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Press Release

Nippon Instruments Corporation Publishes Method for Measurement of Total Mercury in Atmospheric Air by Collection Tube

October 12, 2017 – Osaka, Japan. Nippon Instruments Corporation ([NIC](#)) has published a new application report describing the measurement of mercury (Hg) vapor in atmospheric air via collection tube by thermal decomposition using atomic absorption spectroscopy. The method described in the report complies with [ISO-20552](#), *Workplace air -- Determination of mercury vapour -- Method using gold-amalgam collection and analysis by atomic absorption spectrometry or atomic fluorescence spectrometry*.

NIC Application Note MA-3A-EN-201, *Total Mercury in Collection Tube (Atmospheric Air) Using Direct Mercury Analysis*, includes information about calibration and measurement, and highlights the performance of the [NIC MA-3000](#) direct thermal decomposition mercury analyzer.

Atmospheric elemental mercury, although present only in trace amounts, has been established to be a significant source of mercury in both aquatic and terrestrial environments. Mercury and most of its derivative compounds are metabolic toxins that bioaccumulate in aquatic food chains, eventually reaching concentrations capable of causing neurological and reproductive damage in terrestrial and aquatic organisms. Atmospheric mercury deposition has also led to accumulation in forest soils. Major sources include incineration of medical waste, municipal waste, sewage sludge, and hazardous waste, and other combustion processes. Additionally, the burning of fossil fuels and a wide range of manufacturing activities, such as metals production, mining, refining and cement production, contribute to the problem.

Mercury is known to also bioaccumulate in humans, so bioaccumulation in the aquatic food chain carries over into human populations, where it poses a particular threat to development in utero and in early childhood due to profound central nervous system



**NIC MA-3000 Direct Thermal
Decomposition Mercury Analyzer**



damage. To prevent mercury poisoning, it is therefore necessary to accurately quantify total mercury vapor in the atmosphere.

For the analysis described in the report, sample gas was taken directly from the collection tube. The flow rate of the sampling pump was adjusted to 0.5-1L/min and a gas meter was connected to measure the total sampling volume. Calibration was done using a standard gas box and the least-squares regression method was used to create and complete the calibration curve.

Measurement was performed by the MA-3000 analyzer, a dedicated direct mercury analyzer that selectively measures total mercury by thermal decomposition, gold amalgamation and cold vapor atomic absorption spectroscopy on virtually any sample matrix.

The MA-3000 analyzer is designed to provide quick results without an elaborate, time-consuming sample preparation process. The results show that the NIC MA-3000 is able to analyze collection tube samples of atmospheric air with accuracy and precision.

A copy of this report may be requested at shar-nic@rigaku.co.jp

About Nippon Instruments Corporation

Nippon Instruments produces a broad line of Hg monitors suitable for surveying for vapor-phase elemental mercury in air, and elemental and mercury compounds including methylmercury, in gases, liquids and solids. Materials analyzed include fuels – coal, lignite, crude oil, natural gas– liquids such as waste, drinking and river water; incinerator stack gases; animal products; human tissue and blood and solid waste streams.

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