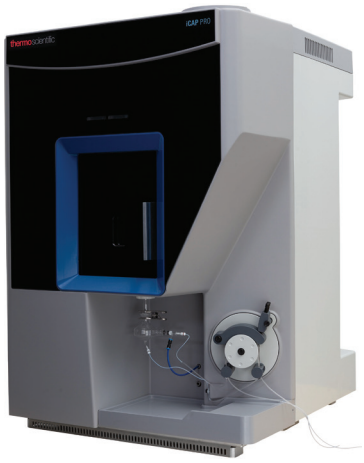
PRODUCT SPECIFICATION 44433

Thermo Scientific iCAP PRO XPS ICP-OES

Fast, robust elemental analysis for the most challenging samples

Benefits

- High-sensitivity elemental analysis
- High-speed analysis with low gas consumption
- Advanced accessory control



Keywords

Ease of use, elemental analysis, high-speed analysis, ICP-OES, simplified workflow, vertical torch

Analyze elemental samples in the shortest possible time with the Thermo Scientific™ iCAP™ PRO XPS ICP-OES. The high light throughput optics combined with the charge injection device detector—the Thermo Scientific™ CID821—ensure the shortest possible analysis times. When using the iFR (intelligent Full Range) analysis mode the complete spectrum is captured in one measurement, further reducing analysis time. For the most demanding applications that require the highest sensitivity in the UV region of the spectrum to determine elements such as mercury, antinomy and lead, the eUV (enhanced Ultra Violet) analysis mode enhances the sensitivity, ensuring regulations for toxic elements are easily met.

The system has a vertical torch and additional gas accessory for high-matrix tolerance, enabling the analysis of the most challenging samples. The instrument is driven by the Thermo Scientific™ Qtegra™ Intelligent Scientific Data Solution™ (ISDS) Software, developed to combine easy data management, scalability and compliance. The Qtegra ISDS Software delivers simplicity, productivity, efficiency and quality in a highly efficient analysis workflow. The fast startup time of just five minutes from standby ensures the instrument is ready to analyze samples at any time during the working day.

iCAP PRO XPS ICP-OES hardware summary

Sample introduction

The bench height sample introduction system is positioned to facilitate user accessibility to all parts.

Spraychamber

- Single-pass cyclonic spraychamber to efficiently filter out larger aerosol droplets for improved plasma stability
- Compatible with all 6 mm OD nebulizers
- Optional spraychambers for total dissolved solids tolerance and resistance to organics or aggressive mineral acids

Nebulizer

- Glass concentric nebulizers for optimal sample consumption
- Optional nebulizers in a range of flow rates, total dissolved solids tolerance and resistance to organics or aggressive mineral acids

Torch

- Demountable Enhanced Matrix Tolerance (EMT)
- All connectivity (argon gas supplies and plasma ignition) designed into the torch holder, reducing complexity and improving usability
- Proprietary, screw-in, self-aligning injector for simplicity and reproducibility

Peristaltic pump

- High precision 12 roller, 4 channel pump
- Pump tubing options are available for aqueous and samples containing organic solvents
- Pump speed is optimized, fully adjustable between 0 and 125 rpm

Inductively coupled plasma

The iCAP PRO Series ICP-OES plasma system is designed to rapidly adapt to changing matrices and provide unparalleled robustness even for challenging samples such as brine samples.

RF generator

- Argon ICP source with digital, solid state RF generator
- Dynamic frequency impedance matching the plasma at 27 MHz
- Highly stable and robust plasma
- Adjustable RF power between 750 to 1600 W for the Duo view instrument
- Adjustable RF power between 750 to 1600 W for the Radial view instrument

Load coil

- Water-cooled load coil with PTFE coating for improved lifetime and reliable plasma ignition

Plasma TV

- Remote monitoring of plasma status via integrated camera

Plasma viewing

Dedicated radial plasma

- The vertical plasma is viewed directly in a radial mode using high efficiency mirrors
- The foreoptics are fully purged to provide enhanced performance in the UV region of the spectrum
- Adjustable radial viewing height of 6 to 18 mm above the load coil

