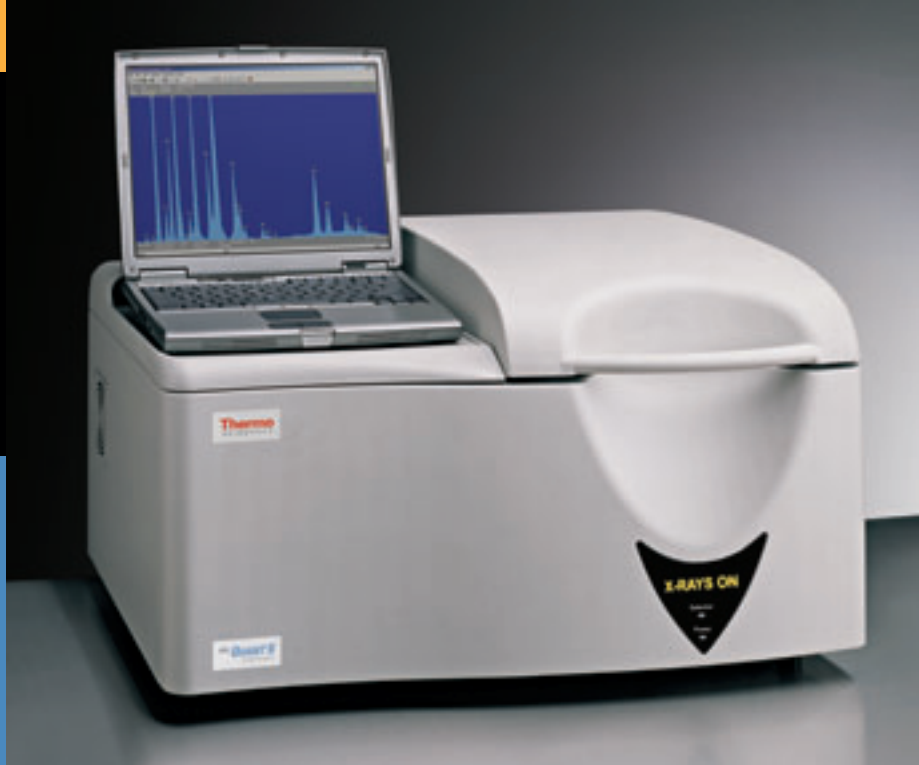


Thermo Scientific ARL QUANT'X Energy-Dispersive XRF Spectrometer



Analysis without Compromises



Aerosol Particulate Filters



RoHS and WEEE Screening



Forensics and Investigation



Food and Consumer Safety



Oils, Lubricants and Wear Metals



Metallurgical Slags and Mining Ores



Cement, Feed and Alternative Fuels



Semiconductor and Magnetic Media

ARL QUANT'X

The peak of EDXRF performance

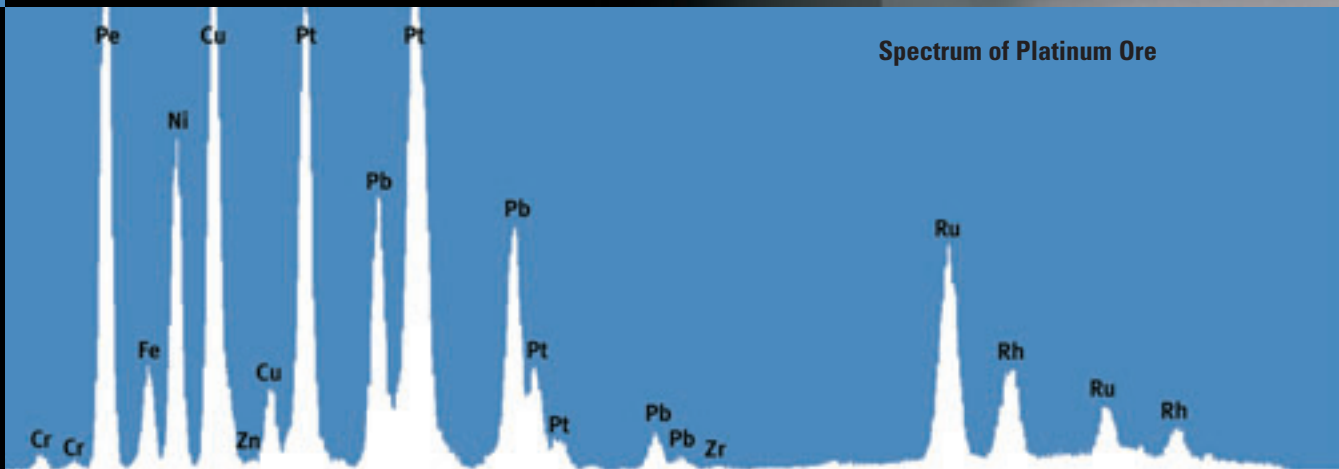
The Thermo Scientific ARL QUANT'X Energy-Dispersive X-ray Fluorescence spectrometer is a state-of-the-art elemental analyzer for the most challenging analytical tasks in research and manufacturing. Look inside the cast metal full-vacuum sample chamber on a welded anodized frame, and you'll know the ARL QUANT'X is built to last. The high-intensity filtered X-ray beam and the most powerful and reliable X-ray detector ever designed provide the highest speed, sensitivity and flexibility.

