RA-915 Series

Zeeman mercury analyzer

Total mercury determination in water by CVAAS

INTRODUCTION

Mercury is acknowledged as one of chemicals that pose the greatest threat to the environment and public health. The determination of mercury in water is one of the most frequently requested analyses for environmental, sanitary and technological purposes.
The Lumex Instruments RA-915M mercury analyzer, equipped with a special cold vapor accessory, can perform conventional cold vapor atomic absorption spectrometry (CVAAS) technique for the determination of mercury in surface, ground, drinking and waste water as well in atmospheric precipitation.

RA-915 M + RP-92

MEASUREMENT METHOD

Water samples must be pretreated with the appropriate standard digestion procedure (potassium permanganate or bromide-bromate).
The Cold Vapor technique is based on the reduction of Hg(II) to the atomic state using a tin(II) chloride solution and the follow-up transporting of mercury atoms into the analytical cell by air flow. The mercury atoms are detected by atomic absorption spectroscopy with Zeeman correction of the background absorption.
The method does not involve intermediate preconcentration of mercury on a gold trap, thereby eliminating ensuing problems.

Detection limit (DL): 0.0001 ppb (0.1 ng/L).
The measurement range: 0 to 5 ppb for the multi-path cell and can be extended up to 2000 ppb using the short single-path cell.

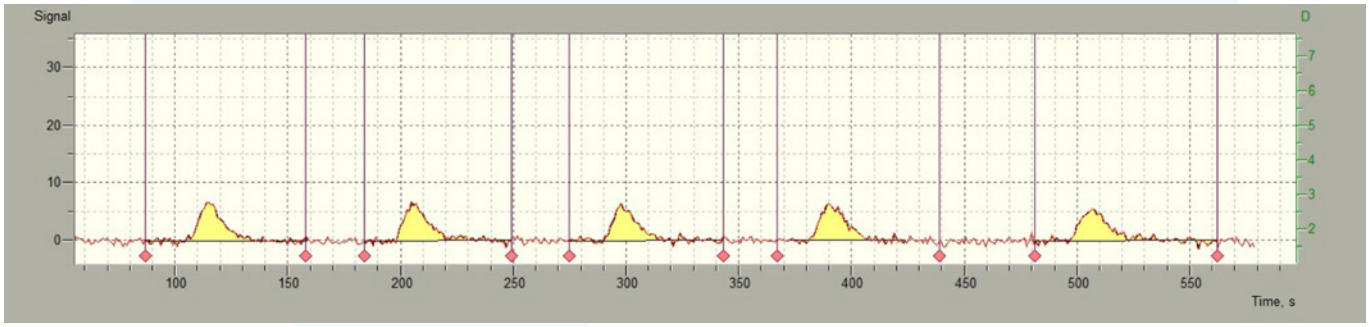

Fig. 1. Peaks corresponding to the injection of 0.005 ng of Hg.

EQUIPMENT AND REAGENTS

The following equipment and materials are used for analysis:
- Mercury analyzer RA-915M with RP-92/URP attachment;
- PC with Windows® OS and RAPID software;
- Lumex Instruments kit, order No 0300003071.

Compatible Methods List

- EPA 245.1
- ISO 12846:2012
- ASTM D3223
- AOAC Official Method 977.22
- APHA/AWWA/WEF Standard Method 3112
- HJ 597-2011
- GB 8538-2022
- IS 3025: Part 48:1994
- IS 12041:1987
- TCVN 7877:2008

Regulations

Directives & standards for drinking water	Limits, µg/L
WHO Guidelines for drinking water quality (202211)	6
Drinking Water Directive 98/83/EC	1
US EPA National Secondary Drinking Water Regulations	2
TR EAEU 044/2017 Technical Regulation on Packaged Water	0.2 / 0.5 / 1
Japan Drinking Water Quality Standards (2015)	0.5
GB 5749-2006 2022 Standards for drinking water quality	1
GB 2762-2017 2022 National food safety standard – Maximum levels of contaminants in foods	1
IS 10500:2012 Drinking Water – Specification	1
QCVN 01:2009/BYT National technical regulation on drinking water quality	1
Ministério da Saúde do Brasil. Brazil Portaria de consolidação No 5, Anexo 7 do Anexo XX	1
Código Alimentario Argentino. Capitulo XII, Artículo 982 (Resolución Conjunta SCS y SAByDR N° 22/2021)	1

EXAMPLES OF ANALYSIS

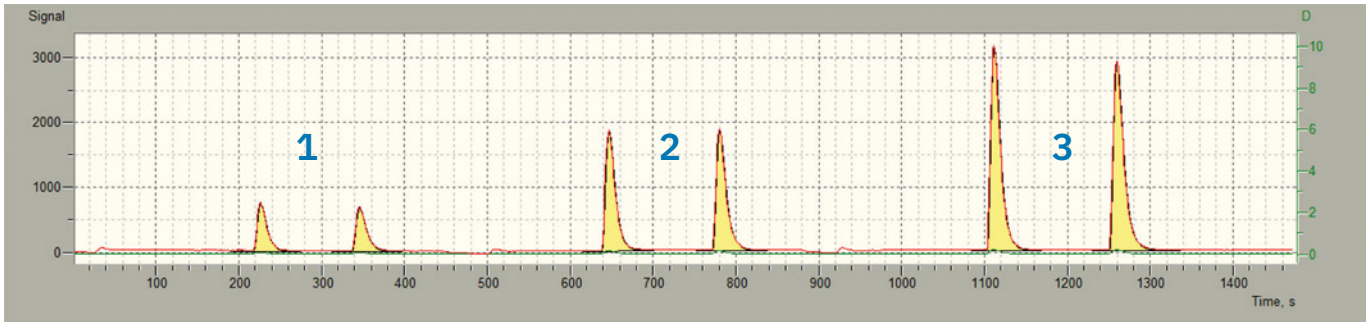

Fig.2. Examples of analyses of the surface and waste water using EPA Method 245.1

Water samples	Measured value, µg/L	
OK L4-14	0.51±0.10	1
OK 13-10	1.9±0.5	2
OK C3-13	5.2±0.7	3