

Thermo Scientific ARL QUANTRIS Optical Emission Spectrometer



Top Performance CCD-Based Metals Analyzer



Very fast, multi-matrix, quantitative and qualitative analysis



Versatility - to accommodate your future needs - combined with performance and reliability of PMT spectrometers



Ultimate reproducibility, accuracy and stability



Full spectral coverage: all elements in all metals



Low costs of ownership

Packaging - Processing

Bid on Equipment

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ARL QUANTRIS

Optical Emission Spectrometer

For over 70 years, our company has set the standard for instrumental analysis of metals. A continuous stream of innovative products contributed to the tens of thousands of systems supplied so far and to the active operating installed base of over 10,000 units. The Thermo Scientific ARL QUANTRIS is a worthy successor of these instruments that have clearly proven their longevity for well over a decade and solidified our powerful reputation for their ease-of-use, quality, stability and reliability.

Your need...

You are looking for an easy to use metals analyzer that combines full versatility of CCD instruments with high performance and reliability of PMT instruments.

You are looking for a true multi-matrix metals analyzer that makes no compromises on the analytical performance and meets your needs throughout your instrument's lifetime.

You are looking for an optical emission spectrometer with full spectral coverage and unique capability regarding qualitative analysis.

Our solution...

The ARL QUANTRIS optical emission spectrometer is the instrument of choice. This latest generation CCD instrument provides the enhanced performance that people have been looking for:

- Analysis of virtually all elements in all metals types such as low alloyed steels, stainless steels, cast iron, low alloyed aluminum, alloyed aluminum, bronzes, brasses and more
- Analysis of carbon, sulfur, phosphorus and nitrogen at low levels
- All the advantages of the CCD technology (versatility, compactness) without compromise on analytical performance

Applications notes are available to describe the superior analytical performance of the ARL QUANTRIS in each matrix. They can be seen at www.thermo.com/oes.

Innovation for increased performance

Some of the most exciting advances with the ARL QUANTRIS include:

- Full and continuous coverage of the wavelengths from 130 to 780 nm permitting the analysis of all the elements required in the various metals industries
- Integration of three separate spectrographs having each specific lenses, gratings and CCD coatings to allow optimal light collection
- All spectrographs operate in direct reading mode for best light transmission. This avoids using fiber optics that degrade performance over time and require regular replacements
- First CCD-based instrument with a digital spark source (CCS) similar to the high-end ARL 4460; this spark source provides optimized analytical performance in each matrix

Your benefits

You will see many advantages of the ARL QUANTRIS, including:

- Capability to measure over wide analytical ranges, like conventional instruments
- Reduced investments costs compared to conventional instruments
- Easy instrument extensions with minimum down-time in case of new analytical requirements
- Excellent performance on both trace and major elements in metals
- Superior stability reducing the time necessary for instrument drift corrections and minimizing consumption of expensive standards
- Productivity increase thanks to a fully stable system providing quickly accurate results, around the clock, day-after-day, month-after-month and year-after-year. This results in low analysis costs over a very long lifetime

Easy extensions

Each ARL QUANTRIS is delivered with all the analytical capabilities to cover the requirements of the user's application.

Even if your requirements change over time, your ARL QUANTRIS won't need any hardware extension, if the third spectrograph is already present.



The **stand** is water cooled to ensure a high stability and is compliant to the EN 61010-1 safety norms. Its simple dismantling mechanism permits easy cleaning and remounting of the sparking chamber in less than five minutes. The direct light transmission from the stand avoids fiber optics that degrade performance over time and require regular replacement.

The patented **CCS spark source** of the ARL QUANTRIS is derived from the powerful source of the high performance ARL 4460. It offers significant advantages compared to the other spark sources, because the computer controlled current waveform can be optimized for each type of metal.



Robust design for metals production control

Optical emission spectrometers are often used out of the laboratory in harsh production environments. The following features illustrate the fact that a combination of traditional and new technologies allows providing top performing and easy-to-maintain instruments:

- At the heart of the ARL QUANTRIS is a rugged construction with a single well proven cast iron body operating under vacuum. This provides full operational comfort with unrivaled reliability and stability over both short and long term
- Temperature controlled CCDs reduce the noise and improve the stability
- The water-cooled stand further enhances the stability
- Automatic optical alignment and spectrum profiling during analysis

Turn-key operation

For the most common applications, the ARL QUANTRIS is supplied as a turn-key system ready to analyze your samples on the installation day. It is pre-configured and calibrated in the factory before delivery:

- The programs elements and the necessary calibrations are recommended by our company
- Optional elements and calibrations can be added upon request

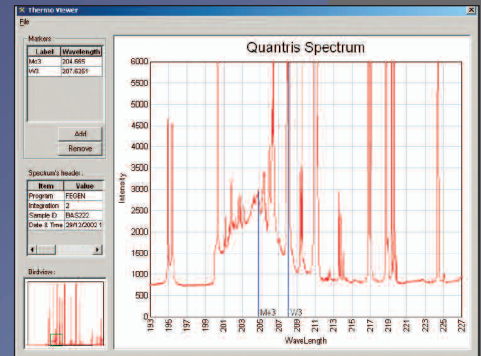
We are fully aware that accuracy, which depends on the calibration of the instrument, is the most important figure of merit required from a spectrometer. Our factory calibrations, performed with CARL - a very sophisticated multi-variable regression software tool that corrects for matrix effects as well as spectral interferences - ensure you the highest possible accuracy.

