

Organic Application Note

Sulfur and Carbon in Plant, Feed, Grain, and Flour

Instrument

SC632

Sample Preparation

A representative, uniform sample is required. Samples should be ground to pass a No. 100 (150 micron) sieve.

Accessories

528-203 Ceramic Boat, 502-321 Com-Cat™

Calibration Samples

NIST, or other suitable reference materials. LECO 502-055 Orchard Leaves, 502-082 Tobacco Leaves, 502-273 Alfalfa, 502-274 Wheat Flour, and 502-277 Barley (additional calibration materials can be found in LECO's Organic Supplies Catalog—form no. 203-828).



Method Parameters*

Description

Nominal Mass	1.0000
Furnace Temperature	1350°C
Lance Delay Time	20 seconds
Elements to Analyze	Sulfur and Carbon

Element Parameters

	Sulfur	Carbon
IR Analysis Stabilize Comparator	2.00	2.00
Manual Load Baseline Delay Time (seconds)	3	3
IR Baseline Time (seconds)	1	2
Auto Detect Data Missed Time (seconds)	5	5
Endline Time (seconds)	1	1
Minimum Analysis Time (seconds)	120	60
Maximum Analysis Time (seconds)	360	360
Comparator Level (%)	0.30	1.00
Conversion Factor	1.00	1.00
Significant Digits	5	5
Range Selection	Automatic	Automatic
Automatic Range Switch Level	3500.0	4000.0
Automatic Range Switch-Back Level	3000.0	3500.0

System Parameters

Gas Conservation Timeout	5 minutes
Auto Increment Sample Name	Disable
Lance Limits	50000
Furnace Standby Temperature	1050

*Refer to SC632 Operator's Instruction Manual for Method Parameter definitions.

SC632

Procedure

1. Prepare instrument for operation as outlined in the operator's instruction manual.
2. Condition the system by analyzing a three to five ~0.25 gram coal samples.
3. Determine blank.
 - a. Enter 1.0000 g mass into Sample Login (F3) using Blank as the sample name.
 - b. Add ~1 gram of 502-321 Com-Cat™ into a 528-203 Ceramic Boat.
 - c. Initiate the analysis sequence (F5)—when "Load Sample into Furnace" message appears on the display, slide crucible into the combustion tube until it reaches crucible stop. *Alternately, place crucible unto the appropriate position of carousel if equipped with autoloader system.*
 - d. Repeat steps 3a through 3c a minimum of five times.
 - e. Set the blank following the procedure outlined in the operator's instruction manual.
4. Calibrate/drift correct.
 - a. Weigh ~0.2 to 0.35 gram of calibration sample into a 528-203 Ceramic Boat, enter mass and sample identification into Sample Login (F3).
 - b. Add ~1 gram of 502-321 Com-Cat™ to the crucible and thoroughly mix with the sample.
 - c. Initiate the analysis sequence (F5)—when "Load Sample into Furnace" message appears on screen, slide crucible into the combustion tube until it reaches crucible stop. *Alternately, place crucible unto the appropriate position of carousel if equipped with autoloader system.*
 - d. Repeat steps 4a through 4c a minimum of five times for each calibration/drift sample used.
 - e. Calibrate or Drift Correct the instrument following the procedure outlined in the operator's instruction manual.
5. Analyze samples.
 - a. Weigh ~ 0.2 to 0.35 gram sample into 528-203 Ceramic Boat and enter mass and identification information into Sample Login (F3).
 - b. Add ~ 1 gram of 502-321 Com-Cat™ to the crucible and thoroughly mix with the sample.
 - c. Initiate the analysis sequence (F5)—when "Load Sample into Furnace" message appears on screen, slide crucible into the combustion tube until it reaches crucible stop. *Alternately, place crucible unto the appropriate position of carousel if equipped with autoloader system.*

Typical Results

Sample	Mass	% S	% C	Sample	Mass	% S	% C
LECO	0.1539	0.293	45.15	LECO	0.1556	0.336	44.52
502-055	0.1516	0.283	45.13	502-273	0.1555	0.343	44.75
Orchard	0.1523	0.284	45.07	Alfalfa	0.1541	0.344	44.59
Leaves	0.1567	0.285	45.22	0.340% S	0.1554	0.343	44.74
0.286% S	0.1551	0.278	45.31	44.43% C	0.1533	0.338	44.63
44.97% C	X =	0.285	45.17		X =	0.341	44.64
	s =	0.005	0.09		s =	0.003	0.10

LECO	0.1569	0.176	44.74
502-277	0.1524	0.179	44.74
Barley	0.1519	0.176	44.70
0.177% S	0.1520	0.178	44.53
44.94% C	0.1577	0.178	44.79
	X =	0.177	44.70
	s =	0.001	0.10

*Results based on multipoint, multi-standard calibration using LECO Plant Tissue calibration samples.



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