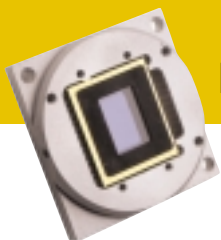


ICP-OES

Varian Vista-MPX
CCD Simultaneous
ICP-OES



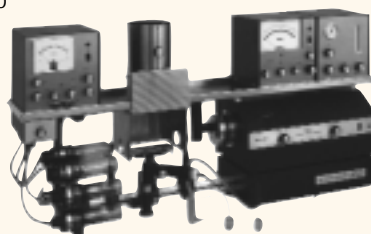
VARIAN



“Delivering the productivity of simultaneous ICP-OES at an affordable price”

Varian, Inc. is a recognized world leader and innovator in AAS, ICP-OES and ICP-MS. Varian's history in atomic spectroscopy began with the development of the components for the world's first atomic absorption spectrometer in the mid 1950s. Since then, Varian's experience in atomic spectroscopy has led to numerous innovations, including:

- SpectrAA—the first AAS to provide centralized PC control in 1984
- UltraMass—the first fully-automated ICP-MS in 1993
- Vista—the world's fastest ICP-OES in 1998



You asked us for an ICP that was more productive and more affordable. We listened. Today, Varian is proud to introduce the Vista-MPX™, delivering the productivity of simultaneous elemental analysis at an affordable price.

The secret to this performance is the innovative MPX megapixel detector, the first to provide over 1.1 million pixels in a CCD array detector design. The Vista-MPX gives the benefits of full wavelength coverage and simultaneous measurement. Full wavelength coverage means spectral interferences can be easily avoided. Simultaneous operation means better results precision, improved background correction and higher productivity. Quite simply, Vista-MPX gives you better answers, faster.

The Vista-MPX is ideal for environmental, chemical and industrial laboratories, offering a host of benefits including:

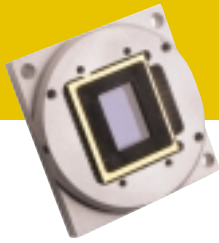
- The productivity of simultaneous measurement of all elements from parts-per-billion to percent levels with the unique megapixel CCD array detector.
- Simple 'one step' analysis that saves you time and argon costs. The optimized plasma viewing systems of the Vista-MPX means that, unlike dual view systems, you don't have to analyze the sample twice.
- Rapid instrument set-up, operator training and method development from our powerful ICP-Expert™ software which is versatile and easy to learn.
- Fast optimization and hands-free operation, from full PC control of all instrument parameters.
- The confidence to analyze any sample type with Varian's robust free running 40 MHz RF generator.
- The highest reliability from no moving parts optics and RF generator designs.





