

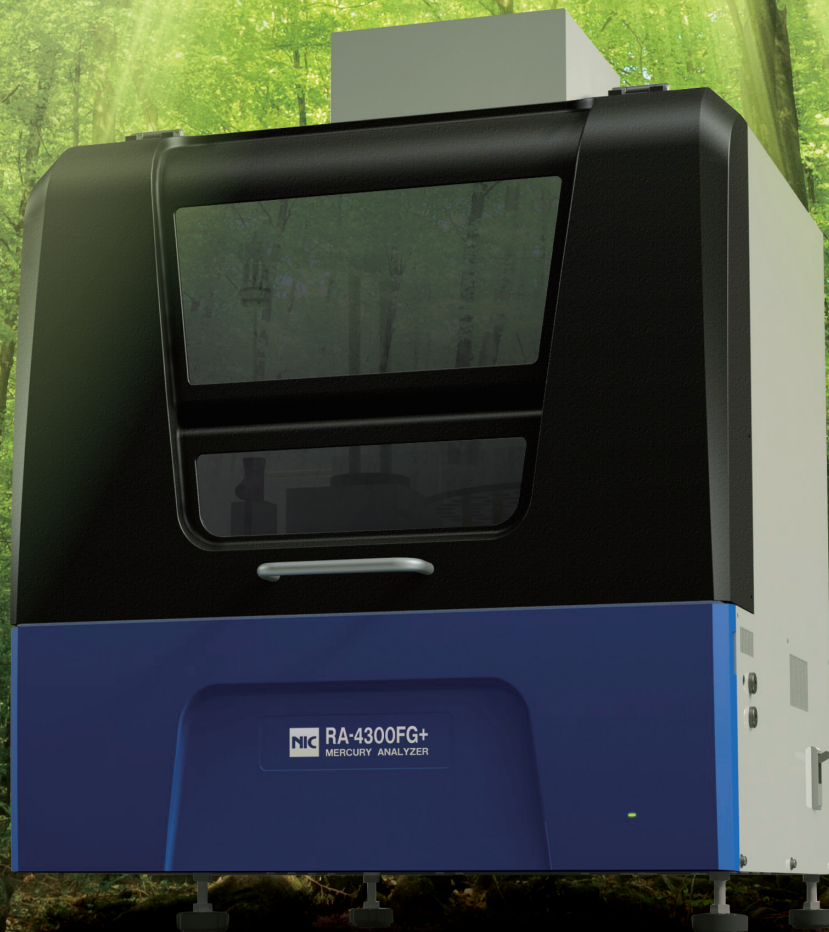


# Mercury Analyzer

RA-4300A  
RA-4300FG+

Simple...  
Cost Effective...  
Environmentally-Friendly...

The total solution in Trace Mercury Analysis for Regulatory  
Methods such as EPA 1631E, EPA 245.7, & more...

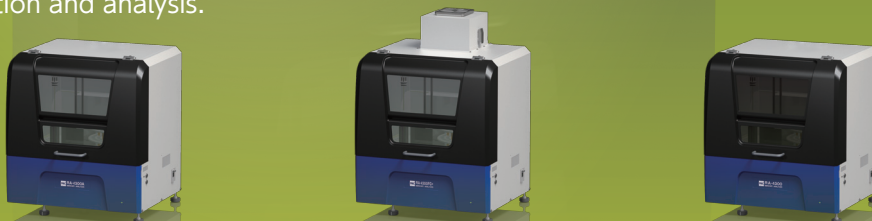


# RA-4000 Series Mercury Analyzers

Mercury is released into our atmosphere through a combination of natural and man-made events on a daily basis. Once in the atmosphere, mercury finds its way into our water sources, where bacteria and other mechanisms convert the mercury to various organo-mercury species that are more bio-available and also more toxic to humans. Mercury also bioaccumulates in many fish species that are eaten by humans, making the detection and monitoring of mercury in our lakes, rivers, seawater, and even wastewaters highly important.