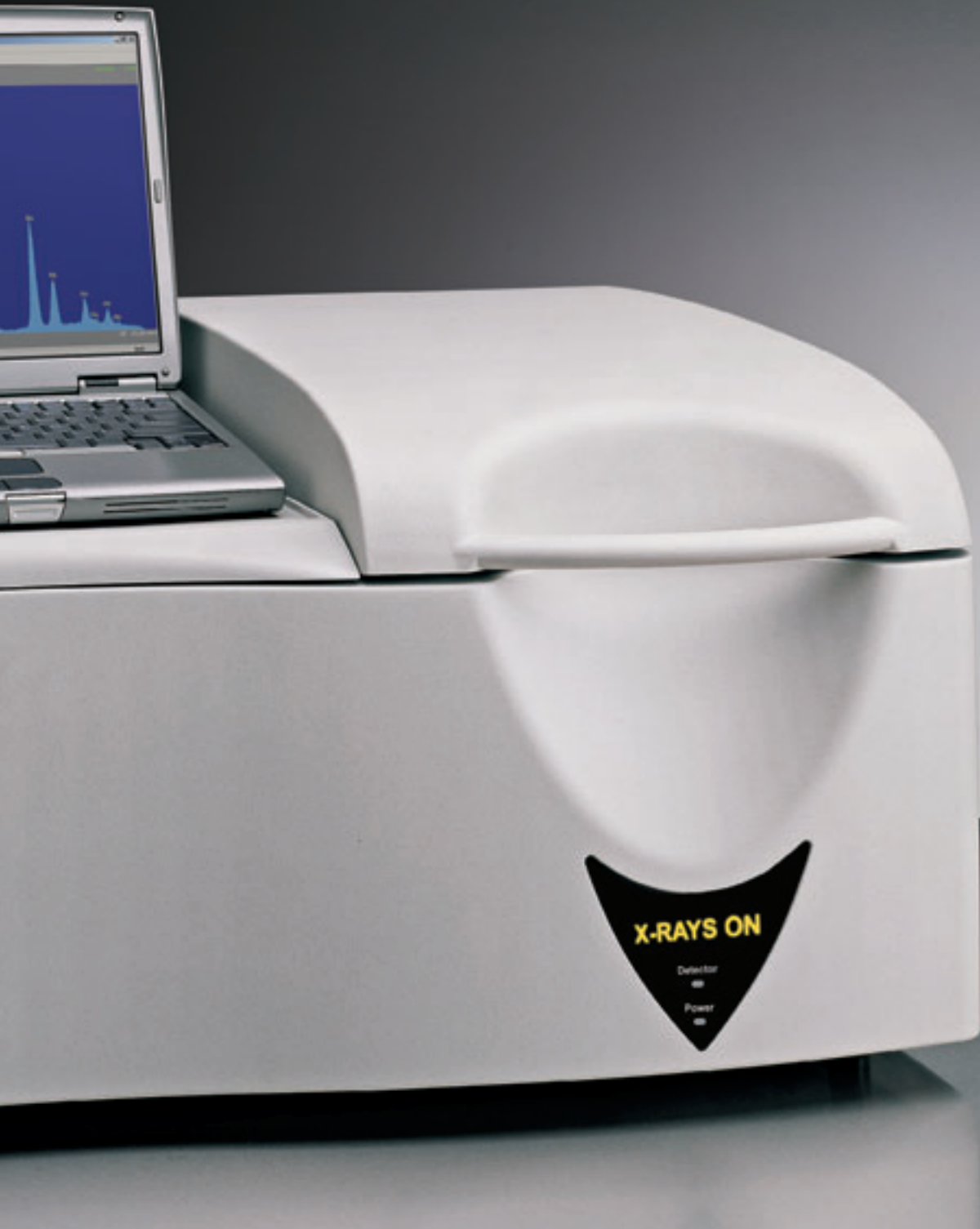
Any analyst can finally take advantage of:

- Rapid elemental analysis from Na to U
- Sensitivity from <1 ppm up to 100 %
- Measurement times 10-60 sec per element
- Many options for sample presentation
- Sample imaging with CCD camera
- Adjustable X-ray beam size 1-10 mm
- Exclusive electrically-cooled Si(Li) detector
- Versatile XRF applications software
- UniQuant® for superior standard-less analysis
- Mechanical durability for trouble-free service
- Compact footprint and easy mobility
- Fully customizable and upgradeable on-site
- Easy to install and even easier to maintain

The ARL QUANT'X spectrometer is a complete package that includes proven hardware, all-inclusive software, on-site method development and technical support – all backed by the industry's most generous warranty and a responsive service organization with decades of expertise in hundreds of successful applications of XRF.

Take a look inside, and see why your search for a benchtop XRF analyzer is finally over. *See the difference...*





Exclusive technology inside the Si(Li)

When it comes to performance, quality and reliability, the latest trend to hit the street isn't always the best choice. After 25 years and 4 generations of technical innovation, the Silicon Lithium-Drifted Si(Li) detector technology at the heart of the ARL QUANT'X continues to set the standard for sensitivity, speed and reliability. As a leading X-ray detector manufacturer for 40 years, our company knows the key parameters that define a detector's performance.

Crystal Area

Analysis of small samples, thin deposits or low concentrations is typically limited by the power of the X-ray tube and requires efficient capture of low fluoresced intensities from the sample. Larger crystal area effectively amplifies X-ray tube power. The Si(Li) crystal area is up to 5x larger than other models and provides a larger "umbrella" for capturing photons. This is one of the main reasons why the ARL QUANT'X can achieve sub-nanogram sensitivity in a compact bench-top package.