MPX

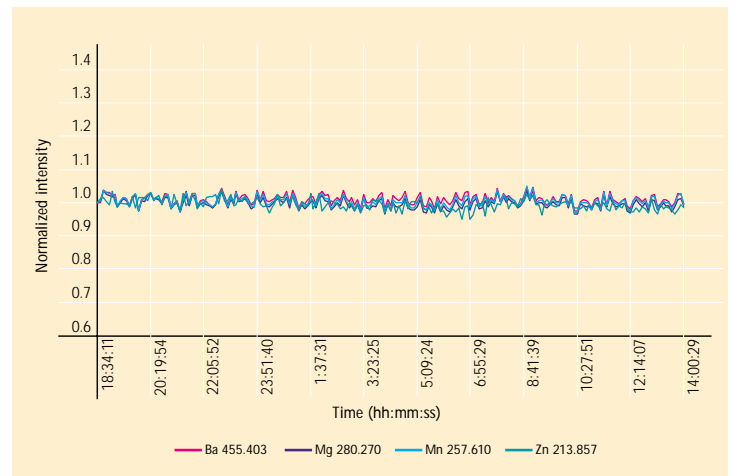




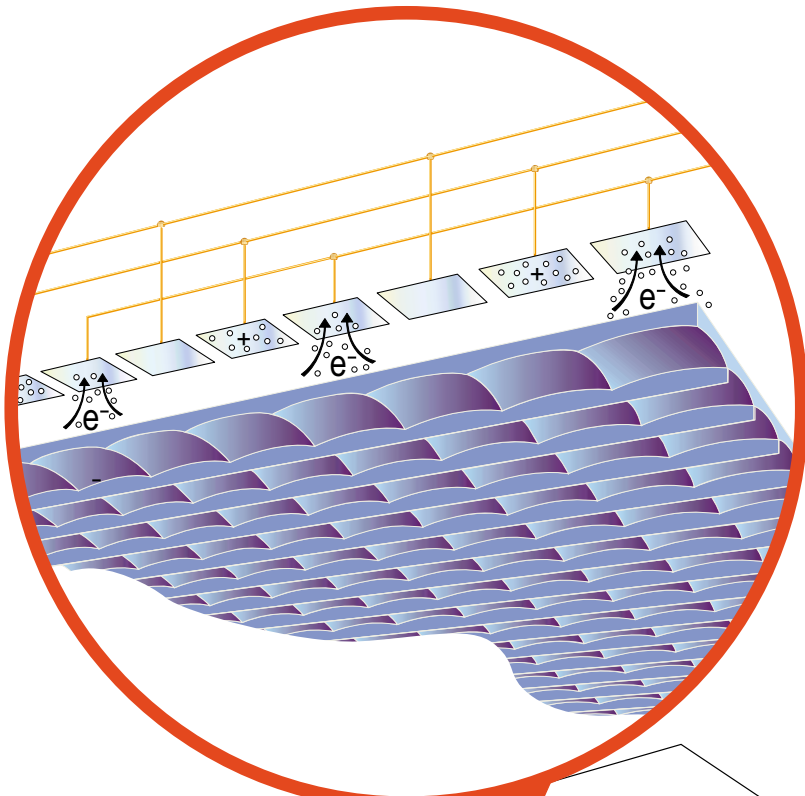
“Simultaneous ICP-OES”

At Varian, our research challenge was to provide the productivity and performance benefits of a simultaneous ICP-OES at the price of a sequential system. The solution was to create a CCD array detector with the ability to capture the entire wavelength spectrum in one reading without scanning. The MPX is the world's first ICP detector to provide over 1.1 million pixels in a large area, CCD array design

With the Vista-MPX, you can experience all the benefits of simultaneous ICP-OES. Because the Vista-MPX captures the entire spectral image in one reading, you save time and argon costs. Whether you have tens or hundreds of samples to analyze each day, Vista-MPX will save you money. Simultaneous ICP means simultaneous background correction and internal standardization—resulting in more accurate and precise results with excellent long term stability. The unique MPX CCD array detector is cooled to -30°C for the ultimate in low noise performance and best possible detection limits. For the best value simultaneous ICP-OES—choose Vista-MPX.



The excellent long term stability of the Vista-MPX is shown over 20 hours of continuous aspiration without internal standardization. Simultaneous ICP-OES with no moving optical parts yields superior stability without drift correction lamps.

