Optima 2100 DV ICP-OES

the flexibility required to
maximize ICP performance

PerkinElmer®
precisely.

innovative design combines
performance and flexibility

Compact solid-state RF generator

High-resolution double mono-chromator

Built-in three-channel peristaltic pump

Quick-change adjustable torch mount
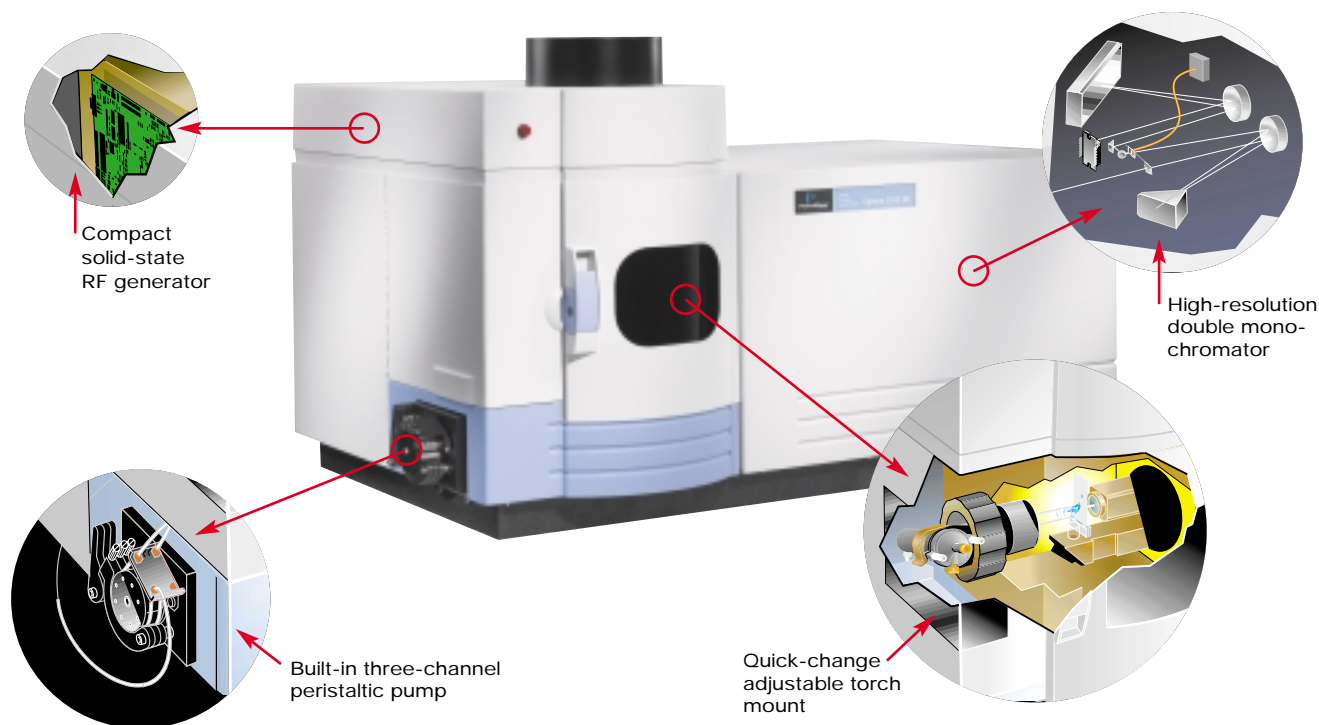
The Optima™ 2100 DV ICP-OES system brings advanced technology to laboratories requiring flexibility and excellent analytical performance for varied and moderate sample loads. The CCD array detector allows you to collect a complete analyte spectrum at speeds that far exceed competitive systems. Automatic **dual viewing** ensures the lowest detection limits and the widest working ranges. The Optima 2100 DV is the ideal solution for research and quality assurance laboratories that have a wide variety of samples and lower frequency of analysis.

The custom-designed solid-state CCD array detector, the second-generation solid-state RF power supply and the purged optical system provide both superior performance measurement stability and enhanced reliability. That reduces operating costs and, more importantly, ensures that your instrument is available when needed. Computer-controlled gas flows and mass-flow control of the nebulizer gas ensure day-to-day reproducibility.

