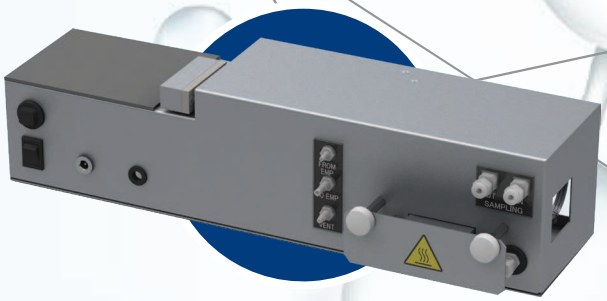
NIC

A Rigaku Company

Field-Portable High-Sensitivity Mercury Analyzer

EMP-Gold+



Revolutionary Ultra-High Sensitivity Field-Portable Gold-Amalgamation Mercury Analyzer

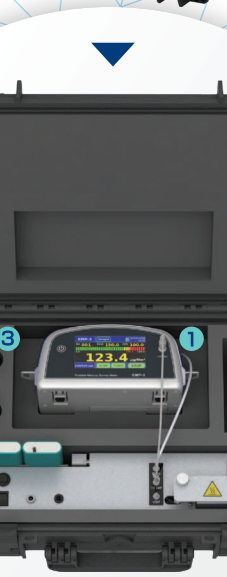
Portability Meets Versatility

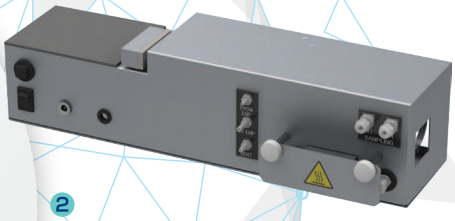
Compact & Light-Weight

Mobility by Battery Operation

Sensitivity & Selectivity

HAND-CARRYING HEAVY-DUTY CASE





1 EMP-Direct Mode

functions as occupational hygiene workplace survey monitoring

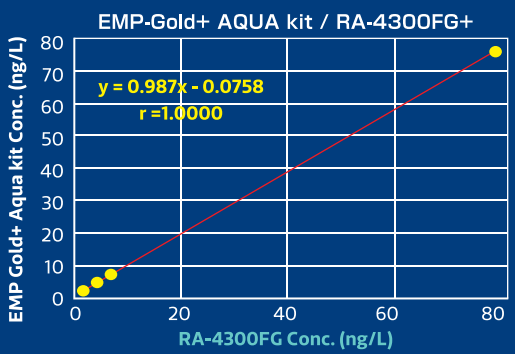
2 EMP-Amalgam Mode

allows pre-concentration of mercury from both gaseous and liquid matrices, extending its sensitivity for measurements down to the part-per-trillion (ppt) levels. In addition to pre-concentration (enrichment), gold-amalgamation eliminates for any possible interferences, ensuring higher level measurements accuracy.

3 Optional Spare Batteries X 2

(recommended as back up)

EMP-Aqua Mode - With & Without Enrichment



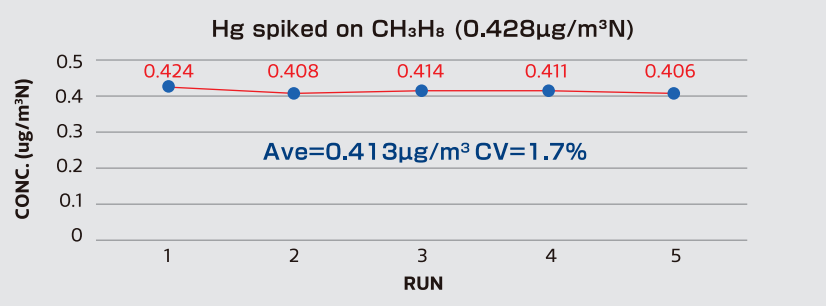
Sample	RA-4300FG+ (ng/L)	EMP-Gold+ (ng/L)	EMP/RA (Ratio)
Sea Water 1	5.09	4.92	0.97
Sea Water 2	3.27	3.08	0.94
Sea Water 3 (muddy)	77.36	76.28	0.99
River Water 1	1.41	1.45	1.03
Sea Water 4	1.17	1.05	0.90

The AQUA kit/mode is an option unit for use on portable EMP-Gold+ to allow quick and easy field measurements of Mercury in aqueous matrices. Simply just add (1+1) sulfuric acid and 10% tin-chloride into the liquid sample to vaporize the mercury ions (Hg^{2+}) to elemental mercury (Hg^{0}) for direct or gold-amalgamation cold-vapor UV atomic absorption measurement, depending on the mercury concentration levels.

