

Carbon, Hydrogen, and Nitrogen in Coal

LECO Corporation; Saint Joseph, Michigan USA

Instrument: TruSpec[®] CHN

Method Reference

ASTM D 5373

Sampling and Sample Preparation

A representative, uniform sample is required. Samples should be prepared in accordance to ASTM D2013. Coal reference materials such as those offered by LECO and NIST are properly prepared.

Accessories

502-186 Tin Foil Cup

Calibration

LECO 502-642 Phenylalanine, 502-092 EDTA, or other suitable reference materials.

NOTE: ASTM Method 05373-08 requires that pure compounds be used for calibration.

Analysis Parameters

Combustion Furnace Temperature	950°C
Afterburner Temperature	850°C

Element Parameters

	Nitrogen	Carbon	Hydrogen
Analyze	Yes	Yes	Yes
Minimum Analysis Time (seconds)	30	NA	NA
Comparator Level	1.00	NA	NA
Endline Time (seconds)	1	NA	NA
Conversion Factor	1.00	1.00	1.00
Significant Digits	5	5	5
IR Analysis Stabilize Comparator			0.00
IR Baseline Delay Time (seconds)			5
IR Baseline Time (seconds)			2
IR Pressure Stabilization Comparator			0.00
IR Stop Flow Time (seconds)			5
TC Baseline Delay Time (seconds)			5
TC Baseline Time (seconds)			2

Burn Profile

Burn Steps	Time	Furnace Flow
1	30 seconds	High
2	180 seconds	Medium
3	30 seconds	High



Macro Ballast Parameters

Ballast

Equilibrate Time (seconds)	30
Not Filled Timeout (seconds)	600

Aliquot Loop

Fill Time (seconds)	20
Equilibrate Pressure Time (seconds)	4

Procedure

1. Prepare instrument for operation as outlined in the operator's instruction manual.
2. Determine and calibrate systems blank as outlined in the operator's instruction manual.
3. Instrument must be calibrated as outlined in the operator's instruction manual.
4. Perform Drift Correction as outlined in the operator's instruction manual.

Note: Drift should be performed at the start of every day or when the results of the check standard fall outside of the correct result(s).

5. Weigh a 0.08 to 0.1 gram coal sample into 502-186 Tin Foil Cup, seal, enter mass and sample identification into the Sample Login, place into the appropriate position on the sample carousel, and proceed with analysis.

Note: Coal should be analyzed "as received". Analytical values are corrected for moisture after analysis.

The LECO logo, consisting of the word "LECO" in a bold, white, sans-serif font, with a small globe icon above the letter "O".

Organic Application Note

Typical Results (Dry Basis)

Sample	Mass g	Carbon %	Hydrogen %	Nitrogen %
LECO 502-642	0.1532	65.40	6.72	8.48
Phenylalanine	0.1541	65.30	6.70	8.48
@ 65.43% C	0.1541	65.37	6.70	8.46
6.71% H	0.1514	65.37	6.70	8.46
8.48% N	0.1512	65.64	6.74	8.48
	0.1553	65.62	6.68	8.45
	X =	65.45	6.71	8.47
	s =	0.14	0.02	0.01
Coal	0.1057	71.99	4.71	1.54
	0.1015	71.80	4.67	1.51
	0.1007	71.84	4.68	1.51
	0.1042	71.86	4.69	1.51
	0.1038	71.64	4.64	1.52
	0.1035	72.10	4.72	1.55
	X =	71.87	4.69	1.52
	s =	0.16	0.03	0.02
NIST 141d	0.0897*	71.07	6.66	10.35
Acetanilide	0.0912*	70.96	6.71	10.35
@ 71.09% C	0.0913*	71.09	6.73	10.36
6.71% H	0.0919*	71.02	6.72	10.34
10.36% N	0.0898*	71.30	6.71	10.36
	X =	71.09	6.71	10.35
	s =	0.13	0.03	0.01
LECO 501-053	0.0921*	70.99	6.73	10.33
Acetanilide	0.0917*	71.06	6.70	10.37
71.09% C	0.0909*	71.21	6.70	10.36
6.71% H	0.0912*	71.12	6.71	10.37
10.36% N	0.0920*	71.04	6.70	10.37
	X =	71.08	6.71	10.36
	s =	0.08	0.01	0.01

*For Acetanilide: weigh 0.05 to 0.09 g sample, then add 0.3 g 502-301 Tungsten Trioxide into tin foil cup.