Since mercury is present in both organic and inorganic species, it is necessary to be able to accurately measure it in all its forms. This is accomplished by the acid/oxidant digestion process, which converts all forms of mercury in the samples to the oxidized and water-soluble inorganic species ( $Hg^{2+}$ ), which is then analyzed by CVAAS or CVAFS. The NIC RA-4000 series mercury analyzers offer both semi or fully automated in-situ digestion capabilities with the versatility to satisfy today's laboratory needs for EASY, FAST, and ACCURATE detection and analysis.

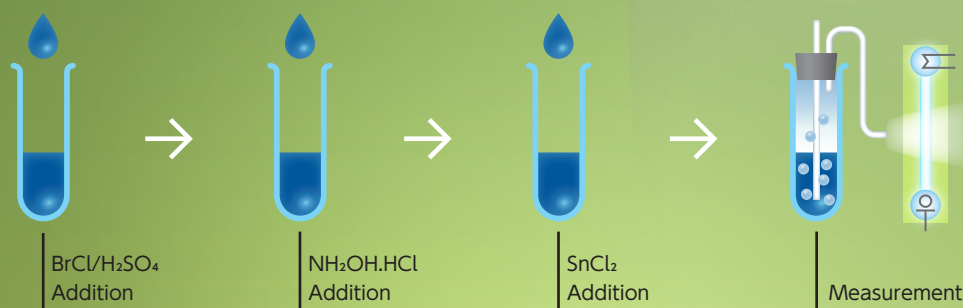
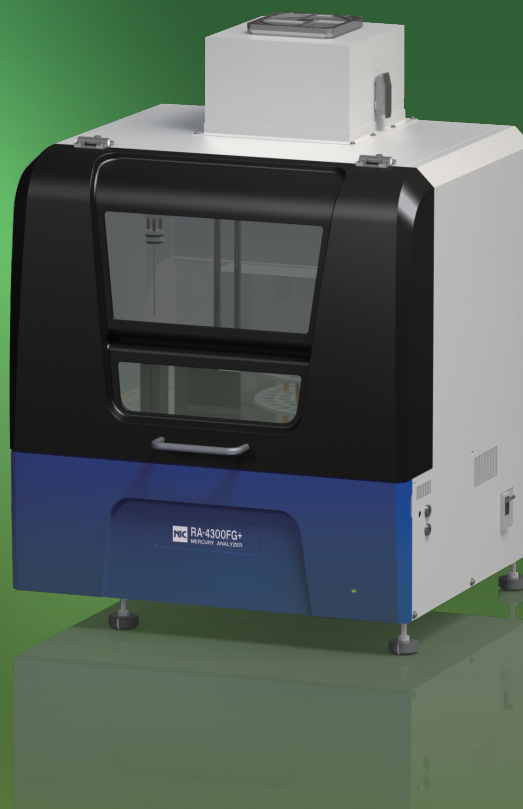


The RA-4000 series are fully compliant with traditional mercury analysis methods, such as US EPA Methods 245.1, 245.2, 245.5, 245.7, 1631E, 7470A, 7471B, ASTM D 3223-02, EN-1483, ISO 12846, 17825, APHA 3112, JIS K0102 and more.

# RA-4300FG+

Trace Mercury Analysis requires a clean environment, clean reagents, and a reliable analyzer with a high quality atomic fluorescence detection system.

The Model RA-4300FG+ Mercury Analyzer accomplishes all of these tasks in a single, compact package. It offers an optional HEPA filtration system to maintain a clean environment. It has a built-in reagent purging system to keep your reagents clean during analysis. The RA-4300FG+ also has one of the most advanced and sensitive atomic fluorescence spectroscopy (AFS) detectors available today.

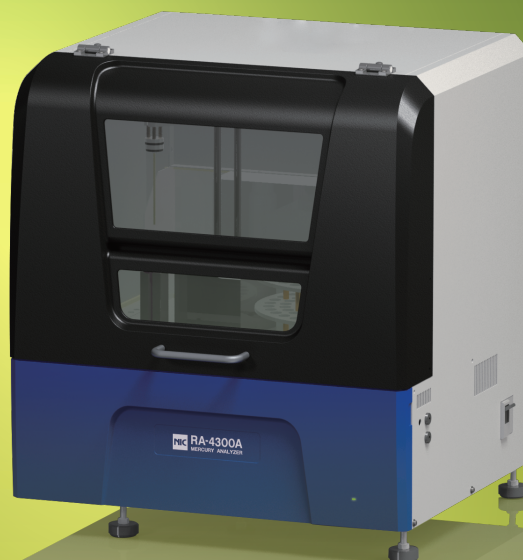


# RA-4300A

The RA-4300A is a highly efficient solution for mercury analysis by cold vapor atomic absorption spectroscopy (CVAAS) that complies with regulatory methods such as EPA 245.1, 245.2, 245.5, 245.7, SW-846 7470A and 7471B.