Sample introduction systems

The Optima 2100 DV incorporates a unique field-tested and proven sample introduction cassette. The cassette accommodates a wide range of sample introduction accessories that make sample analysis simple, regardless of the sample matrix. The range of accessories is virtually endless, including a variety of nebulizer types such as high- and low-flow concentric, high- and low-flow GemCone™, MiraMist® and cross-flow nebulizers. Spray chambers are available in glass cyclonic styles and HF-resistant Ryton™ Scott-type designs. Sample injection systems are available in a variety of materials (quartz, alumina and sapphire) and inner diameters to suit any sample matrix.

The Optima's proven 32-bit Windows® software, WinLab32™, makes it easy to get up and running in minutes rather than days. Customizable method development enables your analysts to quickly configure the system, increasing your lab's productivity. Plus, the compact benchtop design conserves valuable laboratory space.

Improved productivity

Auto-integration by Element is a productivity-maximizing feature in the Optima 2100 DV design. It significantly reduces analysis times through measurement-algorithm enhancements. This feature allows the analyst to select integration times for individual wavelengths on a method specific basis. The result is very short analysis times for elements that have high concentrations, and longer analysis times for elements where detection limits are critical.

Dual-view design

The Optima 2100 DV spectrometer uses PerkinElmer's patented dual-view optical system. Dual viewing allows automatic switching between very sensitive axial viewing to the greater dynamic range of radial viewing in the same sample, with no special adjustments. This eliminates the need to search for alternative wavelengths which is required on single-view instruments.

Rugged, reliable power

The Optima 2100 DV features a second-generation solid-state RF power supply, providing exceptional ruggedness and reliability, eliminating the need for costly power tubes. Solid-state design makes the instrument exceptionally compact, minimizing lab space requirements.

Widest working range

Method-controlled dual viewing of the plasma delivers the widest working range possible, providing the lowest detection limits and the greatest concentration range in a single system. Axial viewing allows ultratrace measurements because it provides a longer emission path for increased sensitivity and lower background levels. At the same time, radial viewing permits percentage concentration measurements. With the Optima 2100 DV, ultratrace and percentage concentration levels can be automatically determined in the same run without having to search through lists of alternative wavelengths.

Shear gas advantage

To eliminate interferences caused by the cooler regions in the plasma gas, the Optima 2100 DV uses a unique compressed-air shear gas system to remove the cool tail plume of the plasma. This provides a maintenance-free, reliable system compared to other methods, which use expensive argon gas and water cooling, as well as cones that may clog.

Accurate and reliable

The Optima 2100 DV features a high-speed, high-resolution double monochromator with a CCD array detector. High resolution yields reduced interferences and improved accuracy. Limited component movement and Dynamic Wavelength Stabilization™ ensure exceptional wavelength accuracy and reliability. With the optical system's superior light throughput and the unmatched quantum efficiency of the solid-state detector, the Optima 2100 DV gives you exceptional detection limits quickly and routinely.

Instrument stability

Since the system continually references a neon background spectrum, the Optima 2100 DV is faster, more precise and consistent than conventional systems that rely on mercury references only between reads. Dynamic Wavelength Stabilization (DWS) allows direct on-peak measurement, eliminating the need for peak searches.

QUICK GLANCE

- The CCD array detector provides the flexibility to analyze samples at speeds that exceed outdated competitive systems

- Exceptional reliability with a second-generation solid-state RF generator

- Dual-view optical system ensures the widest working range and excellent detection limits

- Auto-integration by Element dramatically improves sample throughput

- Versatile wavelength selection for analysis flexibility

- Dynamic Wavelength Stabilization eliminates peak profiling and searching, ensuring exceptional long-term stability

- Enhanced sample throughput and performance with simultaneous background correction

- Enhanced QC checking includes Internal Standard drift checks

- Extensive sample introduction accessories accommodate any sample type

intuitive control and flexibility
boost productivity

Full-featured WinLab32 software is easy to learn and easy to use, and provides unmatched features and flexibility. Operating under the powerful Microsoft® Windows operating systems, WinLab32 gives you all the tools you need to analyze your samples, report and archive data and ensure regulatory compliance. Unlike other software applications that look easy at first but lack feature depth, WinLab32 combines practical functionality with advanced capability, ensuring that the software meets your needs now and in the future.