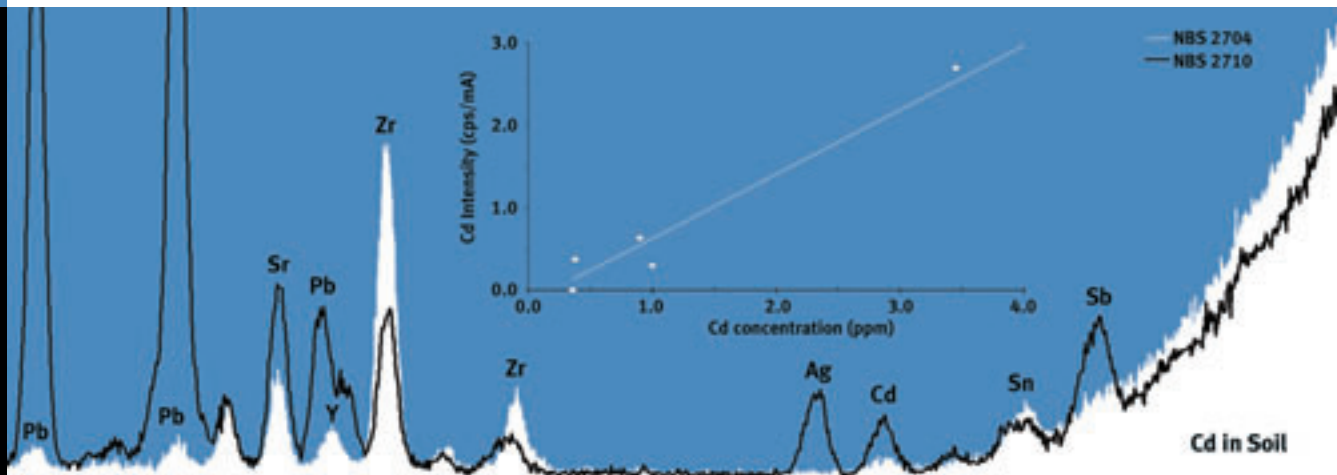
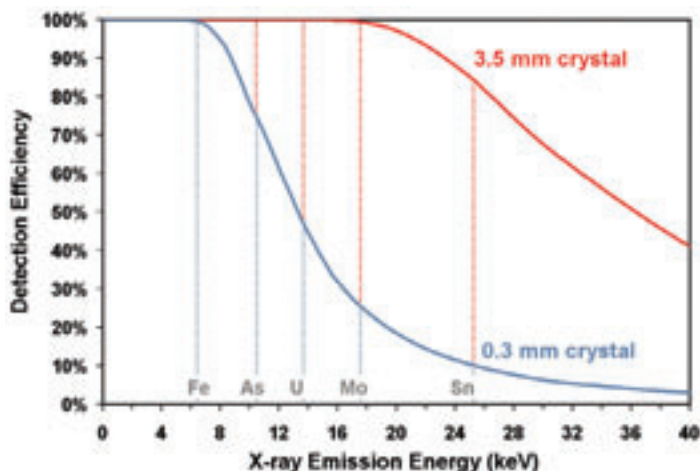
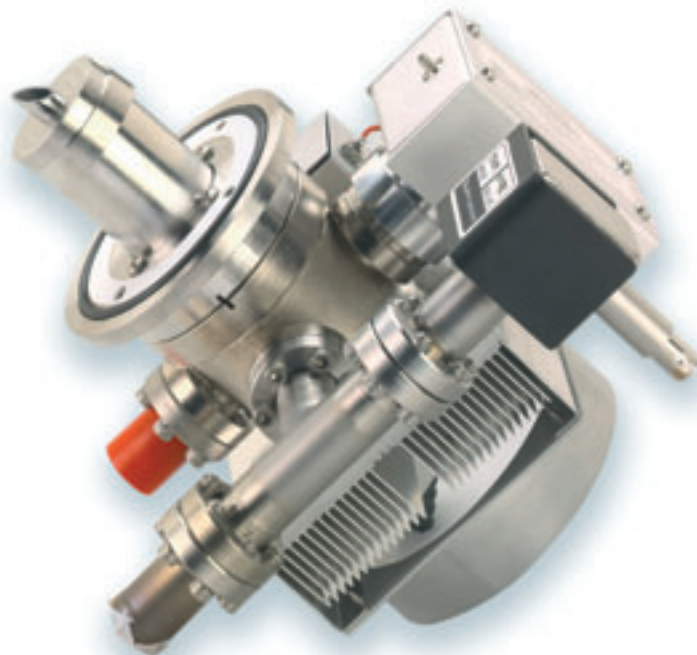
Crystal Temperature

Lower operating temperature dramatically reduces electronic noise, improves resolution, reliability and makes the instrument less sensitive to environmental variations. Thermo Scientific advanced six-stage Peltier coolers can attain -100 °C versus simpler models that operate at -15 to -25 °C. Thanks to cutting edge engineering, the performance of electrically-cooled detectors is now equivalent to that of conventional liquid-nitrogen (LN) designs.

Crystal Thickness

The nature of X-rays is to penetrate matter. High-energy X-rays emitted by atoms such as Mo, Ag or Cd can slice through Silicon like a hot knife through butter, so a thick crystal is required to capture them effectively and prevent damage to sensitive components behind the crystal. The Si(Li) crystal is 10x thicker than other models.

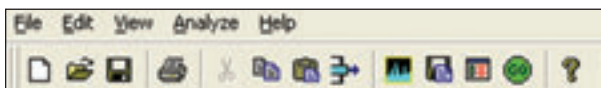
The thin Silicon crystals found in PIN and SDD detector types show a dramatic drop in efficiency for higher-energy fluorescence as illustrated here. For this reason, they should be used primarily for light-element, low-energy analysis.



Just Say GO!

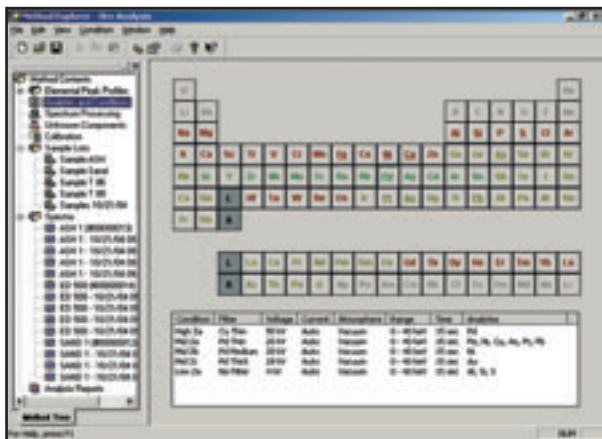
WinTrace software for the ARL QUANT'X opens the door to the limitless inherent flexibility of EDXRF, drawing on advanced algorithms and practices perfected through decades of research and experience. Collect and process up to eight filtered spectra per sample for any number of analytes, apply any one of seven analytical algorithms and include as many or as few calibration standards as you want. Once collected, spectra can always be reprocessed and recalculated off-line - anywhere. And automatic X-ray power adjustment guarantees that any sample – be it air filter, slag, metal, oil or rock – will be analyzed using its own unique optimal setting.