Utilizing discrete technology that eliminates the need to constantly replace pump tubing while reducing reagent waste by over 80%, the RA-4300A is the most environmentally friendly mercury analyzer available. It also does not require any compressed gases, only requiring electricity and a PC for operation. The enclosed atmosphere provides a layer of protection against outside contaminants while reducing exposure to employees in the laboratory.

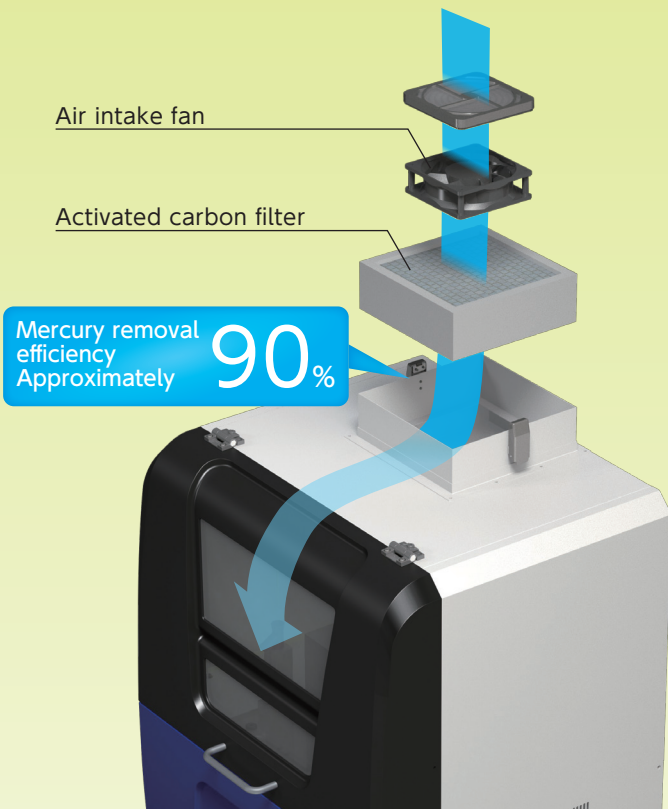
Environment-friendly...Efficient...Effective...



# RA-4300FG+

## Mercury Removal Function

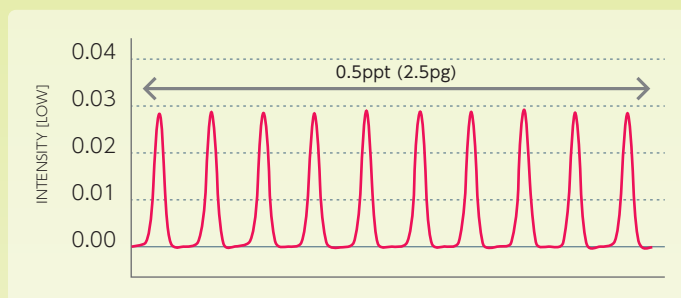
The RA-4300FG+ has a unique and special air cleaner function. Ambient air passes through activated carbon filter, and Hg-free air is introduced inside. This function can keep low reagent blank and avoid contamination of test tube during digestion.



## Excellent Accuracy & Precision

The Model RA-4300FG+ easily achieves ppt and sub-ppt detection levels for Mercury. The RA-4300FG+ can achieve these detection limits in liquid sample types including drinking waters, natural waters, wastewaters, and digested solids using the technique of reducing vaporization and gold amalgamation with atomic fluorescence spectroscopy (AFS) detection.

