330 Nantucket Boulevard, Toronto, Canada M1P 2P4
lab-air-info@tekran.com Tel:+1-416-449-3084 Fax: +1-416-449-9298
Toll Free: (US and Canada) 1-888-383-5726 (*1-888-3-TEKRAN*)

The Tekran Series 2600-IVS Difference!

Rev 021916

Method 1631 (Dual Gold Trap CVAFS)
Method 245.7 (Direct CVAFS Analysis)
US EPA IO-5 (Ambient Air)
ASTM D-6350 (Natural Gas)

Tekran equipment is manufactured under US and foreign patents and patents pending

The ***Tekran®* Series 2600-IVS** is the most stable, sensitive ultra-trace mercury analyzer available today. It was designed to be easy to set up, easy to use, and easy to maintain. The **Series 2600-IVS CVAFS Mercury Analysis System** has a number of unique features that increase its performance and flexibility. The standard system is equipped with the same detector as is used in our **Model 2500**. The **Model 2500 Atomic Fluorescence Detector** is renowned for its sensitivity, low noise and stability.

- **Superior design with unsurpassed analytical performance**
- **Short set up time**
- **Robust & simple to maintain**
- **Superior user control**
- **Adaptable to multiple methods**
- **Minimal sample carryover with auto-flush function**
- **Automatic shut off**
- **Free factory training and lifetime customer support**

330 Nantucket Boulevard, Toronto, Canada M1P 2P4
lab-air-info@tekran.com Tel:+1-416-449-3084 Fax: +1-416-449-9298
Toll Free: (US and Canada) 1-888-383-5726 (*1-888-3-TEKRAN*)

General Features

Before Delivery

Before shipment, every **Series 2600-IVS** system is exercised for several days in our labs. Each and every unit is fully tested to demonstrate an MDL of ***< 0.05 ng/L*** before being shipped. This is a factor of four lower than EPA requirements. Others may claim a low MDL. Tekran actually delivers day after day. In clean room environments with low mercury blanks, MDL's as low as ***0.02 ng/L*** are routinely achievable. We have a ***Pre-Delivery Guide***, to help you prepare your lab before the system arrives. We provide lists of preferred, low mercury reagent suppliers to minimize start up time.

Easy to Set Up

The **Series 2600-IVS** assembles for operation in only minutes. A step by step ***Quick Start Guide*** will have you up and running in no time. Unlimited free telephone support is available in the event you require assistance. (Toll free in the US and Canada)

Ongoing Assistance

Tekran is here to assist you every step of the way. For instance, once you are up and running, you may find that your blanks are too high. Tekran's various ***Method Analytical Guides*** and our phone support will assist you with these and any other analytical issues you may encounter.

Free Factory Training Courses

Tekran provides periodic factory training courses for customers. These courses are provided ***at no charge*** and provide comprehensive information on how to actually run low level samples in your laboratory. They detail methods to reduce background levels and cross contamination as well as demonstrating instrument maintenance and basic repair operations. On-site training can also be arranged for a nominal fee. Customers with previous trace metals analytical experience generally do not require these courses.

Simple to Maintain / Low Cost of Ownership

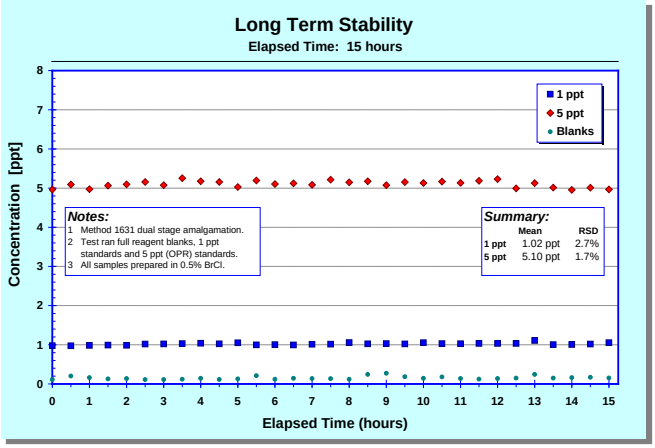
Tekran equipment is routinely used in some of the most remote, inhospitable places on earth. For example, researchers have used the **Series 2600-IVS** in the high Arctic to perform snow sample analysis. These scientists are often capturing unique events that occur for only a few days per year; so reliability is of prime importance. Downtime and service calls are simply not an option. All Tekran products are designed to be easily serviceable by the analyst. Keeping a few spare parts on hand will reduce your downtime to virtually zero.