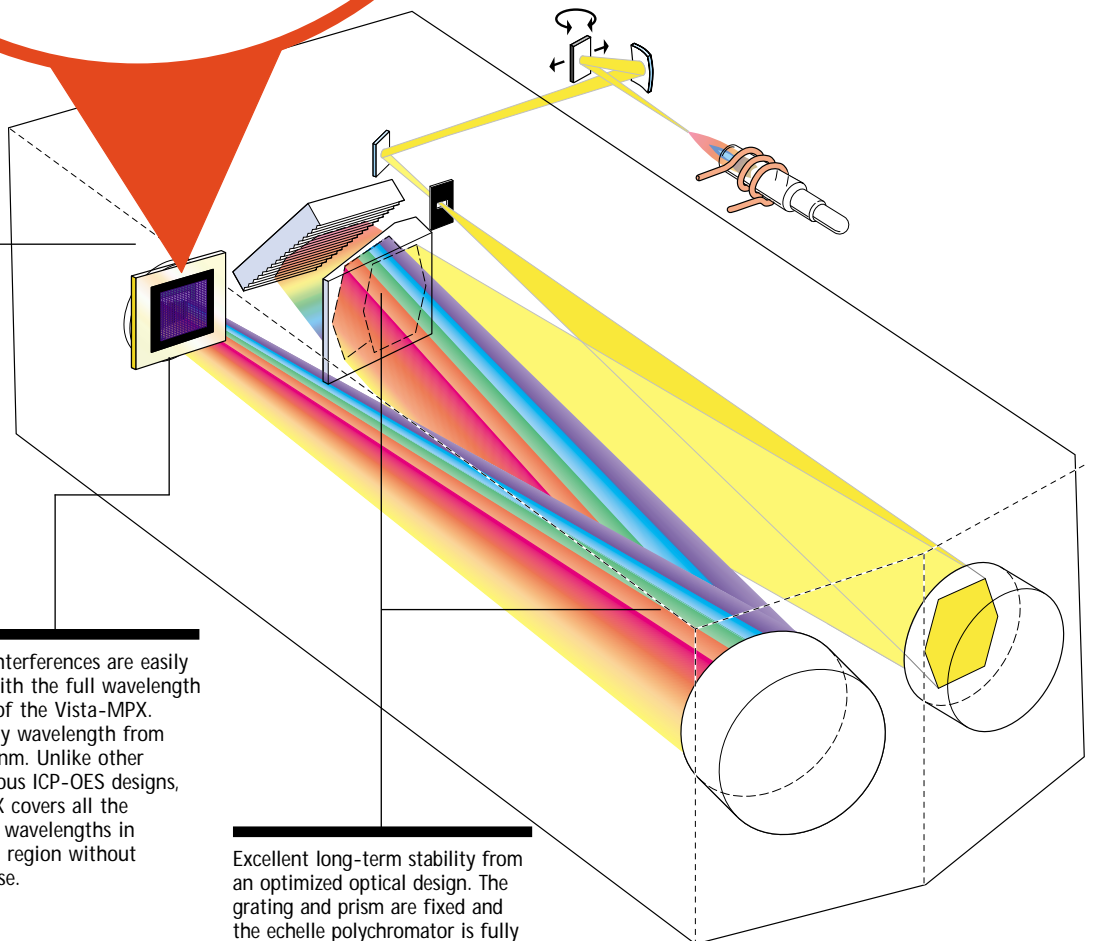


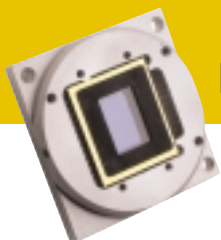
To ensure data integrity and a wide dynamic range the Vista-MPX CCD features the Clocked Recombination System (CRS) for anti-blooming protection.

The productivity of simultaneous ICP-OES—all wavelengths are captured in one reading without time consuming scanning.

Spectral interferences are easily avoided with the full wavelength coverage of the Vista-MPX. Choose any wavelength from 175-785 nm. Unlike other simultaneous ICP-OES designs, Vista-MPX covers all the important wavelengths in the visible region without compromise.

Excellent long-term stability from an optimized optical design. The grating and prism are fixed and the echelle polychromator is fully thermostatted, providing a reliable, no-moving-parts design that does not require correction lamps.





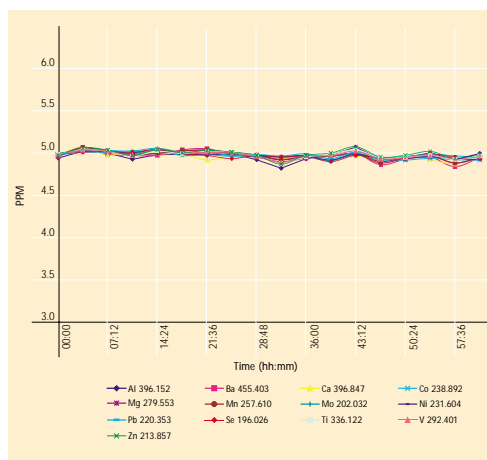
“Robust and Reliable RF Systems”

Varian’s ICP systems have always provided stable and accurate analytical results, even for the most challenging samples. Utilizing our established high performance RF generator, Vista-MPX continues this tradition of excellence, offering:

- Superior plasma performance from over 75% RF coupling efficiency. Directly analyze organic solvents and samples containing high levels of dissolved salts.
- Excellent long term stability through the elimination of inefficient secondary matching networks and reduced waste heat.
- Higher uptime, better reliability and lower service costs as there are no moving parts.
- The flexibility to easily analyze your full range of sample types. Varian’s compact 40 MHz free running design responds quickly to any changes in plasma sample loading and volatility.
- Reliability and servicability are maximized by the elimination of water cooling.