Sample name	N	Average	C.V.
0.5 ppt HgCl <sub>2</sub> Standard solution	10	0.505 ppt	1.3 %

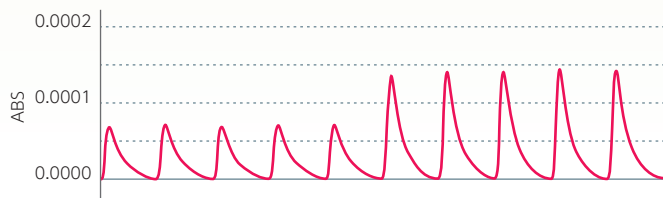


# RA-4300A

## Excellent Precision and Repeatability

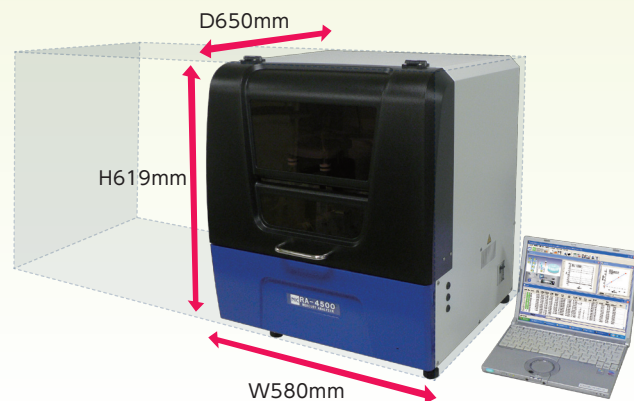
RA-4300A utilizes the same detector optics system as RA-4500. It exhibits excellent accuracy and precision on measurements down to trace levels (2 ppt & 5 ppt Hg<sup>2+</sup> STD) with uncompromised repeatability.

HgCl <sub>2</sub>			
Sample	N	Average	C.V.
0.002 µg/L	5	0.0020 µg/L	6.06 %
0.005 µg/L	5	0.0050 µg/L	2.56 %



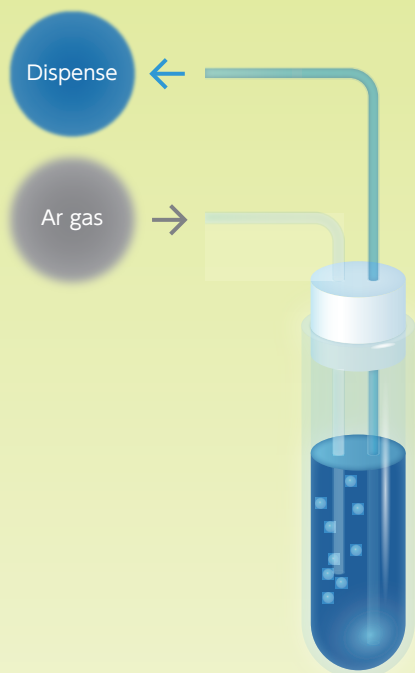
## Compact & Space Saving

All-In-One (Detector, Reagent Dispenser, Digestion, Exhaust Duct). Minimal installation space is required.



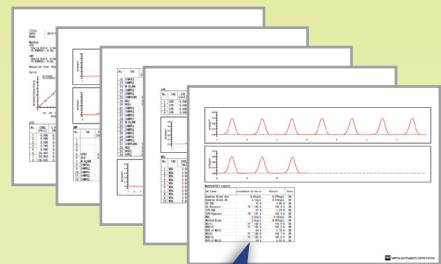
## Argon purge for SnCl<sub>2</sub> and NH<sub>2</sub>OH · HCl solution

The RA-4300FG+ has a built-in Argon purge system. Mercury-free Argon gas is purged through each of the SnCl<sub>2</sub> and NH<sub>2</sub>OH-HCl reagents at all times to eliminate mercury contamination and reduce reagent blanks.



## User-friendly software / Easy to prepare EPA report

The RA-4300FG+ software allows the operator to select for operation by EPA 1631E, EPA 245.7, or normal measurement via the software. The software includes animated graphics that illustrate the analyzer's real-time operation. The software also includes all the standard QC requirements for EPA Methods 1631E/245.7, which are automatically calculated and reported, and even include automated control of the analyzer according to PASS/FAIL QC requirements.