Unmatched Versatility For Multiple Applications

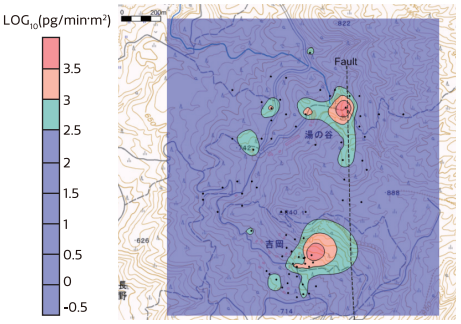
Mercury in Natural Gas Measurements

Natural gas is a naturally occurring hydrocarbon gas mixture consisting primarily of methane, but commonly including varying amounts of other higher alkanes, and sometimes a small percentage of carbon dioxide, nitrogen, hydrogen sulfide. Mercury is also present a natural contaminants, which must be carefully measure and reduced as it is known to cause Liquid Metal Embrittlements (LME) in pipelines, processes, heat-exchangers & etc. Mercury is also highly toxic with detrimental effects on the environment and as a occupational hazard to the workers.



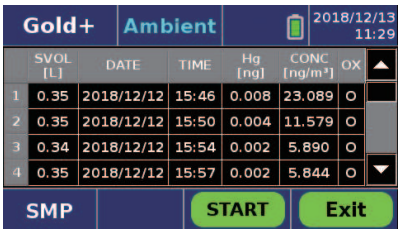
Mercury in Soil Gas Measurements

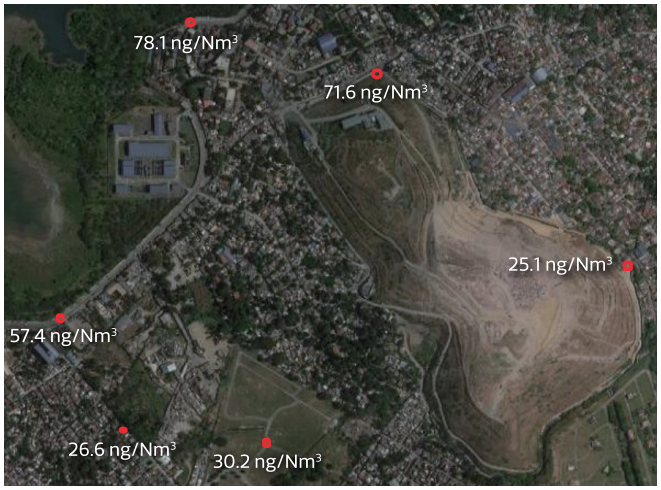
Soil gas is the vapors in the air spaces between soil particles. By applying the soil gas sampling technique, by measuring mercury, it can investigate and determine for possible sources of geo-thermal sites since mercury is one of the vapors emitted from such spots. Soil gas sampling and measurements can also be applied to survey and check for mercury contaminated and remediation sites, like landfills, abandoned industrial area and etc.



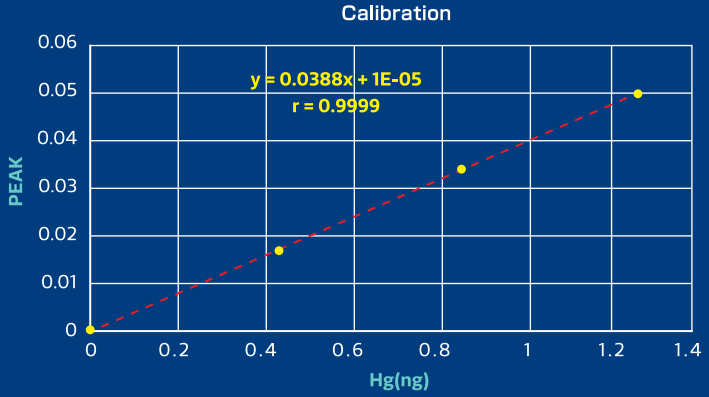
Mercury in Ambient Air Measurements

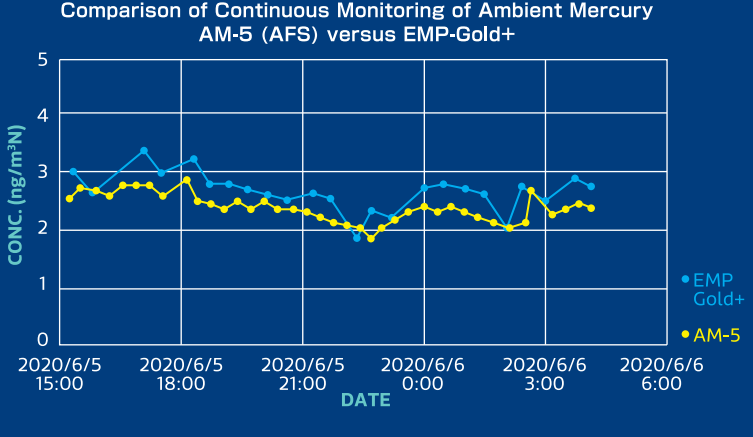
With its mobility (compact, light-weighted and battery-operated), EMP-Gold+ is excellent for field measurements. It exhibits unmatched sensitivity, demonstrating comparable data to AQMS (Air-Quality Measurement System) with Atomic Fluorescence Detector. It is ideal to deploy for site ambient air survey to determine suitable locations to setup AQMS for long term monitoring. It is also handy for site measurements to identify pollution sources, equipped with GPS coordinates recording for accurate location mapping.