Difficult sample measurements made easy

No matter what the sample, the Vista-MPX provides excellent long-term stability. To achieve this, Varian created the Direct Serial Coupling (DISC) system that improves the transfer efficiency of RF energy into the plasma by eliminating inefficient secondary matching networks. As a result, the Vista-MPX RF system produces a robust and stable plasma, suitable for the direct analysis of samples ranging from organic solvents to industrial wastes and concentrated brines. Unlike crystal locked designs, Vista’s free running RF generator responds instantaneously to changes in the plasma impedance for superior stability.



Showing the excellent stability of the Vista-MPX radial view ICP-OES, one hour stability of elements at 5mg/L in a directly aspirated 20% NaCl matrix.

“One-step analysis from one plasma view”

Linear Dynamic Range from Parts Per Billion To Percent Levels

The unique Vista-MPX CCD detector provides full wavelength coverage from 175–785 nm. Our unique MultiCal feature then automatically assigns each result to the appropriate wavelength for that result. MultiCal extends the linear range of ICP-OES analysis from parts-per-billion to percentage levels. Unlike dual view systems, Vista-MPX provides this linear dynamic range without having to analyze the sample twice. Vista-MPX provides one-step analysis from a single plasma view.

Automatic Results Confirmation

One of the greatest challenges in the laboratory is to prove that you have accurate results for unknown samples. Vista’s MultiCal can help by providing automatic on-line results confirmation throughout the analysis. Use MultiCal to simply monitor your results at two or more wavelengths for each element and you have automatic results validation. MultiCal offers an extra level of data quality control—giving you confidence in the accuracy of your results and confirmation of freedom from interferences. If you are not using MultiCal confirmation today—how can you be sure of the accuracy of your data?

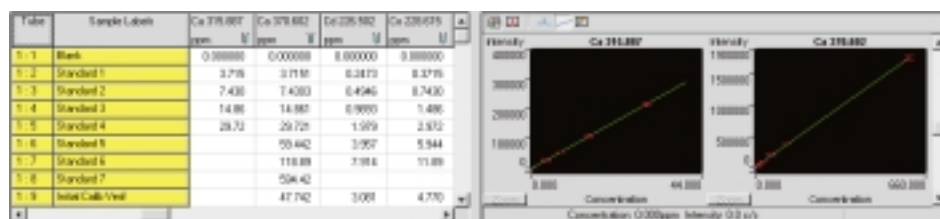
Vertical or Horizontal Plasma?

Vista-MPX offers either optimized axially viewed or radially viewed plasma systems. The horizontal, axially viewed plasma is ideal for environmental applications that require excellent sensitivity and MultiCal provides the dynamic range needed from one plasma view. Varian’s axially viewed plasma is suitable for the routine analysis of samples with dissolved solids contents up to 5%.

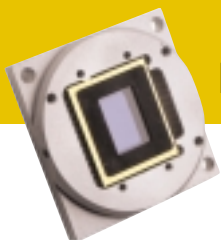
If long term analysis of the most difficult sample types is required, the Vista-MPX radially viewed plasma offers the benefits of robust operation with minimal maintenance. The radially viewed plasma is vertically oriented, providing immediate venting of exhaust vapors for reduced injector tube blockage. Vertically orientated, radially viewed plasma systems have become the accepted standard in many industries including chemicals manufacture, salt production, wear metals analysis, petrochemical production and precious metals refining. Dual view plasma systems, which feature horizontal torches, cannot match the rugged, high dissolved salt performance of the Vista-MPX radial.

3 sigma detection limits of Vista MPX instruments—Axial vs Radial

Element	Wavelength (nm)	Detection limit (ug/L)	
		Axial	Radial
Ag	328.068	0.5	1
Al	396.152	0.9	4
As	188.98	3	12
As	193.696	4	11
Ba	233.527	0.1	0.7
Ba	455.403	0.03	0.15
Ba	455.403	0.03	0.15
Be	313.107	0.05	0.15
Ca	396.847	0.01	0.3
Ca	317.933	0.8	6.5
Cd	214.439	0.2	0.5
Co	238.892	0.4	1.2
Cr	267.716	0.5	1
Cu	327.395	0.9	1.5
Fe	238.204	0.3	0.9
K	766.491	0.3	4
Li	670.783	0.06	1
Mg	279.55	0.05	0.1
Mg	279.8	1.5	10
Mn	257.61	0.1	0.133
Mo	202.03	0.5	2
Na	589.59	0.2	1.5
Ni	231.6	0.7	2.1
P	177.43	4	25
Pb	220.35	1.5	8
Rb	780.03	1	5
S	181.972	4	13
Sb	206.83	3	16
Se	196.03	4	16
Sr	407.77	0.02	0.1
Sn	189.93	2	8
Ti	336.12	0.5	1
Tl	190.79	2	13
V	292.4	0.7	2
Zn	213.86	0.2	0.8



