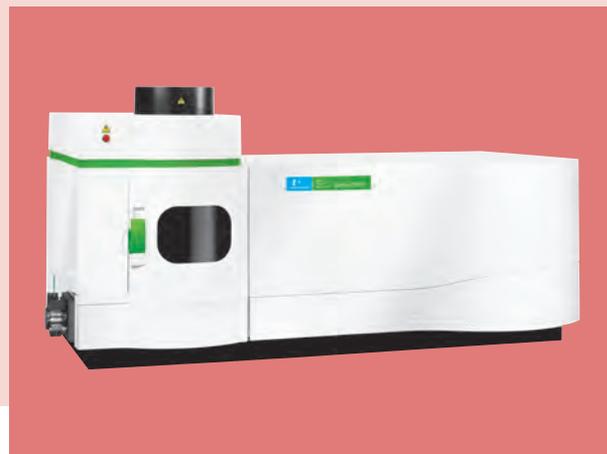


ICP-Optical Emission
Spectroscopy

Optima 7300 V ICP-OES



The PerkinElmer® Optima™ 7300 V is a bench-top vertical torch ICP-OES, the ideal solution for laboratories requiring excellent performance and productivity. Two configurations are available: Optima 7300 V Oils Version for oils analysis and Optima 7300 HF Version for geochemical and high-solids analysis.

Spectrometer specifications**Polychromator**

The high-energy (f/6.7) echelle-based Optima polychromator utilizes two SCD detectors. The measured resolution of the system is 0.006 nm at 200 nm. The 80 by 160 mm echelle grating has 79 lines per mm and a blaze angle of 63.4 degrees. With the Optima 7300 V ICP-OES, a 60-degree fused-quartz prism is used as the cross disperser for the visible region (403-782 nm). The UV disperser incorporates Schmidt correction to eliminate aberration from the 400-mm radius camera sphere.

Thermostatted optics

The entire optical system is enclosed in a purged and thermostatted optical enclosure. The optical enclosure is mounted on the same large optical bench as the sample-introduction system. The optical bench is shock-mounted to the frame of the instrument so that normal floor vibrations do not affect system performance.

Plasma viewing

The Optima 7300 V ICP-OES comes standard with a classic, vertically oriented, radial-view torch. Viewing of the plasma is accomplished by computer control of a mirror located in the optical path and allows adjustment of the plasma viewing in the vertical plane. The software can optimize the viewing position.

Shutter and Hg recalibration system

The computer-controlled, pneumatically operated shutter automatically opens and closes for each sample. By closing the shutter between each sample, the first transfer mirror is protected from long exposures to the intense UV radiation of the plasma, thus extending the useful lifetime of the mirror. A mercury lamp is built into the shutter mechanism and can be viewed when the shutter is closed to monitor the mercury emission line at 253 nm and automatically update the system wavelength calibration. Frequency of the automatic recalibration is user-selectable between 0 and 1000 minutes and can be varied during an autosampler analysis.

Detectors The patented PerkinElmer segmented-array charge-coupled device (SCD) detectors consist of 235 addressable subarrays, covering approximately 6000 wavelengths on a 13 by 19 mm silicon substrate. Typical readout noise is about 13 electrons RMS; dark current is less than 100 electrons/pixel/second; and readout speed is 50 μ sec/pixel. Correlated double-sampling data-acquisition electronics further reduce electronic noise.

ICP system specifications

RF generator The Optima 7300 V ICP-OES features a third-generation 40-MHz, free-running solid-state RF generator, adjustable from 750 to 1500 watts, in 1 watt increments. The power efficiency is greater than 81% with < 0.1% variation in output power stability. The compact RF supply meets all FCC requirements for RF emissions (Part 18 of the FCC rules and regulations). It also complies with EC and VDE 0871 Class B requirements.

Ignition and power control Plasma ignition is computer-controlled and totally automated. A unique software feature allows the plasma to be ignited automatically at a user-determined time and turned off automatically after an analysis. True Power Control maintains the plasma power at the set point, even when changing sample matrices.

Safety interlocks For user safety and system protection, the system constantly monitors water flow, cooling gas pressure, argon pressures, sample-compartment door closure and plasma stability, and displays the interlock status on the computer screen as graphic symbols. If an interlock is interrupted, the plasma will shut down safely and automatically.

Cooling water A water-recirculating cooling system is required, with approximately 4 L/min flow capacity at 310 to 550 kPa and a temperature between 15 °C and 25 °C.

Gas flow controls

Argon flow Computer-controlled solenoid valves are used to regulate the flow automatically within the range of 0-20 L/min in 1 L/min increments for plasma argon and 0 to 2.0 L/min in 0.1 L/min increments for auxiliary argon. A mass-flow controller is supplied with all systems for the nebulizer argon flow and is variable between 0 and 2.0 L/min in 0.01 L/min increments.

Sample introduction system

Torch A unique demountable torch design using one-piece quartz tubing for plasma and auxiliary gas flow is supplied. For the Optima 7300 V Oils Version, a 1.2 mm alumina injector is recommended and supplied. For the Optima 7300 V HF Version, a 2.0 mm alumina injector is recommended and supplied. A variety of other injectors is available.

Torch mount The Optima 7300 V ICP-OES system features a unique internally mounted spray chamber on a quick-disconnect torch mount assembly. The mount can be adjusted for maximum performance in different matrices. No tools are required for torch or sample-introduction removal.

Spray chamber A glass baffled-cyclonic spray chamber is recommended and supplied on the Optima 7300 V Oils Version. An HF-resistant, PEEK cyclonic spray chamber is recommended and supplied on the Optima 7300 V HF Version.

Nebulizers The Optima 7300 V Oils Version is supplied with a low-flow GemCone™ nebulizer – a variety of nebulizers is also available including high- and low-flow concentric types, high-flow GemCone types and a high-sensitivity MiraMist® design.

The Optima 7300 V HF Version is supplied with the non-clogging, HF-resistant GemCone nebulizer recommended for high salt content samples. The GemCone design is manufactured from corrosion-resistant materials (sapphire/ruby tip in a PEEK body). The system can routinely handle 50% (v/v) solutions of HCl, HNO₃, H₂SO₄, H₃PO₄, 20% (v/v) HF and 30% (w/v) NaOH. The system is fully compatible with other sample-introduction systems.

Peristaltic pump A three-channel, computer-controlled pump is built-in with speeds variable from 0.2 to 5 mL/minute in 0.1 mL/min increments using 0.76 mm (0.030 in.) i.d. tubing. Software features, including FastPump™ and SmartRinse™, dramatically improve the sample rinse-out and analysis time.

Spares kit A spares kit of common replacement items is included.

Physical data – instrument

Power One 200-240 V, 20A line, single phase, 50/60 Hz

Dimensions 150 x 76 x 89 cm (W x H x D), 200 kg

Environmental The instrument will operate with a laboratory temperature between 15 and 35 °C (59-95 °F). For optimum instrument performance, the room temperature should be controlled at 20 ±2 °C.