RA-915 Series

Zeeman mercury analyzer

Direct mercury determination in crude oil and oil products

ASTM D6722
SN/T 4429.2

INTRODUCTION

The mercury (Hg) content in crude oil and petroleum products varies in a wide range and poses a number of technological and environmental problems. Besides, the concentration of Hg in petroleum products affects the product cost.
The organic matrix makes it difficult to quantify mercury using conventional techniques. Atomic absorption spectroscopy with Zeeman background correction allows direct mercury determination in crude oil and oil products according to **ASTM D7622** and **SN/T 4429.2**.

MEASUREMENT METHOD

The ASTM D7622 and SN/T 4429.2 methods can be implemented using Lumex Instruments mercury analyzers for direct analysis of crude oil and oil distillation products such as condensate, naphtha, gasoline, diesel fuel, lubricants, etc.
The sample is heated in the thermal decomposition chamber. The mercury compounds are evaporated and dissociated forming elemental mercury. All the gaseous products are transported by Hg-free ambient air into the heated analytical cell, where mercury atoms are detected by differential atomic absorption spectroscopy. This method does not involve intermediate preconcentration of mercury on a gold trap, thereby eliminating ensuing problems. Zeeman background correction provides the highest selectivity with no interference from the sample matrix.

ANALYTICAL CHARACTERISTICS

Sample composition		crude oil, condensate, naphtha, gasoline, diesel fuel, lubricants, etc.
Sample mass		20–150 mg
Measurement range	ASTM D7622	from 5 to 350 ppb
	Lumex Instruments method	from 5.0 to 10 000 ppb
Measurement time		1–5 min

ANALYSIS FEATURES

- no sample pretreatment with wet chemistry;
- low limit of detection, high selectivity;
- wide dynamic measurement range;
- no amalgamation step;
- high analysis throughput (1–5 minutes per sample);
- no need for reagents and cylinders of oxygen, argon or other compressed gases;
- low running cost;
- no memory effect;
- the CRM of any matrix can be used for calibration and QA/QC.

EQUIPMENT AND REAGENTS

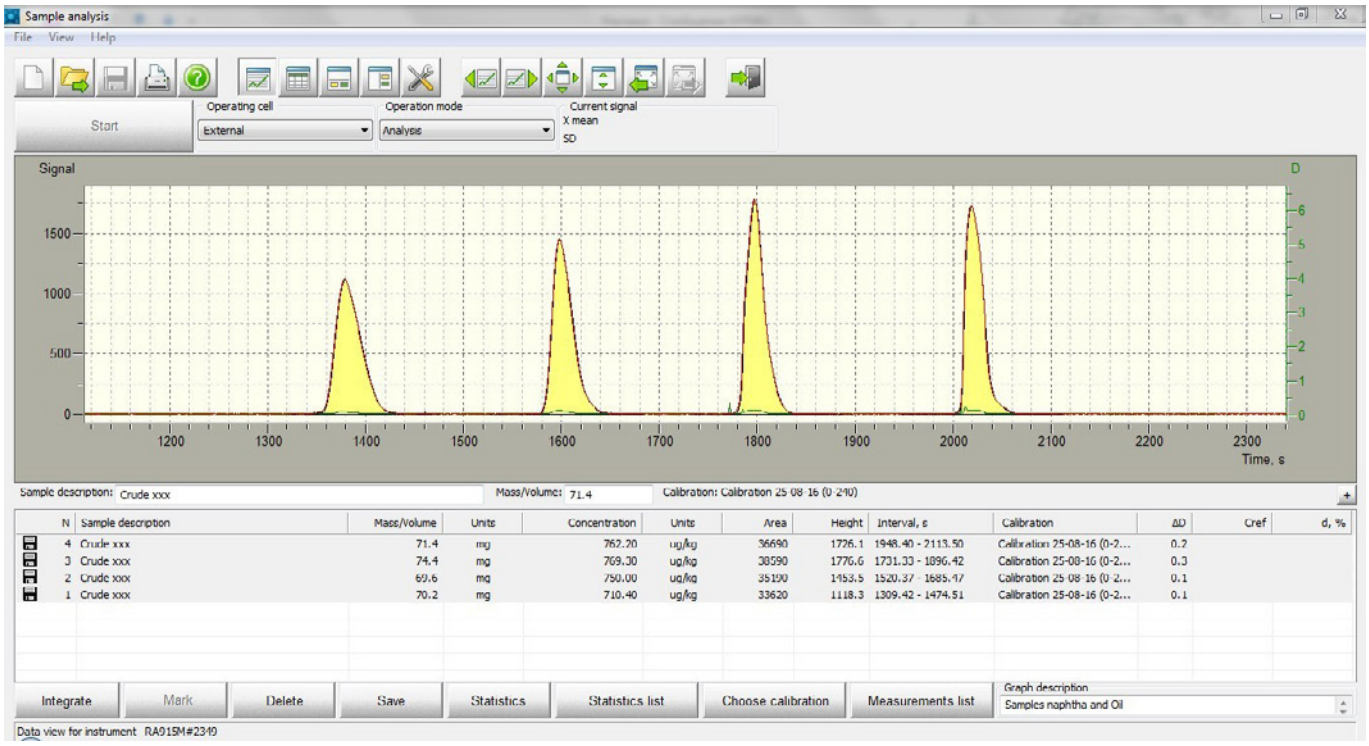
The following equipment and materials are used for analysis:
- RA-915 series mercury analyzer (RA-915 Lab, RA-915M combined with PYRO-915+ attachment, or RA-915F);
- PC with Windows® OS and RAPID software;
- any solid or liquid CRM of mercury;
- Lumex Instruments kit, order **No 0300003044**.

EXAMPLES OF ANALYSIS

Direct measurements of the mercury concentration in crude oil and naphtha.

Samples	C_{Hg}, ppb	C_{Hg}(av.), ppb	RSD, %	Samples	C_{Hg}, ppb	C_{Hg}(av.), ppb	RSD, %
Crude 01	760 769 752	760	0.9	Crude 06	56.9 54.8 53.9	55.2	2.3
Crude 02	19.2 16.4 17.3	17.6	6.6	Crude 07	20.4 21.8 19.9	20.7	3.9
Crude 03	8.5 7.8 7.0	7.8	7.8	Crude 08	82.3 85.0 83.9	83.7	1.3
Crude 04	74.9 68.6 65.9	69.8	5.4	Crude 09	159.5 161.9 163.2	161.5	0.9
Crude 05	1.5 1.7 1.2	1.5	14	Naphtha 115-135	21.1 21.5 22.3	21.6	2.3

Direct mercury determination in sample Crude 01.



RA-915M with PYRO-915+

RA-915 Lab

RA-915F