Click **GO** and analyze anything in 3 clicks!



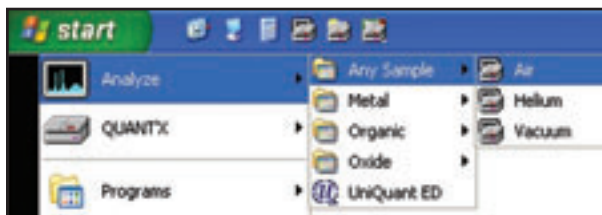
Intuitive

Add or remove elements simply by clicking on a periodic table. Review calibrations and results using a Tree-type interface. Build your own methods from templates for common applications.



Simple and User-friendly

Organize your desktop environment with shortcuts that take you directly to key analytical tasks.



In today's computer-controlled world, even the most advanced hardware would be handicapped without flexible software designed to take full advantage of it. The Method Explorer interface provides advanced users with access to every parameter to obtain the highest throughput, sensitivity and selectivity in any application:

- Any X-ray voltage from 4 kV to 50 kV in 1 kV steps
- Eight primary filters for optimal background control
- The atmosphere and analysis time, per spectrum
- Detector resolution and count-rate for optimal speed
- Interactive excitation guide for each user selection

Secure

Password-protection in all critical areas of the software assures the security of your methods and data. Operators are only allowed to specify sample names, positions and click GO.

Flexible

Accurate extraction of peak intensities from the spectra is a critical first step for any quantitative analysis. Automatic deconvolution settings work for most application and can be easily customized for the most difficult cases.

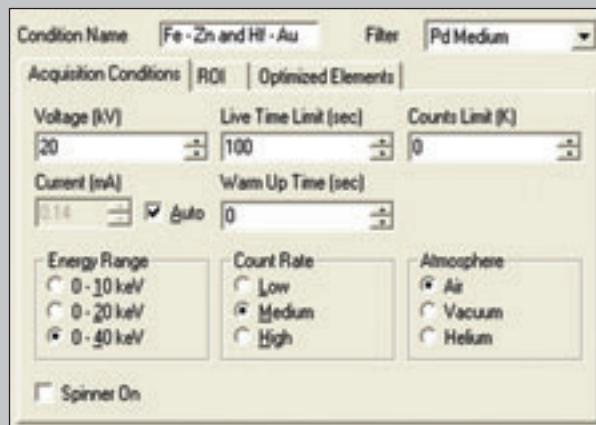
Fundamental Parameters

The standard FP algorithms for the ARL QUANT'X work with any number of elements, standards, sample types, and excitation conditions. The software corrects for compound stoichiometry, specified concentrations and unanalyzed compounds. All equations are recalculated instantly for every sample with accuracy that rivals that of many standard certificates. Thermo Scientific FP has been used to analyze the most difficult and unpredictable samples.

UniQuant® Advanced Standard-less Analysis

Going farther than any other FP analysis, the UniQuant method uses all eight filters to collect all emission lines of all possible elements from Fluorine to Uranium. This complete spectral profile of the sample allows UniQuant to automatically correct for all possible overlap and background effects, which are especially complex in energy-dispersive spectra.

- All elements are always analyzed, so you'll never need to add potential analytes.
- Each sample's unique physical properties, i.e. area, height, and mass are included in the calculation.
- Long-term changes in X-ray tube output are corrected using provided monitor samples.
- A variety of selectable reporting levels and formats present the results clearly for any type of user.
- UniQuant comes completely pre-calibrated and ready to analyze anything right out of the box.



The Sample Chamber

Improve your productivity and extend the analytical benefits of laboratory-grade XRF to a wider range of samples with the large sample chamber and multiple sample automation and presentation options. Modular instrument design allows any sample handling option to be added or removed easily as the application changes.