All flow path components (tubing, cartridges, heaters, traps, Teflon lines, etc.) are user replaceable without tools. All main service components are placed on the top deck platform for easy access. A simple lift of the lid provides full access to these components. Infrequent operations such as lamp changes are easily performed with built in instructions in the operation software.

330 Nantucket Boulevard, Toronto, Canada M1P 2P4
lab-air-info@tekran.com Tel:+1-416-449-3084 Fax: +1-416-449-9298
Toll Free: (US and Canada) 1-888-383-5726 (*1-888-3-TEKRAN*)

Analytical Features

Reliability doesn't count for much if the analyzer gives you the wrong answer! The **Series 2600-IVS** has design refinements and elements that give it unsurpassed analytical performance. Some of these may seem obvious, but no other system incorporates all of these features.

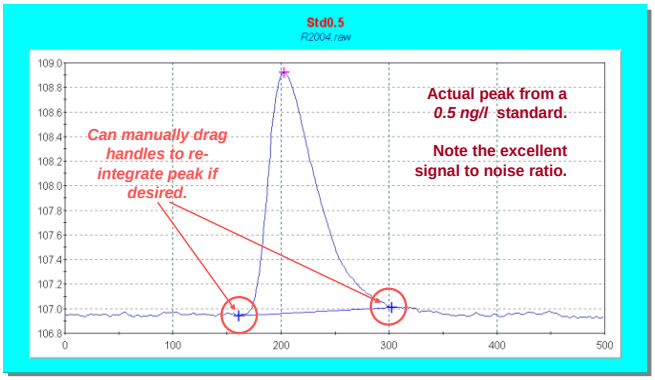


Long Term Stability

The **Series 2600-IVS** is stable and holds its calibration. The graph at right shows repeated runs of low level standard (**1 ppt**) and Ongoing Precision and Recovery (**OPR**) standards run over a 16 hour period. This long term stability means increased productivity with fewer reruns. Long term, continuous operation is expected and delivered.

Superior AF Detector

The AF detector in the **Series 2600-IVS** provides extraordinary sensitivity, stability and selectivity. The graph at right shows a typical 0.5 ppt peak. Note the smooth profile and very low baseline noise. A high resolution (24-bit) A/D converter allows accurate quantitation of peaks ranging from less than 0.1 mV to over 1300 mV in height.



The detector achieves this performance by having a number of unique features. The lamp is temperature controlled. An optical feedback arrangement ensures constant lamp intensity over the course of the run and from day to day. The entire optical path is purged with argon. (Air in the optical path will cause sensitivity and baseline shifts since ozone, ozone precursors, or other UV absorbing compounds may be present.) The detector uses a high sensitivity photomultiplier, rather than a cheaper photodiode UV sensor.

Direct In-Vial Sparging (IVS)

The **Series 2600-IVS** is designed to use direct sparging of mercury from the sample vials using a custom septum piercing probe. With direct sparging, the need for a separate gas/liquid separator is completely eliminated. Also eliminated is the need for a pumping system to move liquids though the system. The overall design is greatly simplified with fewer moving parts and simplification of sample introduction. This reduction in components translates to lower instrumentation cost, as well as reduction is operation cost. The absence of liquid transport greatly improves performance and extends the life of downstream elements. For **Method 1631** (gold pre-concentration), it means that the lifetime of the first stage gold cartridge is substantially extended due to the absence of aerosols.

Mass flow Controller

A constant carrier gas flow is vital to long term stability of the analyzer. The **Series 2600-IVS** incorporates a mass flow controller (**MFC**) to ensure constant, repeatable analytical flow. (A mass flow controller consists of a thermal flow sensor, proportional valve, and closed loop feedback control circuit to ensure that the actual gas flow is always the same as the setpoint flow.) Tekran's MFC flow system is far superior to the flow restrictors or rotometers used in other analyzers.