Dual view plasma

- The vertical dual view plasma may be viewed axially for applications requiring the lowest detection limits or radially to minimize matrix effects and extend the working range
- The dual purged optical path interface ensures excellent sensitivity in the UV region of the spectrum
- Adjustable radial viewing height of 6 to 18 mm above the load coil

Optical system

Type

- High energy echelle cross dispersion optical system with side-by-side optical arrangement of prism and grating
- Unique, all spherical mirror design for very high image quality, improved optical resolution and very low stray light performance

Spectrometer optical path

- The entire spectrometer and foreoptics are purged with either argon or nitrogen to ensure maximum light transmission in the UV region

Spectral bandpass

- <7 pm at 200 nm

Wavelength coverage

- Capture the entire wavelength range in one measurement with the unique iFR analysis mode
- Improve the sensitivity of the instrument in the UV region with the eUV analysis mode
- Lower wavelength limit of 167.021 nm allowing the determination of aluminum at the most sensitive wavelength of 167.120 nm
- Wavelength coverage extends to 852.145 nm for the option of determining potassium at 766.490 nm and sodium at 818.326 nm

Detector

Type

- CID821 Charge Injection Device (CID) high performance solid state camera system. The CID821 is an enhanced charge transfer device delivering high contrast/low noise imaging and quantification of all wavelengths in the analytical range without blooming

Array size

- Four mega pixel detector with individually addressable pixels of 12 µm x 12 µm in a 2048 x 2048 array for continuous coverage of the available wavelengths

iCAP PRO XPS ICP-OES configuration

Table 1.

Configuration	iCAP PRO XPS Radial ICP-OES	iCAP PRO XPS Duo ICP-OES
Peristaltic pump	4 channel, adjustable between 0-125 rpm	
Nebulizer	Glass concentric	
Spraychamber	Single-pass glass cyclonic	
Torch orientation	Vertical (both radial and dual view)	
Injector	Quartz 1.5 mm standard for Radial 2 mm standard for Duo	
RF generator	27 MHz, adjustable between 750-1600 W	27 MHz, adjustable between 750-1600 W
Load coil	Water cooled with PTFE coating	
Argon gas flow controllers	**Nebulizer** • MFC tunable via software and adjustable between 0.0-1.5 L/min **Auxiliary** • MFC tunable via software and adjustable between 0.0-2.0 L/min **Coolant** • MFC tunable via software and adjustable between 0.0-20.0 L/min	
Additional gas	Additional MFC adjustable via software between 0.0-0.25 L/min	
Plasma viewing	Radial adjustable 6 to 18 mm	Axial or radial, with radial adjustable 6 to 18 mm and axial
Optical system	Echelle cross dispersion optical system with side-by-side optical arrangement	
Optical path purge	Argon or nitrogen purged	
Spectral band pass	<7 pm	
Wavelength range	iFR: 167.021-852.145 nm eUV: 167.021-240.000 nm	
Detector type	Charge Injection Device CID821	
Array size	2048 x 2048 pixel array	
Full frame imaging	Yes	
Startup time	Startup time from Standby 5 min	
Minimum integration time	1.0 seconds	
Detector cooling temperature	-45 ˚C with tolerance of 0.1 ˚C	

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Site requirements and dimensions

Table 2.

Environmental		
Temperature	Range	15-35 ˚C
	Rate of change	<2.5 ˚C·h^{-1}
Humidity	Range	20-80% (non-condensing)
Utilities		
Electrical	Supply	200-240 V AC, 50/60 Hz single phase
	Power	Apparent power: 2694 VA Effective power: 2605 W
Cooling water	Supply temperature	25 ˚C
	Supply rate	>2 L·min^{-1}
	Pressure	0.2 MPa (2bar)
Argon gas supply	Purity	>99.995%
	Typical flow rate	16 L·min^{-1}
	Pressure	0.55-0.6 MPa (5.5-6.0 bar; 82.5-90 psi)
Plasma exhaust	Port dimensions	135 mm (recommended 120 mm ID ducting)
	Flow rate (120 mm ID ducting)	3.5 m·s^{-1} (180-220 m^3·h^{-1})

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