The advantages of MultiCal—results for Ca are automatically assigned either to the Ca 315.887 nm wavelength which is calibrated to 30 mg/L or to the Ca 370.602 wavelength which is calibrated to 600 mg/L. With MultiCal the Initial Calibration Verification standard is accurately recovered at 47.7 mg/L (%R = 106%) from the appropriate wavelength.



“Expert software”

Varian's ICP-Expert software is based on our award-winning worksheet concept. Samples are presented as rows, while elements and wavelengths are presented as columns, creating an easy to use worksheet with all data readily at hand. With ICP-Expert you can become an expert user quickly, with Wizards that guide you through each operation and a video Help system which shows you how to do everything from changing a nebulizer to replacing pump tubing.

ICP-Expert features unmatched software capabilities, including:

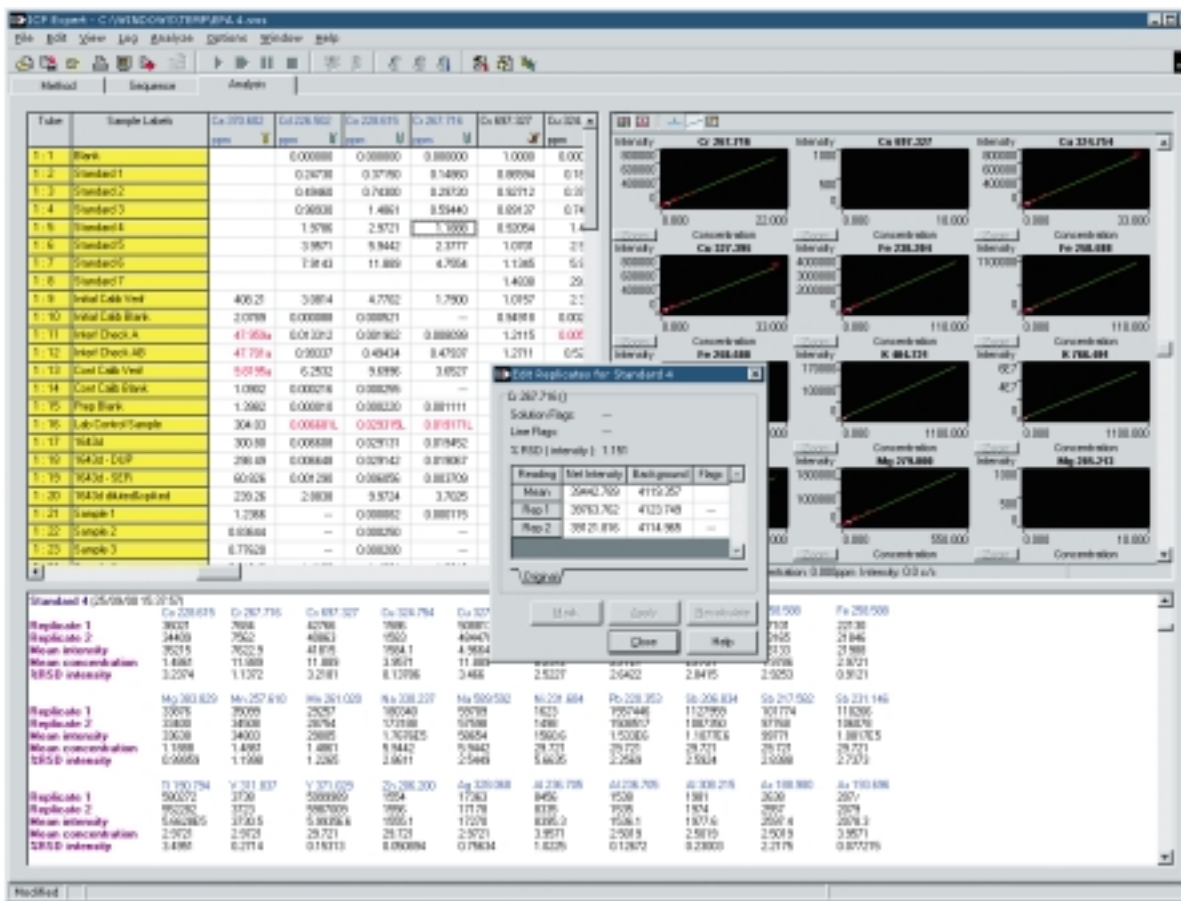
- Standard Additions calibration
- Calibration reslopes
- Full post-analysis data reprocessing of standard concentrations, curve fit, internal standards, background correction points and more
- Full data editing—simply click to mask replicates or solutions from calculations
- Complete units conversion facilities and reporting of results in molecular forms such as KCl or NaCl.
- Full Quality Control Protocols software for compliance with all international regulatory needs.