Method1631 report

QC Items	Acceptance Criteria	Result	Pass
Bubbler Blank Ave	0.25ng/L	0.076ng/L	OK
Bubbler Blank SD	0.1ng/L	0.016ng/L	OK
CF RSD	15 %	4.05 %	OK
CF Recovery	75~125 %	106.4 %	OK
IPR RSD	21 %	1.23 %	OK
IPR Recovery	79~121 %	105.4 %	OK
MDL	0.2ng/L	0.02ng/L	OK
Method Blank	0.5ng/L	0.003ng/L	OK
MS(1)	71~125 %	104.8 %	OK
MSD(1)	71~125 %	103.2 %	OK
RPD of MS(1)	24 %	0.76 %	OK
MS(2)	71~125 %	106.7 %	OK
MSD(2)	71~125 %	105.6 %	OK
RPD of MS(2)	24 %	0.53 %	OK
OPR(1)	77~123 %	104.9 %	OK
OPR(2)	77~123 %	103.5 %	OK
Accuracy	---	102.5~107.5 %	--
QCS	4~6ng/L	5.0ng/L	OK

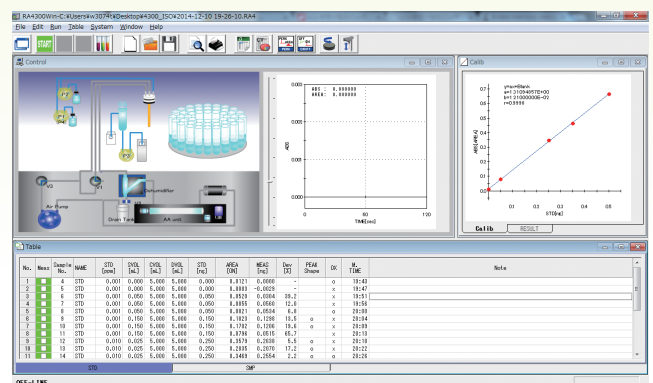
## Choice of Sample Tubes

RA-4300A is compatible to use either NIC re-washable borosilicate glass tube or commercially available disposable Polypropylene-centrifuge-conical-bottom 15mL tubes.



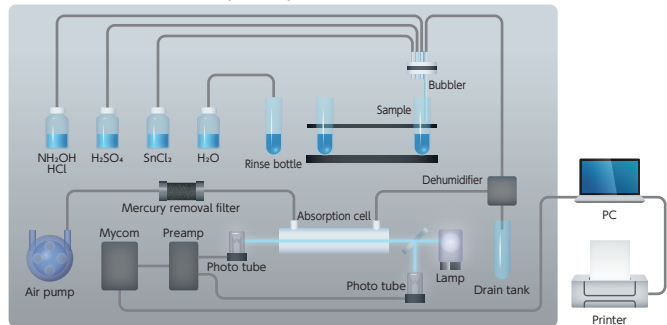
## Easy to Use / User Friendly Software

RA-4300Win software is intuitive, specifically designed for quick learning and easy operation. The software includes animated graphics that illustrate real-time system operations, spreadsheet-style sequence tables, etc. The software also includes an automatic "System Self-Check" that tests the critical components of the system automatically and returns a report of results.

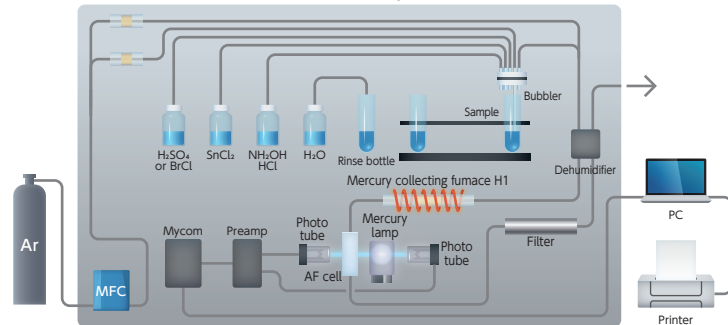


## SCHEMATIC DIAGRAM

RA-4300A (Atomic Absorption System)