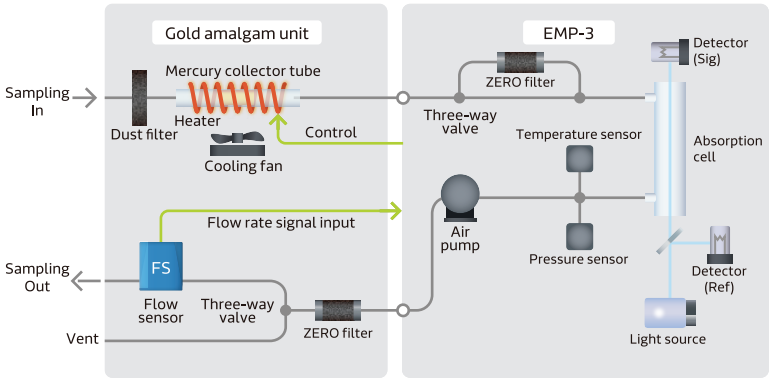


Excellent Sensitivity, Reproducibility & Precision





SCHEMATIC DIAGRAM



APPLICATIONS / TEST METHODS

EMP-Gold Amalgam Mode

Natural Gas, LPG, Shale Gas, Soil Gas, Ambient Air and other Gaseous matrices.
Methods: ASTM D 5954, ISO 20552

EMP Direct

Ambient monitoring for Hygiene Guidelines and Clean-Up protocols.
Guidelines: WHO, ACGIH, OSHA, USEPA, NIOSH, ATSDR and more

EMP-AQUA

Water and Digestates.
Methods: USEPA 245.1, 245.2, 245.5, 7470A, 7471B, EN-1483, ASTM D 3222-02, APHA 3112, JIS K0102 and more

SPECIFICATIONS OF EMP Gold+

Technique & Detection	Gold-amalgamation / Cold vapor atomic absorption spectrometry
Collector tube	4-2 mm Dia., 75mm Gold-Collector
Limit of detection /Limit of quantification	2 pg / 7 pg (LOD = 0.7 ng/m³; LOQ = 2.3 ng/m³ for 10-minutes sampling - 3L)
Measurement range	0.005 to 8ng (Max 2,000 ng/m³ in case of 10-minutes sampling)
Sampling time	1 to 30 mins. (User Adjustable)
Sampling flow rate	Max. 0.3 to 0.4L/min, accumulated amount is calculated by the flow sensor
Battery	Ni-MH Battery (EMP-3 1pc: Amalgam Unit 2pcs)
Preheating	Gold-Collector tube preheated ~150°C
Heating	Heated for 30 seconds under pump stop mode
Cooling	Cooled down to 200 °C or lower by running a fan for 40 seconds after the completion of measurement.
Number of measurement points	50 points (When the battery is fully charged) * At the time of 5 minutes sampling per cycle
Dust removal	PTFE membrane disc filter
Moisture removal	Nafion tube
Mercury exhaust trap	Nano-gold Zero Filter
Dimensions	450W × 370D × 190H (mm) (Carrying case)
Weight	4.8kg (6.4kg including EMP-3)

OPTIONS

N packer
For use in Soil-Gas Investigation

MB-1 (Standard gas box)
For Calibration use

Aqua kit
For Aqueous Reduction use

DC-1C-M (Dry Gas Meter)
For Hydrocarbon Gas Volume Measurement use

SPARE PARTS / CONSUMABLES

For EMP-3	Spare battery, zero filter, and battery charger (Input power 85-246VAC, 50/60Hz)
For gold amalgam unit	Collector tube (75 mm), zero filter, spare battery, dust filter, Nafion tube

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Identify the right mercury analyzer for you
https://www.hg-nic.com

ISO 9001 : 2015 CERTIFIED Tech-center, Factory & Osaka office/2017. 12. 27
ISO 14001 : 2004 CERTIFIED Tech-center, Factory & Osaka office/2007. 6. 8

Distributors

NIC EMP Gold+ Brochure/EN/2025.1 Ver2.1