



## Zeeman mercury analyzer RA-915+

An advanced **mercury analyzer RA-915+** is a unique all-purpose **high sensitivity analytical instrument** for the environmental monitoring, especially **for the real time detection of mercury vapor** in air, mercury detection in water, natural and stack gases, oil and condensate, solid and sediments, foodstuff and so on.

The whole laboratory at your hand! An Advanced Mercury Analyzer RA-915+



**ULTRA LOW DETECTION LIMIT  
DIRECT MEASUREMENTS WITHOUT  
PRELIMINARY MERCURY  
CONCENTRATION ON SORBENTS  
HIGH SELECTIVITY OF ANALYSIS  
WIDE RANGE OF APPLICATIONS**

Mercury is among most abundant environmental pollutants which adversely affects ecological systems and human beings. It shows high toxicity, mobility, and ability of accumulation in trophic chains of water and continental biocenosis. Therefore, it is recognized to be one of the most hazardous global environmental pollutants.

Mercury penetrates into human organisms through breathing and with foodstuffs contaminated by methylated mercury (primarily, with fish and other seafoods).

Laboratories involved in environmental monitoring and safeguarding public health care need means for rapid and reliable analysis of mercury contamination in the environment and human beings.

Multifunctional portable mercury analyzer RA-915+ features a unique capability of performing direct, fast, and precise measurements of mercury vapor and mercury concentration in various media.

### MEASUREMENT PRINCIPLE

RA-915+ is an atomic absorption spectrometer, which employs the effect of the resonance radiation absorption by the mercury atoms.

- **Proprietary scheme of the Zeeman correction for non-selective absorption provides high measurement accuracy irrespective of interfering factors, such as dust, aerosols, absorbing gases and vapors.**
- **Multipath cell with an effective optical length of 10 m provides the highest measurement sensitivity.**

**2 ng/m<sup>3</sup> Hg in the AIR !**

- **Ultra low detection limit**
- **High selectivity of analysis**
- **Direct continuous mercury detection (without preliminary mercury concentration on a sorbent)**
- **Capability of operation in the field using a built-in battery**
- **User-friendly computer interface**
- **Background monitoring of mercury vapor**
- **Direct analysis of complex gas mixtures**
- **On-line measurements**
- **Wide dynamic range of the direct measurements:**

2 – 50 000 ng/m<sup>3</sup> - with a multi-path cell  
 5 000 – 200 000 ng/m<sup>3</sup> - with a single-path cell

- **Measurements from moving objects**

**Analytical characteristics**

Subject	Detection limit	Pumping rate	Technique
Ambient air	2 ng/m <sup>3</sup>	20 l/min	Direct continuous measurements with a response time of 1 sec
Natural and other gases	2 – 500 ng/m <sup>3</sup>	5 – 20 l/min	

**0.5 ng/l in WATER**

- **Measuring low mercury concentrations in potable and natural water**
- **Mercury concentration monitoring in sewage and drain water**
- **Mercury detection in blood, urine, and other liquids**

**Principle of operation – "Cold Vapor" Technique**

Reducing agent, SnCl<sub>2</sub>, is added to a sample, and the atomic mercury thereby produced then enters the analytical cell.

**Analytical characteristics**

Subject	Detection limit	Sample volume	Rate of analyses, samples per hour
Water	0.5 ng/l	20 ml	15
Urine	5 ng/l	1 ml	15
Blood	0,5 µg/l	0.2 ml	15

**0.5 µg/kg in SOIL AND SEDIMENTS**

- **Direct mercury assaying in complex-matrix samples without sample preparation**
- **Visualization of mercury egress from a sample**

**Principle of operation**

Analysis is carried out using an RP-91C attachment. Mercury, which is present in various chemical compounds, is sublimated and atomized in a two-stage pyrolysis reactor. To prepare for most of the measurements, a sample should be merely weighed.

## Analytical characteristics

Subject	Detection limit	Sample weight	Rate of analyses, samples per hour
Oil and condensate	50 µg/kg	10 mg	15
Solid and sediments	0.5 µg/kg	200 mg	15
Tissues	5 µg/kg	10 mg	15
Hair	20 µg/kg	10 mg	15
Plants	2 µg/kg	50 mg	15
Foodstuffs	2 - 10 µg/kg	5 -50 mg	15

**THE RA-915+ PORTABLE MERCURY ANALYZER SYSTEM ENABLES COPING WITH ANY COMPLEX PROBLEMS INVOLVING MERCURY DETECTION IN NATURAL MEDIA AND IN TECHNOLOGICAL PROCESS MONITORING.**

### Demercurization monitoring

- Search and localization of indoor and outdoor mercury contamination in continuous air analysis mode, including those performed from moving vehicles
- Monitoring of a demercurization process involving any chemical reagents
- Quality assurance of the demercurization
- Mercury assaying in construction materials and surface wash-outs

### Handling the toxicology and occupational safety problems

- Screening examination of population
- Proximate analysis of biological objects (urine, blood, hair, and exhaled air)
- Finding out risk groups
- Instrumental monitoring of a mercury intoxication treatment and of the following rehabilitation

### Rapid-analysis of complex objects

- Raw materials and industrial products
- Ecological and geochemical samples, biological objects, foodstuffs, cosmetics, and medical preparations
- Combustible deposits (hydrocarbon gases, natural gas condensate, oil, coal, peat, and shale oil)

### Geological and geochemical survey

- Study of mercury cycles of natural and technological origin
- Prospecting of mineral deposits
- Mercure assaying in:
  - Natural gases
  - Water
  - Rocks and ores

### Ecological survey

- Continuous background mercury vapor monitoring in the atmosphere
- Various ecological surveys of mercury haloes of technological origin and detection of emission sources

All functions of the instrument are microprocessor controlled and activated via the hand-held detachable keypad and by a local or remote computer.

Specifications						
	Size, mm	Weight, kg	Power supply	Power consumption, W	Rate of analyses per hour	Nonstop operating time, hours
<b>RA-915+ (air)</b>	460x210x110	7.5	220/110 V a.c., 50/60 Hz 10/14 V d.c.	15		
<b>RP-91 "Cold Vapor" Attachment</b>	340x240x120	4	220/110 V a.c., 50/60 Hz 6 V d.c.	15	12 – 15	8
<b>RP-91C Pyrolysis Attachment</b>	340x240x120	5.5	220/110 V a.c., 50/60 Hz	250	6 – 8	8

Recommended complete delivery set and options			
	Air	Liquids	Complex-matrix samples
<b>RA-915+ Analyzer</b>	*	*	*
<b>RP-91 Attachment</b>		*	
<b>RP-91C Attachment</b>			*
<b>1 – 5 ml micropipette</b>		*	
<b>IBM-compatible PC with Windows95/98 Software</b>	*	*	*
<b>Installation &amp; Commissioning</b>	*	*	*

### Services

On customer's request our service engineers can carry out installation and commissioning of the Lumex instruments at customer's site. Consultations and initial training of attendance personnel are provided with due account of customer's specific needs. Spare parts are delivered and repair is made immediately upon customer's request (free within the warranty period).

### Warranty

All of the Lumex equipment is covered by a 12-months warranty.

**The RA-915+ mercury analyzer complies with EPA Methods 1631, 7470, and 7471 as well as with the OSHA and FDA requirements.**