

Instrument: SC832 Series

Sulfur in Hydrocarbons*

LECO Corporation; St. Joseph, Michigan USA



Introduction

Sulfur content in hydrocarbons can be seen as detrimental, and in some cases beneficial, depending upon the specific form and use of the hydrocarbon product or material. Sulfur analysis for hydrocarbons is often used to predict performance, handling, and processing properties, as well as determine regulatory requirements if the hydrocarbon material will be used as a fuel.

Reference

ASTM D1552

*Applicable to samples boiling above 177°C (350°F) (Refer to ASTM D1552 for details).

Accessories

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

Calibration Materials

LECO or other suitable hydrocarbon reference materials

Method Parameters

General Parameters

Furnace Temperature	1350°C
Lance on Delay	20 s
Nominal Mass	0.100 g

Element Parameters

Wait of Baseline Stability	Yes
Starting Baseline	2 s
Use Comparator	Yes
Comparator Level	0.30%
Minimum Integration Time	90 s
Maximum Integration Time	120 s

Procedure

1. Prepare instrument for operation as outlined in the operator's instruction manual.
2. Condition the system by analyzing at least four hydrocarbon replicates.
3. Determine instrument blank.
 - a. Login a minimum of three blanks.
 - b. Add ~1.0 g of 502-321 Com-Cat™ to the crucible.
 - c. Place the ceramic boat in front of the furnace entrance.
 - d. Initiate the analysis by pressing the Analyze button.
 - e. Load the sample into the furnace and press the analyze button when prompted by the software.
 - f. Repeat steps 3b through 3e a minimum of three times.
 - g. Set the Blank according to the procedure outlined in the operator's instruction manual.

4. Instrument calibration/drift correction.
 - a. Login a minimum of three Standard reps for each calibration/drift reference material to be used for calibration/drift.
 - b. Add ~0.50 g of 502-321 Com-Cat™ to the crucible and use a spatula to make a trough.
 - c. Weigh ~0.10 to 0.13 g of a hydrocarbon calibration/drift reference material into the trough in the ceramic boat, and enter the mass and reference material identification into the standard login.
 - d. Add ~0.50 g of 502-321 Com-Cat™ on top of the sample.
 - e. Place the ceramic boat in front of the furnace entrance.
 - f. Initiate the analysis by pressing the Analyze button.
 - g. Load the sample into the furnace when prompted by the software.
 - h. Repeat steps 4b through 4g a minimum of three times.
 - i. Calibrate/drift correct by following the procedure in the operator's instruction manual.
5. Sample Analysis.
 - a. Login a sample with the desired amount of reps.
 - b. Add ~0.50 g of 502-321 Com-Cat™ to the crucible and use a spatula to make a trough.
 - c. Weigh ~0.10 to 0.13 g of a hydrocarbon sample into the trough in the ceramic boat, and enter the mass and sample identification into the sample login.
 - d. Add ~0.50 g of 502-321 Com-Cat™ on top of the sample.
 - e. Place the ceramic boat in front of the furnace entrance.
 - f. Initiate the analysis by pressing the Analyze button.
 - g. Load the sample into the furnace when prompted by the software.
 - h. Repeat steps 5b through 5g as necessary.

Note: Hydrocarbons may evaporate; it is advisable to minimize the time they spend waiting for analysis by not pre-weighing the samples in advance.

Typical Results

Name	Description	Mass	Sulfur Concentration
LECO 502-850	Residual Fuel Oil	0.1144	3.00
Lot: 1000	3.00 ± 0.06% S	0.1215	3.00
		0.1321	3.00
		0.1246	3.00
		0.1247	3.00
		Avg. =	3.00
		s =	0.003
LECO 502-849	Residual Fuel Oil	0.1338	0.98
Lot: 1001	1.00 ± 0.05% S	0.1180	0.97
		0.1284	0.97
		0.1258	0.98
		0.1083	0.97
		Avg. =	0.97
		s =	0.006
NIST SRM 2722	Heavy Sweet Crude	0.1063	0.21
	0.21037% S	0.1167	0.21
		0.1169	0.21
		0.1141	0.21
		0.1174	0.21
		Avg. =	0.21
		s =	0.003
502-428 HP-14050C	#2 Diesel Fuel	0.1052	0.50
	0.50% S	0.1010	0.49
		0.1108	0.50
		0.1120	0.50
		0.1128	0.49
		Avg. =	0.50
		s =	0.003

Note: Results calibrated using LECO 502-850 Lot: 1000 at 3.00% S force through origin calibration curve.

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