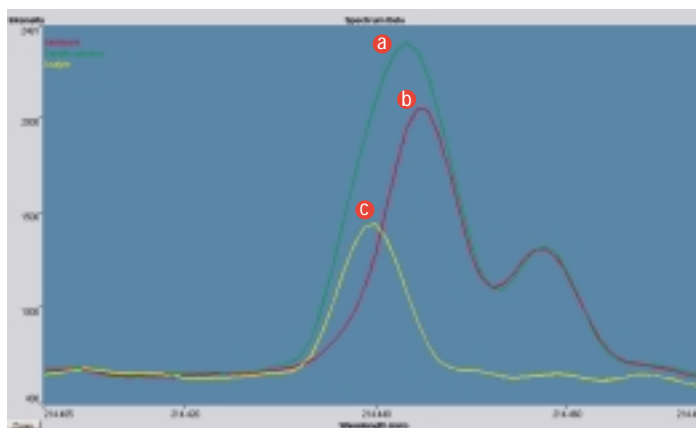
Need help? Join PlasmaNet™ -
Varian's on-line ICP users email forum.



The ICP-Expert multimedia Help includes video instructions for hardware setup and routine maintenance procedures.



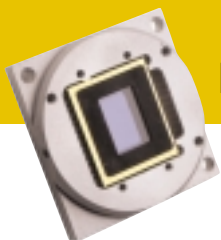
For even greater productivity, our built-in Fast Automated Curve-fitting Technique (FACT) achieves on-line spectral deconvolution with no time penalties. For your most complex spectral interference problems, simply aspirate a typical sample matrix and use the FACT wizard to solve spectral interferences. Traditional spectral deconvolution techniques require spectral scanning methods that can triple or quadruple the analysis time. FACT's productivity means you can analyze more samples per day and further reduce argon consumption.



FACT in action. As shown here, FACT easily handles the resolution of the difficult Fe interference at 214.438 nm. Shown are:

- the appearance of the peaks in real soil sample
- The FACT model of the interference (500 mg/L Fe)
- The FACT deconvolution of the Cd analyte at 214.438 nm

FACT's power can also be used after the analysis has been completed. If any of the results appear inaccurate, FACT modelling can be conducted after the analysis and applied to the data to solve spectral interference problems and provide greater accuracy. With FACT, your data is never wasted.



“Performance”

Productivity and Dynamic Range for Environmental Applications

Only Varian can offer the productivity of simultaneous ICP coupled with the benefits of our unique CCD detector technologies. With MultiCal, the measurement of major and trace elements in soils, waters and other samples is made easy with just one plasma view. This extended linear dynamic range coupled with the freedom from interferences offered by the MPX CCD detector, makes the Vista-MPX ideal for environmental applications.

Robust Performance for Industry

Varian's robust RF generator system provides the rugged stability needed for chemical and industrial laboratories. Whether you are performing process control in the petrochemical industry, measuring pharmaceutical impurities or screening for toxic element contents in food, Vista-MPX offers stable, reliable performance for all of your sample types.

Flexible Sample Introduction

Vista-MPX is compatible with a range of sample introduction options that are easily and rapidly exchanged for aqueous, organics and HF applications.



Four hour stability study for 5 mg/L S21 elements in directly aspirated kerosene, showing the stable and reliable performance of the Vista-MPX for difficult organic solvents.