WinOE Software: Simplicity itself

WinOE software is a well recognized, highly easy-to-use, powerful and reliable software for metals analysis by OES:

- WinOE integrates the latest HTML/Internet technologies to simplify work with the spectrometer
- Shortcuts make it possible to start analysis with just one click or keystroke
- With large user-friendly icons, all functions are easily accessible
- Routine tasks are achieved quickly and efficiently by use of "push button" automated functions to guide the operation, or via "blackbox" intelligent modules running in the background with minimum (or no) user intervention

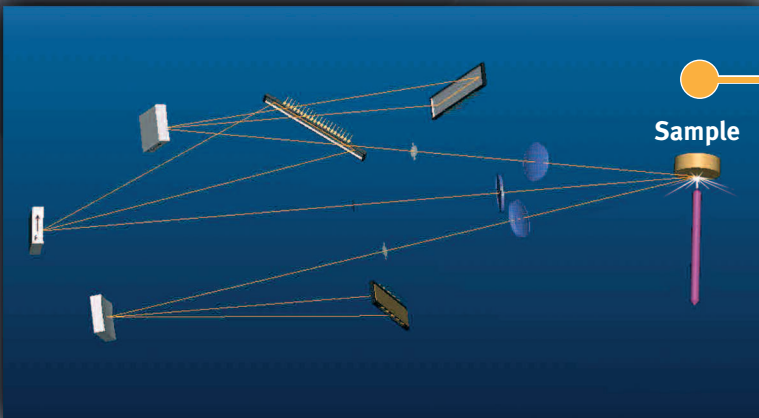
These are just a few of the many features contributing to the fast routine operation of WinOE.



Spectrum from 193 to 227 nm

El	Conc	Unit	SP1	SP2	SP3	SP4	SP5	SP6	SP7
Al	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
As	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
B	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Be	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Bi	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Br	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ca	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cd	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Co	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cu	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Fe	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ge	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hg	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
In	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
K	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Li	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mn	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
N	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ni	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
P	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pb	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Se	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Si	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ta	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tb	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ti	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
V	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
W	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Zn	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Zr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Results display



The optical lay-out

From the spark discharge the light emitted is transferred directly and simultaneously to the entrance lens of each spectrograph. After passing through each entrance slit, it illuminates the grating where it is diffracted and sent to the CCD detector. This simple configuration and detection system ensure optimized light collection in each spectrograph through specific lenses and gratings as well as manufacturing of reliable and stable systems.

Specifications for the ARL QUANTRIS

Spectrometer

Spectrometer:	Vacuum instrument, including two or three flat field optical spectrographs with own entrance slit, grating and solid-state detector, each
Focal length:	200 mm
VUV spectrograph:	Wavelengths from 130 to 200 nm
Basic spectrograph:	Wavelengths from 200 to 410 nm
Optional alkaline spectrograph:	Wavelengths from 410 to 780 nm
Primary slit width:	10 and 15 μm
Type of detector:	Tri-linear CCD image sensor with 3 x 8640 pixels per spectrograph. Luminescent coating on the CCD of the VUV spectrograph. Cooled down by Peltier devices and controlled to $\pm 0.1^\circ\text{C}$ at 0.5°C for VUV spectrograph and at 1.5°C for other spectrographs
Pixels:	Photodiode 7 x 9.8 μm at 7 μm pitch
Grating type:	Aberration corrected concave gratings with 590, 1105 and 3240 gr/mm (at grating center)
Average resolution:	8 pm/pixel for VUV spectrograph, 24 pm/pixel for basic spectrograph, 43 pm/pixel for alkaline spectrograph
Sample stand:	Argon flushed, water cooled table with self-contained, closed loop coolant system

Source

Type:	Patented current controlled source (CCS)
Peak current:	Programmable up to 250 A max.
Plateau current:	Programmable up to 30 A max.
Frequency:	Up to 1000 Hz
Instrument control:	Thermo Scientific microcontroller boards based on NetSilicon Net+50 and Intel 386 EX processors
Software:	WinOE software running on Windows [®] XP
Enclosure:	Built-in dust protection with high capacity cooling fans

Requirements

Ambient temperature:	10-30 $^\circ\text{C}$ (50-86 $^\circ\text{F}$)
Relative humidity:	20-80 %
Voltage:	230 V (+10 % -15 %), single phase with protective ground (2.5 kVA regulator required if fluctuations exceed ± 10 %)
Current:	7 A, including PC, screen and printer
Frequency:	50 or 60 Hz
Grounding:	< 1 Ω
Argon:	> 99.996 % maximum 5 ppm oxygen (maximum 2 ppm oxygen for samples with high Si content) > 99.9997 % for low carbon, nitrogen and oxygen analysis Otherwise argon gas purifier mandatory

Consumption

Electrical power:	Max 1.6 kVA, stand-by approximately 0.6 kVA
Argon:	5 l/min during analysis, 0.25 l/min stand-by, pulsed high flow just before and after analysis, Eco-mode
Compliance to norms:	98/37/EC Machinery 73/23/EEC Low voltage material 89/336/EEC Electromagnetic compatibility

Dimensions and weight

Overall dimensions:	100 x 78 x 119 cm or 39.4 x 31 x 46.9 inches (121 x 92 x 140 cm or 47.6 x 36.2 x 55.1 inches packed)
Weight:	330 kg or 730 lb (approximately 350 kg or 775 lb packed)

Accessories and options

Argon purification systems
Voltage stabilization systems or uninterruptible power supply (UPS)

In addition to these offices, Thermo Fisher Scientific maintains a network of representative organizations throughout the world.

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