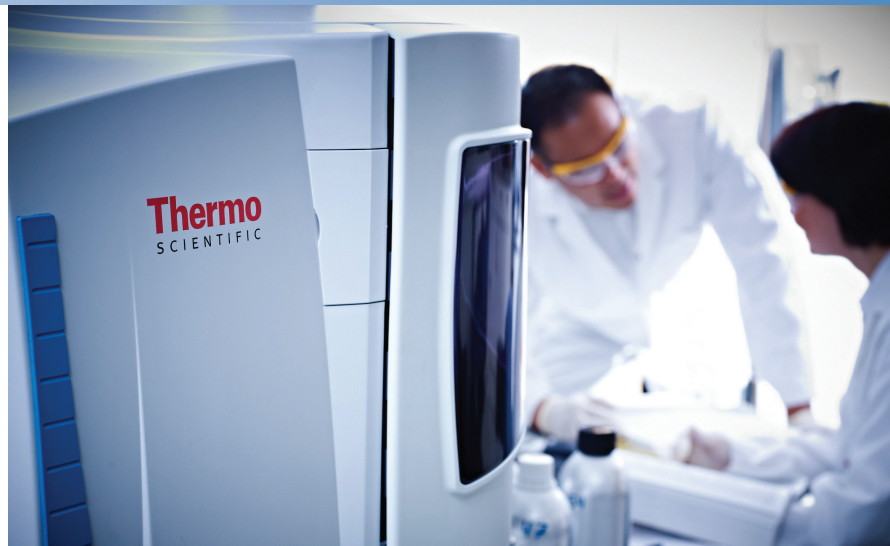


Thermo Scientific iCAP 7200 ICP-OES

Cost effective analysis for low sample thru-put requirements

The Thermo Scientific™ iCAP™ 7200 ICP-OES is a powerful, easy to use instrument for users who are new to the ICP-OES technique, offering simplicity with no compromise on performance. Low cost alternative to Atomic Absorption and achieving better sensitivity than Microwave Plasma instrumentation, the iCAP 7200 ICP-OES is the ideal solution for laboratories requiring low thru-put, multi element analysis.



The Thermo Scientific™ iCAP™ 7200 ICP-OES is a powerful simultaneous dual view spectrometer based on the core technologies of the Thermo Scientific iCAP 7000 Plus Series ICP-OES. The iCAP 7200 ICP-OES is a simple alternative to the Atomic Absorption technique and Microwave Plasma technology providing a multi-element analysis solution for laboratories with increasing demands for sample throughput and lower detection limit capability.

The instrument is driven by the Thermo Scientific Qtegra™ Intelligent Scientific Data Solution™ (ISDS) platform software. Developed to combine highly efficient workflow, easy data management, scalability and compliance, Qtegra ISDS delivers simplicity, productivity, efficiency and quality in the analysis workflow.

The instrument is uniquely optimized to reduce gas consumption and running costs with a highly efficient plasma torch and interface design. Integral product components include analysis ready sample introduction kits and pre-loaded method templates. These features enable simple 'out-of-box' operation for rugged, consistent day-to-day analyses and help analysts who are new to the ICP-OES technique to achieve standard operator competence with minimal training.

Thermo
SCIENTIFIC

Performance

A 3-channel, 12-roller peristaltic pump, with a unique drain sensor, provides smooth, low noise signals and safe operation.

The enhanced, high efficiency free-running 27.12 MHz solid state RF plasma generator delivers rugged reliable performance with the power and stability to cope with even the most difficult sample matrices.

The high resolution simultaneous echelle spectrometer has a unique optical layout, resulting in high efficiency light transmission and excellent resolution with enhanced sensitivity and detection capability. The iCAP 7200 ICP-OES is also an extremely compact instrument and therefore requires minimal laboratory bench space.

A powerful Charge Injection Device (CID) detector, the CID86, enables free choice of wavelengths over the complete 166 – 847 nm range. More stable, with lower noise and greater dynamic range than previous CID designs, its non-destructive readout allows optimum signal-to-noise measurements at all concentration levels.

The use of an autosampler enables maximized efficiency when larger numbers of samples are analyzed. Comprehensive quality control (QC) checking may be performed at intervals in the analysis to guarantee data quality. Automatic recalibration and repeat sample analyses are possible; reducing the need for next-day sample re-runs. Full autosampler flexibility allows for samples and calibrations to be added/deleted/moved whilst the autosampler is running.