Auto-Samplers

Automated 10- and 20-sample carousels are designed for standard powder and liquid cups, pressed pellets, as well as aerosol or sediment filters. A sample spinner is available to assure representative results for samples of questionable uniformity.



Beam Collimators

Beam size can be adjusted from 15 mm for rapid screening down to 1 mm for research and investigative work.



Atmosphere

Vacuum and helium help improve sensitivity for light elements in solid, powder and liquid samples. The inert gas flush can be used with corrosive or unstable materials.

Specialized Stages

Automated multi-point analysis of industry-specific samples such as hard disks and silicon wafers can be performed with specialized stages.

Large Samples

The single-sample tray and the special large-sample deck can accept odd, large and irregular samples, as long as they fit inside the chamber.

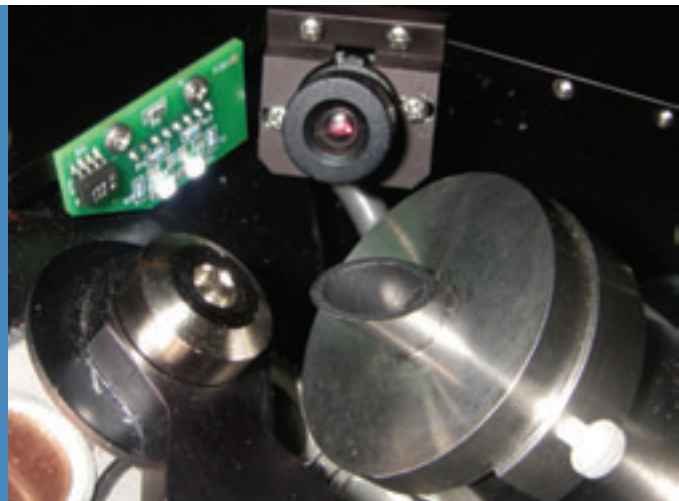
Chamber Extension

Even the largest of samples, such as cinder blocks, boots, turbine fragments, automotive parts and any sample up to 37 cm (14.6 in) high can be analyzed for semi-quantitative results without additional effort or preparation. This option helps combine the sampling advantages of hand-held XRF and the sensitivity of a laboratory analyzer. It is an ideal choice for university, forensic, museum, anthropological, military and contract laboratories.



With a CCD camera for sample imaging and adjustable X-ray beam diameter, the ARL QUANT'X opens an entirely new field of EDXRF, best described as "milli" XRF. For the first time, if you can see it – you can analyze it! The ARL QUANT'X combines all the analytical features, selectivity and sensitivity of a "bulk-analysis" spectrometer with the sampling flexibility typically found in "micro" analyzers. Add another exciting dimension to your results:

- Visualize and locate sample before or during analysis
- Identify, isolate, and align small samples or features
- Improve accuracy of qualitative and quantitative analysis
- Effective spatial resolution down to 0.1 mm
- LED's provide illumination inside sample chamber
- Works in air, vacuum or helium environments



Technical Specifications

X-ray Generator

Tube Target:	Rh standard, Ag optional
X-ray Power:	50 W maximum
Voltage Range:	4-50 kV in 1 kV steps
Current Range:	0.02-1.98 mA in 0.02 mA steps
Cooling:	Air-cooled
Selectivity:	7 filters + direct excitation
Beam Size:	1.0 mm – 8.8 mm, user adjustable

Basic Performance

Stability:	< 0.3 % rsd over 8 hours
Sensitivity:	< 3 ppm for Fe and Pb in Conostan S12
Stray Lines:	< 0.015 % med eV, < 0.05 % high eV
Repeatability:	< 0.3 % rsd at 1 million counts

Sample Chamber

Sample Size:	30.0 cm x 40.0 cm x 5.0 cm maximum
Extension 1:	20.0 cm max. sample height
Extension 2:	36.0 cm max. sample height
Atmosphere:	Air, Vacuum and Helium option
Sample holder:	1-sample stage and large deck
Auto-samplers:	10- and 20-position sample trays
Special Stages:	R-Theta (disk) and Y-Theta (wafer)
Sample Imaging:	CCD Camera, VGA resolution
Sample-spinner:	Available, software-controlled
Helium Flush:	15-65 psig input, 2.4 liters/min max.

