



# Mercury Analyzer

PE-1000

## FULLY AUTOMATED PETRO-PYROLYSIS MERCURY ANALYZER

Direct Measurement of  
Total Mercury in  
Liquid-Hydrocarbons  
Matrices

**Fully Comply**  
to UOP 938-10  
Test Method



NIC PE-1  
MERCURY ANALYZER

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MERCURY ANALYZER

# Determination of Mercury in Crude Oil and its Fractions

Just like other heavy metals, Mercury occurs naturally in Crude Oil, in concentration ranging from low parts-per-billion to parts-per-million, varying from its oil fields in different continents. When processing the feedstock (crude oil) to obtain its valuable fractions like LPG, Naphtha, Gasoline, Jet Fuel, Kerosene and etc, Mercury must be prior removed to prevent contamination or carryover into these products. Therefore, a precise measurement of the Mercury content in Crude Oil is crucial and decisive for the control of the refinement processes. In addition, product fraction like Naphtha which will be further utilized to crack to produce highly demand polymers, controlling and restricting its Mercury content is more stringent to protect its hydrogenated catalysts which affects the cracking efficiency. Therefore, downstream petro-chemical processes normally want to measure Mercury in its Naphtha feedstock down to low or sub parts-per-billion levels accurately.

Nippon Instruments PE-1000 Mercury Analyzer allows direct measurement and analysis of all liquid petroleum-based samples, ranging from feedstock such as Crude Oil down to petroleum fractions as the light Naphtha, without any need of pre-treatment. The PE-1000 Mercury Analyzer utilizes NIC knowledgeable combustion and amalgamation technology coupled with the highly sensitive CVAF detector, enabling Mercury detection limit down to 0.01 parts-per-billion in raw petroleum sample. It is accredited and adopted under UOP Test Method 938-10. Analysis time is approximately 8 to 12 minutes. and, with the inclusion of the auto-liquid injector makes sample volume transfer more consistent, thereby ensuring precision down to trace levels without any user intervention. Samples are contained in septa-seal vials, avoiding loss due to volatility, thus maintaining sample integrity. In addition, the analyzer is capable to control sample aspirating speed, mixing, and wash cycle to eliminate sample to sample cross-contamination, makes the PE-1000 Mercury Analyzer a perfect solution for all petroleum laboratories.

PE-1000 Mercury Analyzer also offers optional gas analysis and sampling accessories to allow determination of Mercury in LPG, natural gas and gaseous matrices.



Ultra-High  
Sensitivity

Unmatched  
Precision

Fully-  
Automated

## 110-positions Autosampler / Injector for Unmanned Automated Analysis Enhancing Productivity

Operation is easy - simply just fill the samples in the sample vials and place into the autosampler tray, no need for any pre-treatment (extraction or digestion), minimize any possibility of error.



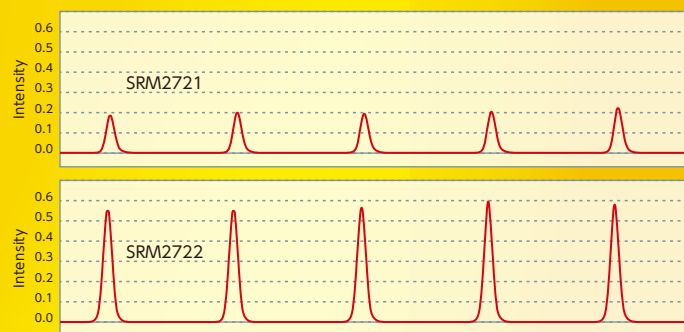
## Patented Innovative Pre-Concentration / Combustion Technology

Direct injection in a closed-system flow design ensures no loss of volatile analytes, providing uncompromised precision and consistency on every single measurement. High efficiency pyrolyzer with real-time temperature control ensuring complete combustion with quick-turnover time on each analysis. Fully automated operation for high analysis throughput and lab productivity.



**Patented**  
JP NO.4226049  
USP NO.8223332

## Ultra-High Sensitivity with Unmatched Precision

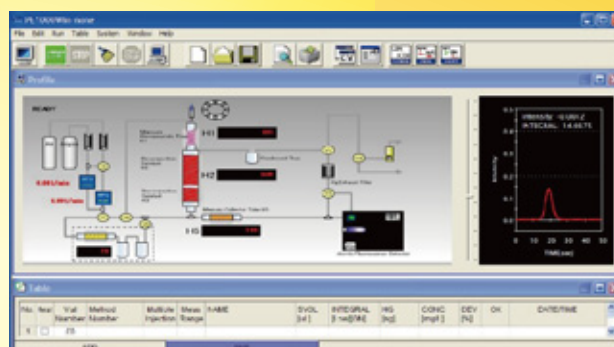


### Crude Oil Matrix (NIST SRM)

Sample	N	Certified Conc (ppb)	Measured Conc (ppb)	C.V. (%)
SRM2721	5	0.0360~0.0474	0.0401	8.3
SRM2722	5	0.116~0.142	0.1209	3.1

## Easy to Use / User Friendly Software

PE1000Win software is specifically designed for quick learning and easy operation. The software includes animated graphics that illustrate real time system operations (GUI), spreadsheet-style sequence tables and pre-set Heat Methods to match analysis of various sample matrices.