Continuous graphics

The Optima 2100 DV offers a very unique tool – continuous graphics. Continuous graphics offers a look at how the instrument is operating by acquiring and displaying data in real-time. The operating parameters of the instrument and RF generator can be modified as data are acquired, allowing method optimization to be further enhanced. For example, RF power and nebulizer flow can be changed while their impact is monitored. Peristaltic pump speed can be set to improve noise and signal intensity, maximizing system performance.

Tools for optimum performance

The unique optical system of the Optima 2100 DV and its exceptional stability allow WinLab32 to include tools previously available only in high-end ICP-OES instruments. Features such as simultaneous background correction, Inter-Element Correction (IEC) and Multi-component Spectral Fitting (MSF) significantly enhance analytical performance and minimize potential interferences. All analytical data can be stored, recalled and re-examined. This allows data to be reprocessed, eliminating the need to rerun samples.

Confidence in your analysis

Built-in diagnostics check each system component to verify proper operation. Leveraging on the Microsoft Windows operating systems, WinLab32 has added even more security features, including password-controlled access to software functions.

Regulatory compliance

Whether regulations are internal, industry or government-imposed, the optional WinLab32 Enhanced Security (ES) software gives you the tools you need. Built-in compliance features, including multiple user-defined Quality Control (QC) standards, check samples, internal standard checks and a selection of calibration procedures ensure that you and your staff adhere to appropriate guidelines.

Reporting made easy

The WinLab32 report function uses Wizards to guide you through report generation step-by-step. With WinLab32's multi-tasking capabilities, you can even generate reports while the Optima 2100 DV analyzes the next group of samples. WinLab32 stores all raw analytical data, so you can reprocess previously stored data with new conditions, eliminating the time-consuming process of repeating analyses.

The Optima 2100 DV is capable of acquiring and displaying data in a continuous real-time graphics format. This is quite useful for optimizing instrument performance. The graph shows the signal increasing as the RF power is increased while data are being displayed.

Seamless data transfer

WinLab32 automatically reformats your results for transfer to different programs or computers. Simply select the data and samples you want to move and specify the file format. WinLab32 can automatically generate a file configured for exporting directly into most spreadsheet, database and word-processing programs. Save the file to disk or send it to any connected device.

Help is a click away

WinLab32 is loaded with features that make it easy to learn and to use. Dialog boxes suggest correct entries or entry ranges. Wizards guide you through procedures. Tool Tips, available in many languages, provide useful information to simplify your tasks. Many functions, such as selection of integration times and programmed start-up and shut-down, are fully automated, providing optimum results with minimal operator effort. And, if you have a question, just press the F1 key for context-sensitive help.
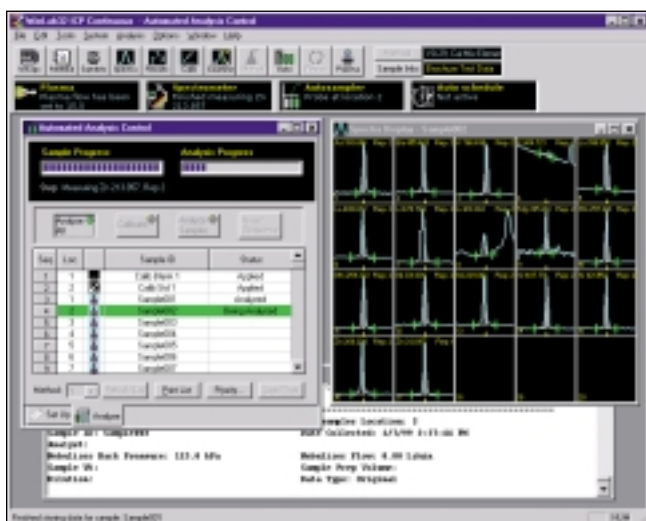
A typical WinLab32 layout. You determine what is displayed. Pick the features you want. Move and size them to create a display you're comfortable with. Save the layout for automatic setup the next time you run the method. Or, use one of the many standard layouts to start your analyses immediately.
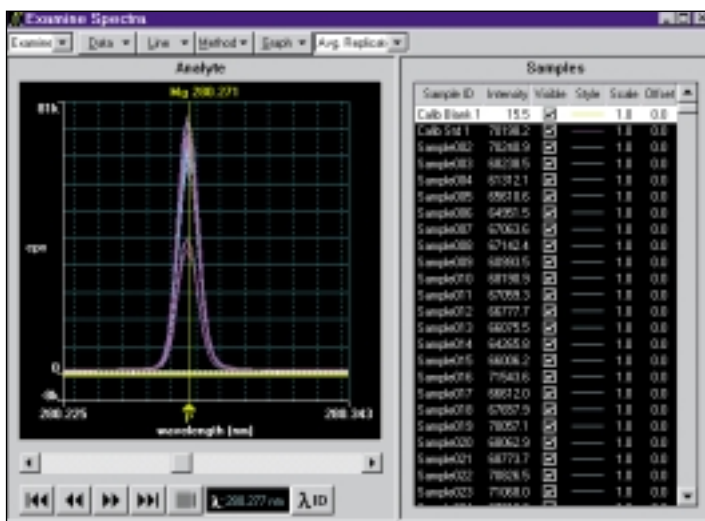