Cost efficiency

The compact optical and detector technology is combined with an elegant plasma interface solution to enable routine operation with minimized gas consumption and running costs. The iCAP 7200 ICP-OES operates over an optimized wavelength range which reduces the requirement for optical purge gas and employs only a low 1 L/min plasma interface gas flow to cool key instrument components.

The advanced RF generator design achieves extremely efficient sample coupling with >78% energy transfer - allowing exceptional sample processing capability using lower power and gas consumption rates.

An Enhanced Matrix Tolerance (EMT) torch design provides powerful performance whilst minimizing the requirements for routine maintenance operations and reducing plasma gas consumption.

Simplicity

Optimized pressure controlled gas flows provide simplicity of operation for routine analysis.

The instrument is supplied with analysis-ready sample introduction parameters, so users are no longer required to optimize pump speed, plasma RF power and gas flow rates. This solution is fully compatible with Thermo Scientific application-specific sample handling kits.

Qtegra ISDS controls the iCAP 7200 ICP-OES and has an intuitive user interface design, making it quick to learn and use. Setting up a method is an extremely simple operation with minimal method development steps and typically requires only the elements of interest to be defined by the user. Following method creation, the user simply creates an autosampler loading list, performs plasma ignition and runs the sample sequence. Results can then either be printed or exported in electronic format to the required file location.

Accessories

A range of Teledyne CETAC technologies autosamplers are available to enable optimization of the iCAP 7200 ICP-OES for automated, unattended analysis.

An on-line hydride generation accessory is available, which can be used to enable sub-ppb detection limit capabilities for hydride forming elements such as As, Bi, Hg, Sb, Se, Sn and Te.

A range of sample handling kits are available for specific use with aqueous, high dissolved solids, hydrofluoric acid and organic solvent containing samples.

Samples containing up to 25% dissolved solids can be handled effectively using the argon humidifier accessory, while the ceramic D Torch accessory provides enhanced torch longevity with aggressive sample matrices.

Detection Limits

Detection limits (DL) are key indicators of an instrument's capabilities; useful as an aid in determining its suitability for a chosen task. They demonstrate the lowest level of analyte distinguishable from the background noise under optimal conditions and are typically determined several times to improve the statistical accuracy. As a comparison between instruments, instrument detection limits (IDL) provide useful indicators to the laboratory chemist either in the decision process for instrument acquisitions or as a measure of performance for current instruments.

An IDL is a generic value that defines the lowest concentration of an analyte that can be detected under ideal conditions; and normally measured on a single element basis, using clean sample e.g. ultrapure water.

Typical detection limits are measured on several instruments of the same type to assess the average level of performance that can be expected. The typical detection limits, presented in table 1, are the IDLs of an iCAP 7200 ICP-OES as determined by applications chemists in a standard laboratory and are an excellent indication of what is achievable with the instrument. The detection limits were determined on an iCAP 7200 ICP-OES using standard sample introduction components, consisting of a concentric nebulizer and cyclonic spraychamber.

Detection Limit Determination

To determine the detection limit for an element, a standard of 50-times the expected value and a blank were prepared. The instrument was allowed to stabilize and then 10 measurements of each solution were taken using 15 second integration times. The detection limits were calculated using the raw intensity data from the standard and the blank as follows:

$$IDL = 3SD_{blk} \frac{STD_{conc}}{STD_x - BLK_x}$$

Where:

IDL is the instrument detection limit

SD_{blk} is the standard deviation of the intensities of the multiple blank measurements

STD_x is the mean signal for the standard

BLK_x is the mean signal for the blank

STD_{conc} is the concentration of the standard

The multiplier of three is based on the student's t-test table and shows that a confidence interval of 99% is used to calculate the detection limit.

Table 1. The detection limits for the iCAP 7200 Series ICP-OES.

