

Coleman® Camp Fuel

Category: Petrochemical

Technique: CAAVHC

Summary

Determination of total mercury in Coleman® Camp Fuel (Boiling Point: > 38 °C, Auto-ignition Temperature: No Data Available) can be performed using the Hydra IIc mercury analyzer in Volatile Hydrocarbon (VHC) mode. The analysis does not require sample pretreatment or wet chemistry.

Total, inorganic, and methyl mercury determination is an important tool for monitoring mercury uptake and bioaccumulation in ecosystem flora and/or fauna. By quantifying environmental mercury contamination, the dangers of human and/or industrial exposure can be adequately assessed.

This technical note will demonstrate the capabilities of the Hydra IIc in VHC mode for total mercury determination by direct combustion of Coleman® Camp Fuel. The system was also configured with an enhanced moisture control system as described in Teledyne Leeman Labs Application Note – AN1701 (Viewable [Here](#)).

A weighed sample is introduced into the Hydra IIc and the uninterrupted analysis is completed in 13 minutes. It should be noted that 5 minutes of the total time is wait time between samples, during which the furnace cools to an injection temperature that will avoid sample auto-ignition during the injection phase.

Direct analysis of Hg via Thermal Decomposition is described in methods such as USEPA 7623, 7473 and ASTM 6722.

Instrumentation

Hydra IIc direct combustion CVAA analyzer, Envoy SW Version 2.2, quartz boats (calibration), nickel boats (samples), analytical balance, spatula, pipette and tips, diatomaceous earth, labware and reagents for aqueous standard preparation.

Method Parameters

	°C	Seconds	Other
Drying	150	60	Default @ Min. Time
Catalyst	600	30	
Decomposition	800	180	
Oxygen Flow			350 mL/min
Integration		80	
Amalgamator	600	30	

Calibration

Aqueous standards prepared in 1% HNO₃, various weights added to quartz boats for total mass in ng of Hg as listed.

Low Concentration	Blank, 0.1, 0.5, 1, 5, 10 20 ng
High Concentration	50, 100, 200, 400, 600, 800, 1000 ng

Sample Weight

~70 mg (Max Weight ≤ 80 mg)

Procedure

1. Add ~100 mg of diatomaceous earth to a nickel boat
2. Tare boat(s) and add sample(s) to boat(s) - max weight of 80 mg
3. Load boats onto the sample boat shuttle
4. Run Hydra IIc in VHC mode using an automated sequence

Results

	ng/g	
Oil Standard QC 100 ng/g	105.1	105 % Recovery
Coal Fly Ash SRM 1005 ng/g	1069	106 % Recovery
Oil Standard QC 1000 ng/g	1052	105 % Recovery
Hg in Coleman Camp Fuel 1	0.0718	
Hg in Coleman Camp Fuel 2	-0.0492	
Hg in Coleman Camp Fuel 3	-0.1537	
Hg in Coleman Camp Fuel 4	-0.1973	
Hg in Coleman Camp Fuel 5	-0.2204	
Hg in Coleman Camp Fuel 6	-0.2765	
Hg in Coleman Camp Fuel 7	-0.2557	
Avg	-0.15 ± 0.0889	@ 95 %
STDEV	0.12	
Min	-0.2765	
Max	0.0718	
Oil Standard QC 100 ng/g	105.6	106 % Recovery

Conclusion

The QC recoveries demonstrate that the system is in control and stable. The calculated MDL for this analytical system under these condition is ≤ 0.4 ng/g, therefore all Coleman® Camp Fuel samples are non-detect.

The Hydra IIc in VHC mode is an ideal system to precisely determine the concentration of Hg in light to heavy petroleum distillates.