Element	Expected ICSAB (mg/L)	Found ICSAB (mg/L)	% Recovery ICSAB	US EPA + 20% Pass/Fail Result
Ag 328.068	0.20	0.22	110.4%	PASS
As 188.980	0.10	0.10	99.8%	PASS
Ba 585.367	0.49	0.51	103.3%	PASS
Be 313.042	0.49	0.47	96.0%	PASS
Cd 226.502	0.98	1.01	102.7%	PASS
Co 228.615	0.49	0.50	101.1%	PASS
Cr 267.716	0.49	0.49	100.2%	PASS
Cu 327.395	0.49	0.52	106.1%	PASS
Mn 257.610	0.49	0.49	99.4%	PASS
Ni 231.604	0.98	0.98	100.1%	PASS
Pb 220.353	0.05	0.05	99.5%	PASS
Sb 206.834	0.59	0.58	98.7%	PASS
Se 196.026	0.05	0.04	91.3%	PASS
Tl 190.794	0.10	0.09	91.7%	PASS
V 311.837	0.49	0.51	104.2%	PASS
Zn 206.200	0.98	0.92	93.5%	PASS
Zn 206.200	0.98	0.92	93.5%	PASS
Al 308.215	460.1	441.7	96.0%	PASS
Ca 315.887	460.1	452.8	98.4%	PASS
Fe 258.588	184.0	166.4	90.4%	PASS
Mg 383.829	460.1	421.9	91.7%	PASS

The determination of the USEPA elements in the interference check standard ICSAB (interferents and low level analytes). All analytes were recovered within required limits and even the high level interferents at up to 500 mg/L were accurately measured. Typical analysis time was less than 5 minutes per sample.

"A Family of Solutions"

The new Vista-MPX extends Varian's family of ICP-OES spectrometers, offering you a comprehensive range of ICP-OES instruments to suit your needs and budget. All Varian ICP-OES spectrometers feature ICP-Expert software, providing full PC control of all instrument parameters. Together with our Atomic Absorption Spectrometry and ICP-Mass Spectrometry ranges, Varian provides an elemental analysis solution for every laboratory. The ICP-OES range begins with the budget priced Liberty series—the world's Number One selling sequential scanning system. The Liberty is ideal for smaller capacity labs, for the education field or for those wanting to augment or replace their atomic absorption capabilities.

With its new CCD detector technology, the Vista-MPX provides all the productivity and flexibility of a simultaneous ICP-OES at an affordable price. Vista-MPX is ideal for busy environmental, chemical and industrial laboratories, where it's 'one-step' analysis approach means higher productivity and lower running costs. For more complex sample types Vista-MPX provides the benefits of simultaneous background correction and simultaneous internal standardization.

For the ultimate in PROductivity and performance, Varian offers the Vista-PRO. With an established reputation for excellence, Vista-PRO is the ICP-OES of choice for hundreds of ICP users worldwide. When you require the best detection limits, resolution,

speed and performance for the most difficult samples, the choice is Vista-PRO. Vista-PRO is ideal for all busy laboratories and is particularly suited for demanding research applications.

Safety

It is Varian's policy to manufacture safe products and to meet all legal requirements governing the design, manufacture and sale of safe products. As with all similar products, some or all of the following hazards may be present: high temperatures, high pressure gases, explosive gases, magnetic and radio frequency radiation, UV and visible light and electricity. Each product is designed to protect operators from potential hazards. Varian supplies instructions that describe the correct procedures for the operation and maintenance of each product.

Vista and Liberty series Inductively Coupled Plasma Optical Emission Spectrometers are designed to be used to determine the levels of trace and major elements.



Liberty™
sequential scanning ICP-OES
ideal for smaller capacity
labs

Vista-MPX™
simultaneous ICP-OES
ideal for environmental,
chemical and industrial
laboratories

Vista-PRO™
simultaneous ICP-OES
ideal for all busy laboratories
and is particularly suited for
research applications



VARIAN

Varian is committed to a process of continuous improvement which demands that we understand and then meet or exceed the needs and expectations of our customers—both inside and outside the company—in everything we do.

Varian Analytical Instruments, serving worldwide markets in:

Agriculture
Basic Chemical
Biotechnology
Clinical
Electronics
Environmental
Photonics
Toxicology
Pharmaceutical
Food and Beverage
Metals and Mining
Petroleum and Petrochemical

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