Examine Spectra mode allows you to display peaks and associated analytical data at any time.

superior features
provide great value

The Optima 2100 DV is significantly different from other ICP instruments. With the power and reliability found only in high-end simultaneous research systems and the flexibility inherent to traditional systems, the Optima 2100 DV is ready for the demands of the 21st century.

Exceptional stability

An environmentally stable sample compartment and Dynamic Wavelength Stabilization provide the Optima 2100 DV with exceptional stability, eliminating the drift commonly experienced with other systems. That stability ensures reproducible performance sample-after-sample, day-after-day. Consistent operation also allows the Optima 2100 DV to perform inter-element corrections and Multi-component Spectral Fitting (MSF), techniques that provide superior analytical accuracy. For challenging laboratory environments, an optional sample-compartment thermostat is available.
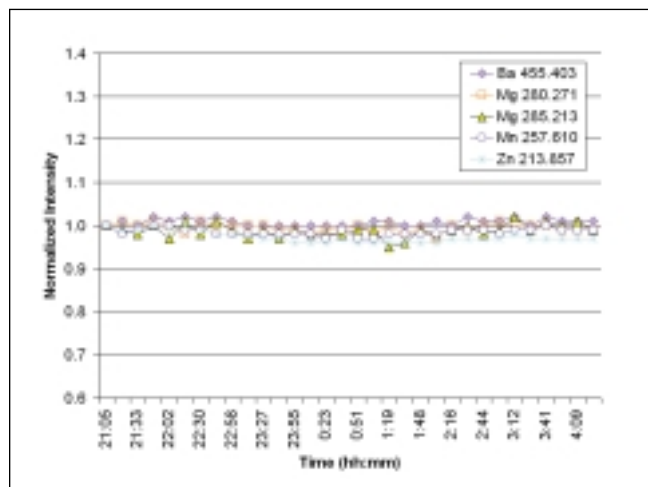
Typical long-term (8-hour) stability for the Optima 2100 DV. Long-term stability gives higher lab productivity and better analytical performance.

Unmatched speed

Outdated competitive ICP systems typically measure one wavelength at a time. The unique Optima 2100 CCD array measures the wavelength range around the emission line of interest *simultaneously*. This significantly reduces analysis time without sacrificing the flexibility inherent in full-wavelength capable systems. It also allows the Optima 2100 DV to perform background correction measurements simultaneously with the measurement at the emission line, improving measurement accuracy and enhancing analysis speed. Add in the time saved using the broad concentration range coverage made possible by automatic dual viewing of the plasma, and you have an ICP-OES system that analyzes all of your samples at previously unheard-of speeds.

Sampling simplicity

The Optima 2100 DV offers you a choice of easy-to-maintain sample introduction systems. The durable HF-resistant spray chamber accommodates most matrices. For optimum performance in water matrices, use the cyclonic spray chamber and concentric nebulizer. Both systems are based on a snap-in-place cassette with real-time adjustments for the ultimate in sampling flexibility.

Analytical power

High resolution, high light throughput, high quantum efficiency, axial viewing and simultaneous background correction combine to give the Optima 2100 DV out-standing analytical power as shown by its typical detection limits (Table 1).

Superior analytical results

Even if you don't need to reach the ultratrace detection limits that the Optima 2100 DV can provide, its power translates into improved precision and accuracy, supplying clearly superior analytical results (Tables 2 and 3). Plus, you can be assured that if your requirements change, you have a system that has the ability to grow with you.