Element	Wavelength nm	iCAP 7200 ICP-OES Duo (Axial view) DL µg/l (15s)
Ag	328.068	0.32
Al	308.215	4.10
As	189.042	1.43
Ba	455.503	0.03
Be	311.107	0.017
Ca	393.366	0.003
Cd	214.438	0.07
Co	228.616	0.51
Cr	205.560	0.21
Cu	324.754	0.39
Fe	259.940	0.25
Hg	184.950	0.14
K	766.490	0.6
Li	670.784	0.03
Mg	279.553	0.01
Mn	257.610	0.07
Mo	202.030	0.38
Na	589.592	0.37
Ni	231.604	0.36
P	177.495	1.55
Pb	220.353	1.06
S	180.731	1.05
Sb	206.833	3.25
Se	196.090	3.05
Sn	189.989	1.1
Sr	407.771	0.01
Ti	336.121	0.30
Tl	190.856	4.4
V	309.311	0.23
Zn	213.856	0.19

iCAP 7200 ICP-OES	
Dimensions (mm)	840 W x 750 D x 590 H
Peristaltic pump	3-channel, 12 roller peristaltic pump Speed: 0 to 45 rpm
Standard sample introduction kit	Concentric glass nebulizer Glass cyclonic spray chamber Semi-demountable EMT torch 2 mm bore quartz center tube
Plasma gas	12 L/min
Auxiliary gas	Fixed, 4 flows 0, 0.5, 1.0, 1.5 L/min
Nebulizer gas	Pressure control, 0 – 0.4 MPa
Plasma Viewing	Duo
RF source	27.12 MHz solid state Optimized at 1150 and 1300 W
Spectrometer	Simultaneous echelle type 52.91 groves/mm ruled grating 383 mm effective focal length 9.5 UV fused silica cross dispersion prism
Spectral bandpass	7 pm at 200 nm
Wavelength range	166 – 847 nm
Detector	High performance solid state CID86 chip
Data acquisition mode	Standard precision mode

Ordering information

Required items

iCAP 7200 ICP-OES Duo	8423 200 72001 or 8423 200 72101 (N. America)
TF900 Turbine Pump Chiller (230 V/50 Hz)	101163010000001 (or user supplied equivalent)
TF900 Turbine Pump Chiller (115 V/60 Hz)	101163010000003 (or user supplied equivalent)
TF900 Turbine Pump Chiller (208 V/60 Hz)	101163010000000 (or user supplied equivalent)
Data Station (110 or 220 V)	8423 140 50004 (or user supplied equivalent)

Optional accessories

Auto Sampler:	
CETAC ASX-260 (up to 180 samples)	8423 470 04002
CETAC ASX-520 (up to 360 samples)	8423 470 04001
Duo sample introduction kit	
Organics	8423 120 52261
Volatile organics	8423 120 52251
HF resistant	8423 120 52241
High solids	8423 120 52231
Standard aqueous	8423 120 52221
Duo Ceramic D torch kit	8423 120 52202
Argon humidifier	8423 120 52081
Basic hydride generation kit / Internal standards mixing kit	
	8423 120 51551

www.thermoscientific.com

©2015 Thermo Fisher Scientific Inc. All rights reserved. ISO is a trademark of the International Standards Organization. All other trademarks are the property of Thermo Fisher Scientific and its subsidiaries. This information is presented as an example of the capabilities of Thermo Fisher Scientific products. It is not intended to encourage use of these products in any manners that might infringe the intellectual property rights of others. Specifications, terms and pricing are subject to change. Not all products are available in all countries. Please consult your local sales representative for details.



Africa +43 1 333 50 34 0	Denmark +45 70 23 62 60	Japan +81 45 453 9100	Russia/CIS +43 1 333 50 34 0
Australia +61 3 9757 4300	Europe-Other +43 1 333 50 34 0	Korea +82 2 3420 8600	Singapore +65 6289 1190
Austria +43 810 282 206	Finland +358 9 3291 0200	Latin America +1 561 688 8700	Spain +34 914 845 965
Belgium +32 53 73 42 41	France +33 1 60 92 48 00	Middle East +43 1 333 50 34 0	Sweden +46 8 556 468 00
Canada +1 800 530 8447	Germany +49 6103 408 1014	Netherlands +31 76 579 55 55	Switzerland +41 61 716 77 00
China 800 810 5118 (free call domestic) 400 650 5118	India +91 22 6742 9494	New Zealand +64 9 980 6700	UK +44 1442 233555
	Italy +39 02 950 591	Norway +46 8 556 468 00	USA +1 800 532 4752

Thermo

SCIENTIFIC

A Thermo Fisher Scientific Brand