Flow Path

The **Series 2600-IVS** uses only ***gas phase*** flow switching. Some other analyzers use valves to switch between the sample and wash water ***liquid*** streams. This is an ongoing source of difficulties, especially when running unfiltered samples. Switching the liquid phase with a valve can cause the following problems:

- Contamination
- High carryover
- Scarring of the valve seat, causing leaks
- Scavenging of mercury

Except when actually loading the first stage cartridge with mercury, the **Series 2600-IVS** vents gas from the phase separator to the outside air rather than simply passing it downstream. This keeps the analytical system clean, ensuring trouble free operation for extended periods.

Simple Mercury Speciation

Some customers are using the **Series 2600-IVS** to perform fractionation of biological samples (e.g. fish and hair) into mercury species. By altering the reagents and on-line reduction chemistry, the **Series 2600-IVS** can be configured to measure either ***total mercury*** or ***inorganic mercury*** fractions. ***Organic mercury*** (methyl) is determined by difference. A simple, common digestion procedure is used prior to running both fractions. This approach is useful for certain matrices and avoids the lengthy and complex distillation, ethylation and GC separation required for low-level methyl mercury analysis.

Recording and Logging of Internal Instrument States

The **Series 2600-IVS** records a number of internal instrument variables and stores these results for each analytical run. Some of the parameters measured are:

- Lamp intensity
- Lamp drive voltage
- Pump speed
- Pump current
- Actual carrier gas flow

This information provides a permanent record of the instrument parameters most vital to performance. It greatly simplifies troubleshooting and provides advance notice of potential problems.

330 Nantucket Boulevard, Toronto, Canada M1P 2P4
lab-air-info@tekran.com Tel:+1-416-449-3084 Fax: +1-416-449-9298
Toll Free: (US and Canada) 1-888-383-5726 (*1-888-3-TEKRAN*)

Sample Carryover and Auto-Flush Function

The **Series 2600-IVS** has been designed with a number of features to minimize sample carryover. If you encounter an unexpectedly high sample that could result in carryover, the system **Auto-Flush Function** will automatically suspend sample analysis, perform exactly as many cleaning/flushing cycles as needed to eliminate residual contamination, and then resume processing your batch.

This **Auto-Flush Function** is highly desirable because running a high concentration sample will immediately contaminate any analyzer's inlet pathways, especially if there is any liquid contact in the sample train (which the Series 2600-IVS avoids). Contamination from previous samples affects subsequent measurements and the flushing function reduces carry over potential.

To further reduce contamination between samples, a **Rinse** tube containing an acid rinsing solution may be specified to run automatically after each sample. This feature ***does not*** increase the analytical time per sample and dedicating only one tube per rack of 12 samples provides sufficient solution for rinsing. This rinse step is ***in addition to*** the normal rinse function.

Automatic Shutoff

The analyzer will automatically purge itself and shut off all gases and reagent use after the final sample is run. Unattended operation is safe and routine.

Tekran 2621M Auto Sampler

Interfacing with the **Series 2600-IVS** is the state of the art **Tekran 2621M** auto sampler. The 2621M features a dedicated rack for standards, and a small footprint, and an optional integrated wash station. The unit can hold a maximum of 120 samples at a time, with the ability to run a combination of up to three "fold down" trays, each containing twenty-four 40 mL septa vials.

Flexibility

Even if you plan on running only compliance wastewater samples initially, you will appreciate the flexibility of the **Series 2600-IVS**. The analytical carrier gas flow, pump speed, valve configuration and heater temperatures are all set in user configurable event tables. Users can create and edit as many of these analytical cycle tables as desired. Opto-isolated event trigger outputs allow control of external equipment. For example, some customers connect the detector cell output of the **Series 2600-IVS** to a mass spectrometer, allowing ***isotopic abundances*** of their trace samples to be measured. Moreover, the top-deck method design of the **Series 2600-IVS** allows easy switching of analytical methods in a couple of minutes. The **Series 2600-IVS** is easily converted to carry out analysis water samples by EPA Method 245.7. Additionally, manually collected air samples may be analyzed via EPA method IO-5, manually collected natural gas samples may be analyzed via ASTM method D-5459-98 and ISO method 6978.

Due to continuing development, all specifications are subject to change.