of purified oxygen. The carbon in the sample is oxidized primarily to carbon dioxide (CO_2) with some carbon monoxide (CO) possibly being produced. The sulfur is oxidized to sulfur dioxide (SO_2). These gases are swept, along with the oxygen, through a dust filter and drying reagent into an infrared cell (IR) where sulfur is detected as SO_2. The gases are then routed through a heated catalyst which converts CO to CO_2 and SO_2 to sulfur trioxide (SO_3). The SO_3 is removed by a filter and CO_2 is subsequently measured in separate IR cells. Carbon measurements will be made based on the range selected. The low carbon range features a longer path-length IR cell, while the high carbon range utilizes a shorter path-length IR cell. The difference in path length assures optimum resolution for the range selected. The instrument automatically chooses the optimum detection range.

CO_2 and SO_2 absorb IR energy at precise wavelengths within the IR spectrum. Energy at these wavelengths is absorbed as the gases pass through respective IR absorption cells. Changes in energy are then observed at the detectors. The absorption of IR energy is attributed to only CO_2 or SO_2 (depending on the cell), and its concentration is then determined. Each IR cell serves as both a reference and measure chamber.

Flow Diagram



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

World Headquarters/United States
In United States (800) 292-6141
(269) 985-5496
Outside U.S.A. (269) 983-5531

International Offices/Subsidiaries

Africa • *LECO Africa (Pty.) Ltd.*
Kempton Park, South Africa
Ph: 27-11-974-1681 • Fax: 27-11-974-1848

Argentina • *LECO Argentina S.A.*
Buenos Aires, Argentina
Ph: 54-114-523-8077 • Fax: 54-114-523-8873

Australia • *LECO Australia Pty. Ltd.*
Castle Hill, NSW, Australia
Ph: 61-2-9894-5955 • Fax: 61-2-9894-5247

Brazil • *LECO Instrumentos Ltda.*
Rio De Janeiro, Brazil
Ph: 55-212-538-4250 • Fax: 55-212-538-4299

Canada • *LECO Instruments Ltd.*
Mississauga, Ontario Canada
Ph: 905-564-6577 • Fax: 905-564-6582

China • *LECO Corp/Beijing Office*
Beijing, China
Ph: 86-10-6512-8877 • Fax: 86-10-6528-0373

Czech Republic • *LECO Instrumente Plzen s.r.o.*
Plzen/Czech Republic
Ph: 420-37-751-0811 • Fax: 420-37-725-9304

France • *LECO France*
GARGES-Les-GONESSE; Cedex, France
Ph: 33-134-45-4600 • Fax: 33-139-86-4105

Germany • *LECO Instrumente GmbH*
Mönchengladbach, Germany
Ph: 49-2166-687-0 • Fax: 49-2166-687-100

Hong Kong • *LECO Instruments Hong Kong Ltd.*
Kowloon, Hong Kong
Ph: 852-2387-7028 • Fax: 852-2708-4388

Italy • *LECO Italy, S.R.L.*
Milan, Italy
Ph: 39-02-953-43391 • Fax: 39-02-953-43461

Japan • *LECO Japan Corporation*
Tokyo, Japan
Ph: 813 (5782) 7800 • Fax: 813 (5782) 7801

Korea • *LECO Korea Co. Ltd.*
Gyeonggi-Do, Korea
Ph: 82-31-478-2441 • Fax: 82-31-478-2440

Malaysia • *LECO Instruments (M) Sdn. Bhd.*
Selangor, D.E. Malaysia
Ph: 60-3-7805-2100 • Fax: 60-3-7805-2212

Mexico • *LECO Mexico S.A. de C.V.*
Monterrey, NL CP 64900 Mexico
Ph: 52-81-83-49-3927 • Fax: 52-81-83-49-6485

The Netherlands • *LECO Europe B.V.*
Geleen, The Netherlands
Ph: 31-46-4747473 • Fax: 31-46-4747333

Poland • *LECO Polska Sp.zo.o*
Katowice, Poland
Ph: 48-32-2000-760 • Fax: 48-32-2000-536

Russia • *Z.A.O. LECO Center Moscow*
Moscow, Russia
Ph: 7495-710-3818 • Fax: 7495-710-3826

Spain • *LECO Instrumentos S.A.*
Madrid, Spain
Ph: 3491-803-1250 • Fax: 3491-804-0577

Sweden • *LECO Corporation Svenska AB*
Upplands Väsby, Sweden
Ph: 468-594-11000 • Fax: 468-594-11011

Taiwan • *LECO Instruments Taiwan Ltd.*
Taipei, Taiwan R.O.C.
Ph: 886-22-518-4699 • Fax: 886-22-518-4671

Thailand • *LECO Instruments (Thailand) Ltd.*
Bangkok, Thailand
Ph: 66-2-886-4350 • Fax: 66-2-886-4351

United Kingdom • *LECO Instruments (U.K.) Ltd.*
Stockport, Cheshire, England
Ph: 44-161-487-5900 • Fax: 44-161-456-0969

Venezuela • *Instrumentos LECO Venezuela, C.A.*
Puerto Ordaz, Edo. Bolivar, Venezuela
Ph: 58-286-994-4835 • Fax: 58-286-994-1570

Vietnam • *LECO (Vietnam) Co., Ltd.*
Ho Chi Minh City, Vietnam
Ph: 848-829-8979 • Fax: 848-829-8978

LECO Corporation
3000 Lakeview Avenue • St. Joseph, MI 49085 • Phone: 800-292-6141 • Fax: 269-982-8977
info@leco.com • www.leco.com • ISO-9001:2000 • No. FM 24045 • ***LECO is a registered trademark of LECO Corporation.***

Delivering the Right Results

209-120-001 5/08-REV6