Radiation and Electrical Safety

Interlocks:	Chamber lid (dual, separate circuits), X-ray tube, detector, warning light, side panels. Fail-safe circuit design.
Radiation:	< 0.25 mR/hr at a distance of 2 inches
Sound:	< 65 dbA at a distance of 1 meter
Compliance:	TÜV, UL, CE, GS

Computer and Software

PC Platform:	Laptop or Desktop computer
Processor:	Intel-based Pentium 4, 2.8 GHz
Memory:	1 Gb RAM, 40 Gb hard drive
Communication:	Ethernet (2 ports), USB
Operating System:	Windows XP
Elemental Range:	F-U, no limit on number of analytes
Exc. Conditions:	up to 8 excitation conditions per sample
Spectrum Display:	Auto-peak ID, KLM markers, conditions and status, overlays, hardware control
Peak Processing:	Peak-profile XML fit, background filter
Standard Analysis:	Linear, quadratic, ratio, intensity or conc. correction, comprehensive custom FP.
Advanced Quant:	UniQuant FP for multi-matrix standard-less analysis, full sample property correction, drift correction, factory pre-calibrated

X-ray Detector

Detector Type:	Si(Li) drifted crystal
Cooling Type:	Peltier or Liquid Nitrogen
Crystal Area:	15 mm ² PCD / 30 mm ² LN
Crystal Depth:	3.5 mm (3500 microns)
Energy Resolution:	< 155 eV PCD / < 149 eV LN
Sensitivity:	Fluorine to Uranium
Temperature:	< 190 K

Pulse Processor

Processor Type:	32-bit Digital, 3 DSP
Channels:	2048, 20 eV / channel
Shaping Time:	1-40 ms, user adjustable
Count Rate:	up to 100,000 cps (live)
Energy Range:	400 eV - 40960 eV
Deadtime effect:	< 3.0 %
Pileup correction:	< 0.3 %
Calibration:	Software-controlled

Site / Utility Requirements

Line Voltage:	110-240 VAC, 50/60 Hz
Spectrometer:	500 W PCD, 300 W LN
Vacuum Pump:	1000 W
Ambient Temp:	0-30 °C (32-86 °F)
Humidity:	20-80 %, non-condensing
Conditions:	Indoor use only

Weight and Dimensions

Height:	42.7 cm (closed), 91.5 cm (open)
Width x Depth:	72.4 cm x 59.7 cm
Weight:	80-91 kg (175-200 lbs), approx.



Hundreds of industrial and academic users have taken advantage of the versatility and sensitivity of the ARL QUANT'X as illustrated by the following typical configurations:

Application	Typical Analytes	Chamber Options	Atmosphere	Software
Air Filters	48+ elements	10-pos auto-sampler	Vacuum	Thickness FP module
RoHS / WEEE	Cr, Br, Hg, Pb, Cd...	CCD camera, collimators	Air	UniQuant
Forensics	Na-U	CCD camera, collimators	Vacuum and He	UniQuant
Oils, Lubricants	Metals	10-pos auto-sampler	Air	UniQuant
Slag and Cement	Na-Fe	10-pos auto-sampler	Vacuum	Standard Calibration
Alternative Fuels	20+ elements	1-sample holder	Air and Helium	UniQuant
Magnetic Media	Ti, Cr, Fe, Co, Pt, Ru	R-Theta stage	Air	MagMedia module
Industrial Coats	Ti, Cr, Fe, Ni, Cu, Zn	1-sample large deck	Air	Thickness FP module

X-ray Elemental Analysis Capabilities from Thermo Fisher Scientific

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

X-ray spectrometry is a common and very powerful technique for fast, non-destructive, quantitative analysis of major, minor and trace components in all types of materials, including solids, powders, aqueous or organic solutions, and layered structures. It has numerous applications in every industry: pharmaceuticals, environmental monitoring, metals, cement, electronics, and mining, just to name a few.

Thermo Fisher Scientific provides a full range of X-ray fluorescence and X-ray diffraction instrumentation (EDXRF, WDXRF, XRD, EDS, ESCA) that cover every aspect of X-ray spectrometry from routine to highly specialized research applications. From the versatile ARL QUANT'X to the ultra-precise ARL 9900 X-ray WorkStation™, each instrument combines leading-edge technology with a long history of quality, durability and exceptional analytical performance.



ARL OPTIM'X compact XRF



Handheld NITON XRF Analyzer



ARL ADVANT'X Series IntelliPower™



ARL X'TRA powder diffractometer



ARL 9900 X-ray WorkStation™ Full XRF/XRD

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