Table 1. Typical Optima 2100 DV detection limits in µg/L (ppb) based on three standard deviations. All values were obtained using axial viewing, a GemCone nebulizer and cyclonic spray chamber and a 10-second integration.

Element	Wavelength (nm)	D.L.
Al	396.152	0.9
As	193.696	3.6
B	249.772	0.25
Be	313.107	0.017
Cd	214.440	0.07
Co	238.892	0.25
Cr	267.716	0.25
Cu	224.700	0.9
Fe	259.939	0.2
Mn	257.610	0.03
Mo	202.031	2
Ni	231.604	0.4
Pb	220.353	1.4
Sb	206.836	4
Se	196.026	4.5
Tl	190.801	3.5
V	309.310	0.15
Zn	206.200	0.2

Table 2. Typical low concentration performance of the Optima 2100 DV. Determination of selected elements in certified standard NIST 1643d, Trace Elements in Water.

Element	Wavelength (nm)	NIST 1643d (µg/L) Found ± S.D.	Certified ± S.D.
Al	309	125.3 ± 41	27.60 ± 3.5
As	193	56.6 ± 0.9	56.02 ± 0.73
Ba	233	506 ± 450	6.50 ± 8.9
Be	234	12.4 ± 0.03	12.53 ± 0.28
Cd	214	6.4 ± 0.2	6.47 ± 0.37
Co	238	24.6 ± 0.2	25.00 ± 0.59
Mn	257	37.8 ± 0.3	37.66 ± 0.83
Mo	203	113 ± 0.95	112.90 ± 1.7
Ni	231	57.4 ± 0.3	58.10 ± 2.7
Pb	220	17.8 ± 0.15	18.15 ± 0.64
Sb	217	52.5 ± 1.4	54.10 ± 1.1
Se	196	10.9 ± 0.8	11.43 ± 0.17
V	309	36.4 ± 0.4	35.10 ± 1.4
Zn	206	72.4 ± 0.3	72.48 ± 0.65

Table 3. Optima 2100 DV analysis of certified sludge samples showing excellent performance over a wide concentration range with complex samples.

Element	Wavelength (nm)	BCR 145 Sludge Concentration (mg/kg) Found	Certificate	BCR 146 Sludge Concentration (mg/kg) Found	Certificate
Cd	228.806	17.6	16.8	76.6	76.5
Co	228.616	7.37	6.8	10.5	9.9
Cr	267.713	77.7	85.2	708	769
Cu	327.404	402	415.9	926	921
Ni	231.604	38.8	38.5	260	269
Pb	220.353	357	332	1310	1255
Zn	206.203	2820	2772	3650	4002

PerkinElmer, Inc.

Expect more from the leader in inorganic analysis

With over 40 years experience and a product line that includes flame AA systems, high-performance graphite furnace AA systems, flexible ICP-OES systems, and the most powerful ICP-MS systems; PerkinElmer is the undisputed leader in inorganic analysis. We have placed over 40,000 systems throughout the world, performing inorganic analyses every hour of every day. With the largest technical service and support staff in the industry and a solid reputation for quality products and service, the Optima 2100 DV delivers the flexibility required to maximize ICP performance in your laboratory.

Expect more from the leader in inorganic analysis

PerkinElmer is a world leader in chemical analysis. Our analytical instrument technologies serve the fast-evolving pharmaceutical, chemical, environmental and semiconductor industries, providing integrated solutions – from sample handling to interpretation and communication of test results.

As one of the best-known brands in research, analysis and testing, ours was probably the first analytical instrument you ever used. In addition to our ICP-OES systems, we offer a broad range of solutions in Luminescence, UV-Vis, NIR, GC, GC/MS, MALDI-TOF MS, HPLC, AA, ICP-MS, Thermal Analysis, Elemental Analysis, FTIR and LIMS. There are over 60 years of experience built into every product we make. So, for leading edge R&D and demanding QA/QC, you get the speed, accuracy and reliability you seek – for the productivity you need.

Our service and support people are located in 125 countries throughout the world and are factory trained. Compliance doesn't get any easier than with our software, including 21 CFR Part 11 technical compliance on many products. And online consumables and accessories ordering lets you get your hands on what you need fast.

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precisely.

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