



DETERMINATION OF THE **MERCURY** CONCENTRATION IN CRUDE OIL

COMPLIANT WITH ASTM D7622-10(2015) METHOD

INTRODUCTION

The mercury concentration in crude oil and petroleum products can vary in a wide range of less than 0.1 ppb to dozens ppm. Direct mercury determination in crude oil and petroleum products at the range above 5 ppb is covered by **ASTM D7622-10(2015) "Standard test method for total mercury in crude oil using combustion and direct cold vapor atomic absorption method with Zeeman background correction"**. Complex organic matrix impedes conventional quantitative analysis for mercury.

MEASURING METHOD

The proposed method of direct mercury determination in crude oil and oil products is based on the atomization of mercury contained in the sample in a **PYRO-915+** attachment and subsequent mercury determination by flameless AAS with a mercury analyzer **RA-915M**.

The analysis is made directly without any sample preparation and mercury accumulation on a sorbent. The sample of 50–200 μl is sufficient for mercury determination in a range of **1–5 ppb to 100 ppm**. The routine analysis takes 1–2 min, for samples with a high Hg concentration, up to 5 min.

ANALYSIS FEATURES

- Simple measurement procedure and user-friendly interface
- No sample preparation, besides sample homogenisation, is necessary.
- Very fast analysis taking from 1 to 5 min.
- Wide dynamic measurement range, no "memory effect".
- The SRM of any composition can be used for calibration and validation of composition.
- The calibration coefficient has long-term (months) stability.
- Control of the non-selective absorption during the measurement process excludes analysis errors.
- Visualization of the mercury release from the sample via a user-friendly computer interface.
- No need for cylinders with compressed oxygen or other carrier gas.
- Low running cost.

ANALYTICAL CHARACTERISTICS

Sample composition	crude oil, condensate, naphtha, gasoline, diesel fuel, lubricants, etc.
Sample volume	20–200 μl
Detection limit	1–5 ppb
Upper limit of the measurement range	100 ppm
Measurement time	1–5 min

EQUIPMENT AND REAGENTS

The following equipment and materials are used for analysis:

- mercury analyzer RA-915M (or RA-915+) with PYRO-915+ attachment and RAPID software;
- PC with Windows® XP/Vista/7/8;
- any certified SRM of mercury.

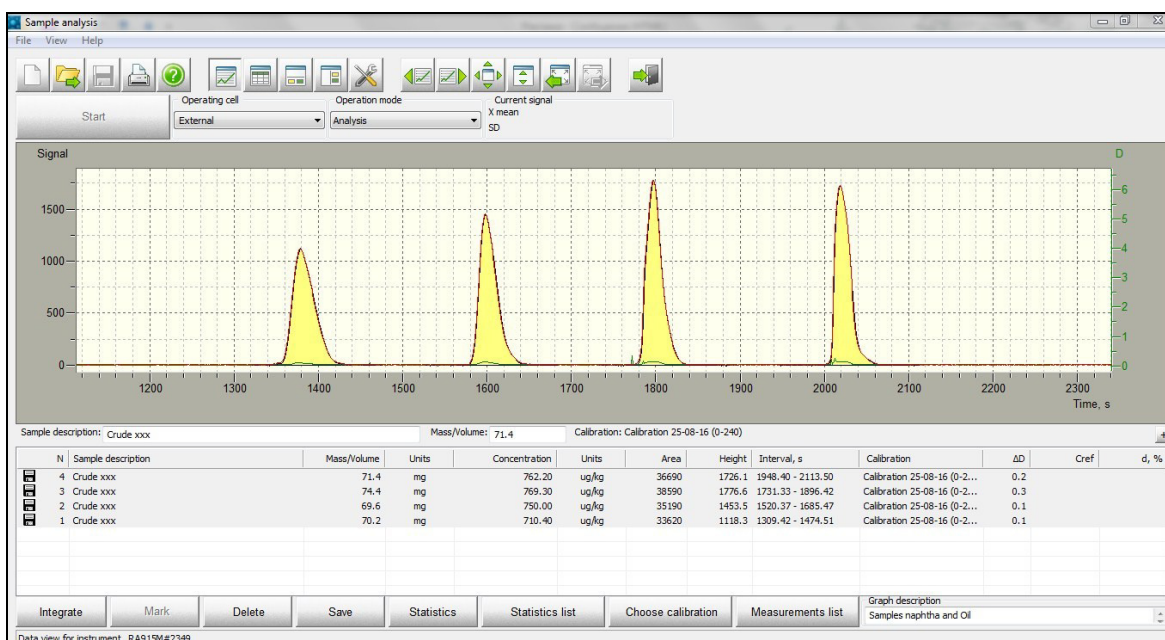




EXAMPLES OF ANALYSIS

Samples	C _{Hg} , ppb	C _{Hg} (av.), ppb	RSD, %
Crude 01	760 769 752	760	0.9
Crude 02	19.2 16.4 17.3	17.6	6.6
Crude 03	8,5 7,8 7,0	7.8	7.8
Crude 04	74.9 68.6 65.9	69.8	5.4
Crude 05	1.5 1.7 1.2	1.5	14

Samples	C _{Hg} , ppb	C _{Hg} (av.), ppb	RSD, %
Crude 06	56.9 54.8 53.9	55.2	2.3
Crude 07	20.4 21.8 19.9	20.7	3.9
Crude 08	82.3 85.0 83.9	83.7	1.3
Crude 09	159.5 161.9 163.2	161.5	0.9
Naphtha 115-135	21.1 21.5 22.3	21.6	2.3



The information in this leaflet is supplemental. To get more specific information on this method, please contact the LUMEX INSTRUMENT Group.

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