RA-4300FG+ (Atomic Fluorescence System)



## APPLICATIONS

Drinking water, Underground water, Seawater, Wastewater, River water, Lake water, Rain-runoff, Liquid & Solid Digestates and more

## TEST METHOD

AAS Methods	AFS Methods
USEPA 245.1, 245.2, 245.5, 7470A, 7471B, ASTM D 3223-02, EN-1483, ISO12846, APHA 3112, JIS K0102 and more	USEPA 245.7; 1631e; ISO 17825; ISO12846

## SPECIFICATIONS

	RA-4300A (Atomic Absorption System)	RA-4300FG+ (Atomic Fluorescence System)
<b>Sample treatment section</b>	Number of sample	80
	Drive system	Turn table system
	Sample tray	Polycarbonate
	Sample container	Glass (50pcs) ※Disposable PP tube is also available
	Bubbler	Reagent-resistance resin bubbler
<b>Reagent dispenser section</b>	Dispensing	Delivered with a tube pump
	Dispensing volume	Adjustable
	Dispensed reagents	Sulfuric acid, Tin (II) chloride solution, Hydroxylamine hydrochloride solution, Distilled water
<b>Mercury detecting section</b>	Measurement principle	Cold vapor Atomic Absorption Spectroscopy
	Measurement method	Reducing vaporization with open air-supply (Peak height measuring and integration measuring selectable)
	Light source	Low pressure mercury discharge lamp
	Wave length	253.7nm
	Detector	Photo-tube
	Detection limit	2.5pg / 5mL (0.5ppt) ※5ppt in case of including chemical treatment
	Maximum range	500ng/5mL (100 ppb)
	Measuring time	90sec ~ 300sec
	Mercury removal	Absorption by activated carbon
	Flow monitor	Flow sensor
	<b>Data processing system (RA-4300Win)</b>	OS
Communication		Ethernet (One-to-one for RA-4300, not for in-house LAN)
Display		Peak wave shape, Calibration curve, Measuring time and Measuring result
Control software		Start/stop measuring : Controllable, Reagent dispensing volume setup
Data processing software		Selectable from 6 formulas ( 3 linear and 3 3rd Order fits ) , Correlation coefficient is automatically calculated. Statistic calculation : Mean value, Standard deviation, Coefficient of variation (All values are automatically calculated.)
Print		Measuring conditions, Calibration curve, Measured values, Statistical calculations, Peak wave shape and Measuring time
Quality control		Check standard, Avoid abnormally high mercury etc.
<b>Installation requirements</b>	Installation dimensions	580W × 530D × 619H (mm)
	Weight	38kg
<b>Power supply</b>	(1) AC, single phase, 100V, 220 ~ 240V 50/60Hz	(2) Voltage variation : within ±5%
	(3) Power capacity : 0.24 kVA (Excluding PC and printer)	(4) Power quality : Non surging, no high-frequency waves, and noiseless.
	(5) Distance from power supply : 2m or less	(6) Ground-fault circuit interrupter : 15mA
	(7) Grounding : Grounding terminal with ground resistance of 100Ω or less	

## ACCESSORIES

Power cable 2m [Q'ty 1] / Plug adaptor [Q'ty 1] / Sample container [Q'ty 50] / Bubbler (for spare) [Q'ty 1] / Mist catcher φ25 (for spare) [Q'ty 2] / Screw driver [Q'ty 1] / L-cysteine 1g [Q'ty 1] / Waste bottle 2L [Q'ty 1] / LAN cable 2m [Q'ty 1] / CD-ROM for Window soft [Q'ty 1] / Instruction manual [Q'ty 1] / Simplified instruction manual [Q'ty 1]

※Recommended brands of PP Centrifuge tubes: ThermoFisher (Nunc); Greiner; Corning & VWR



**NIP** Nippon Instruments Corporation

Identify the right mercury analyzer for you



Distributors



# WolfLabs

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The specifications listed in this brochure are subject to change by the manufacturer and therefore cannot be guaranteed to be correct. If there are aspects of the specification that must be guaranteed, please provide these to our sales team so that details can be confirmed.

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