## Selective Configurations and Attachments

PE-1000 is available in with 110-positions liquid autosampler/injector or manual injection (PE-1) configuration, still with capability of upgrading with the autosampler whenever is needed. Compact design optimizes valuable laboratory bench-space. Other optional attachments and accessories are Gas Tube Desorption Module (RH-PE), Dual-Channel Direct Amalgam (Vaporizer) Sampler, Mercury Vapor Calibration Box (MB-1) & more.

- Gas-Tube Desorption Module
- LNG/LPG Direct Gas Sampler
- Mercury Standard for Gas Calibration
- Manual Reducing Vaporization
- PE-1 Manual Injection Configuration



RH-PE



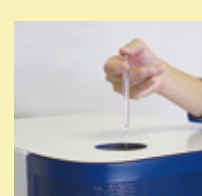
Direct-Amalgam Sampler



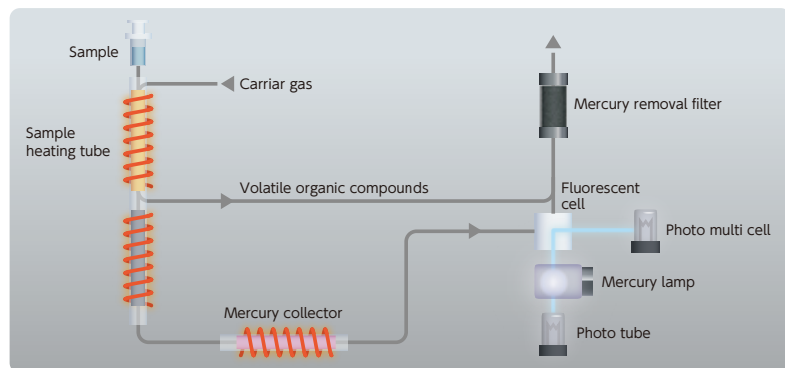
MB-1



S-MA (20mL)  
(for use with RH-PE)



## SCHEMATIC DIAGRAM



## APPLICATIONS/TEST METHOD

### Thermal decomposition:

Naphtha, Pygas, Gasoline, Jet fuel, Kerosene, Diesel fuel, Condensate, Crude oil, Fuel oil, Waste water & more

### Methods:

UOP 938-10

### Gas analysis:

LNG/LPG, Natural Gas, Propane, Butane, Shale gas, Ambient air & more

### Methods:

JLPGA-S-07, ISO 6978, ASTM D-6350

## SPECIFICATIONS

<b>Mercury measurement section (PE-1)</b>	Measurement principle	Non-dispersive double-beam CVAFS
	Light source	Low pressure mercury discharge lamp
	Wave length	253.7nm
	Detectors	Photo multiplier tube (PMT)
	Flow rate MFC controlled	0.01 ~ 1.0L/min
	Combustion tube	Quartz pre-packed with catalysts
	Maximum decomposition temperature	Up to 820°C
	Detection limit (Hg concentration)	0.01 µg/L
	Detection limit (Hg amount)	0.003ng
	Maximum measurement range	Up to 100ng (RSD < 3% @ 0.1ng)
	Mercury removal	Absorption by activated carbon
<b>Data processing system (PC-Win/PE-1)</b>	OS	Windows XP, 7, 8
	Communication	RS-232C
	Display	Peak wave shape, Calibration curve, Measuring time and measuring result
	Device control	Start/stop measuring : Controllable Pretreatment conditions : Heating conditions setup (Heating temperature & heating time), Sample volume setup (Extraction & dispensing volume & speed; Rinse volume & solutions)
	Printing	Memo, Analysis condition, Calibration curve, Measured and statistical data, Peak profiles
<b>Dimension &amp; Utility</b>	Dimension	510W × 350D × 510H (mm)
	Weight	40kg
	Power supply	AC100 ~ 240V, 50 / 60Hz, 1.5kVA Grounding : Grounding terminal with ground resistance of 100Ω or less
	Gas requirements	Argon 0.2 ~ 0.8MPa, >99.995% purity Compressed purified air 0.2 ~ 0.8MPa

## OPTION

<b>Auto liquid injector/Changer (HT-300A)</b>	Number of sample position	Up to 110 positions
	Drive system	Turn table system
	Sample container	2ml septum piercing vial
	Random access	Possible
	Sample delivery	Gas-tight syringe 100ul
	Dimension	420W × 400D × 520H (mm)
<b>Gas analysis attachment (RH-PE)</b>	Weight	9kg
	Heating temperature	Up to 700°C
	Dimension	150W × 180D × 350H (mm)
	Weight	6kg

## ACCESSORIES

Combustion tube (pre-packed with catalysts), Mercury collector tube M-100, Gas tight syringe, Sample vial, Cap & septa, Teflon joint set, Injection port septum, Mercury lamp & etc



Identify the right mercury analyzer for you  
<http://www.hg-nic.com>



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