Total Mercury in Coal using Direct Mercury Analysis

[Background]

Mercury is released into the environment air mainly by human activities, particularly from coal-fired power stations, residential heating systems, waste incinerators and the mining of mercury, gold and other metals. Once released in the environment air, elemental mercury is transformed into methyl mercury that is accumulated in fish and shellfish. To prevent the effect of mercury, it is necessary to measure the amount of mercury accurately contained in both coal and other fossil fuels.

<References>
·WHO HP:
http://www.who.int/ipcs/assessment/public_health/mercury/en/

[Instrument]

NIC MA-3000 is a dedicated direct mercury analyzer which selectively measures Total Mercury by thermal decomposition, gold amalgamation and cold vapor atomic absorption spectroscopy, on virtually any sample matrix - solid, liquid, and gas. The MA-3000 offers quick results without any tedious, time-consuming and elaborate sample preparation process. It is a perfect solution to today's increasing laboratory demand for easy, fast and accurate mercury measurements.

[Regulation]

Compliance with ASTM D 6722-01.

[Calibration]

Calibration is done using certified aqueous ionic-mercury standard solution diluted to the required concentration. Least squared regression method is used to create and complete the calibration curve.

[Sample condition]

Coal samples are ground by a mortar to avoid segregation effect.

MA-3000 calibration data
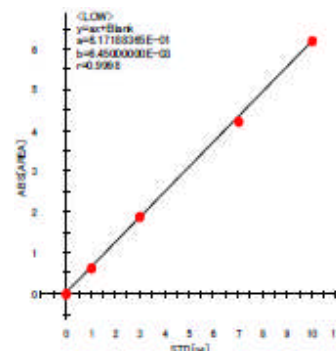
No.	STD [ng]	AREA [ON]	MEAS [ng]	DEV [%]
1	0.000	0.00645	0.000	–
2	1.000	0.62914	1.009	0.9
3	3.000	1.90707	3.079	2.6
4	7.000	4.24295	6.864	1.9
5	10.000	6.22174	10.070	0.7

[Method]
(Decomposition conditions)
Carrier gas: O_2

Sample	Conditions
STD solution	Atomize1: 150℃, 1min Atomize2: - , - Atomize3: 800℃, 2min
Coal	Atomize1: - , - Atomize2: 180℃, 2min Atomize3: 850℃, 2min

[Results]

Sample	Sample size (mg)	N	Conc. (µg/kg)	CV (%)	STD addition Recovery (%)
Sample	42~44	3	31.9	7.7	103

[Conclusion]

NIC MA-3000 is able to reproduce good STD addition recovery of Coal.

NIC MA-3000 analyzes Coal samples with accuracy and precision.