



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



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**



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.



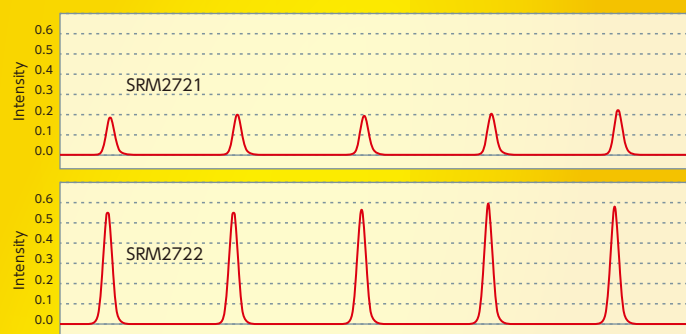
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New function for inhomogeneous samples such as solidified crude oil

VORTEX function with heating allows to extract from inhomogeneous and viscous samples without being diluted.



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



RH-PE

LNG/LPG Direct
Gas Sampler



Direct-Amalgam
Sampler

Mercury Standard
for Gas Calibration



MB-1

Manual Reducing
Vaporization

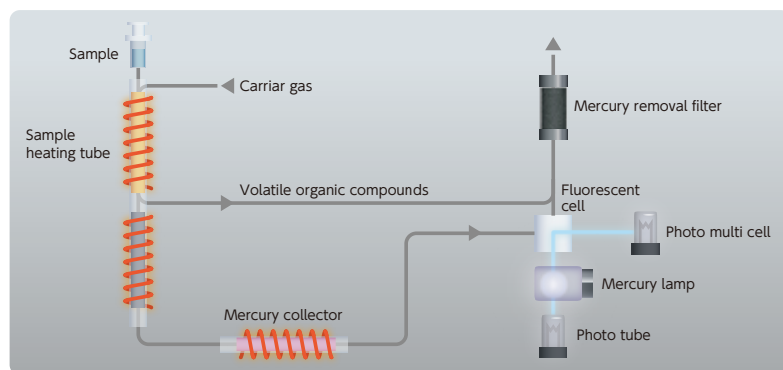


S-MA (20mL)
(for use with RH-PE)

PE-1 Manual Injection Configuration



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

Mercury measurement section (PE-1)	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)
Data processing system (PC-Win/PE-1)	Mercury removal	Absorption by activated carbon
	OS	Windows 8, Windows 10
	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)
Dimension & Utility	Printing	Memo, Analysis condition, Calibration curve, Measured and statistical data, Peak profiles
	Dimension	430W × 610D × 490H (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

Auto liquid injector/Changer (HT3103A)	Number of sample position	Up to 15 positions
	Sample container	2ml septum piercing vial
	Random access	Possible
	Sample delivery	Gas-tight syringe 100ul
	Dimension	310W × 323D × 637H (mm)
	Weight	9.5kg
Gas analysis attachment (RH-PE)	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



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ISO 9001 : 2008 CERTIFIED Tech-center, Factory & Osaka office/2003. 1. 30
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