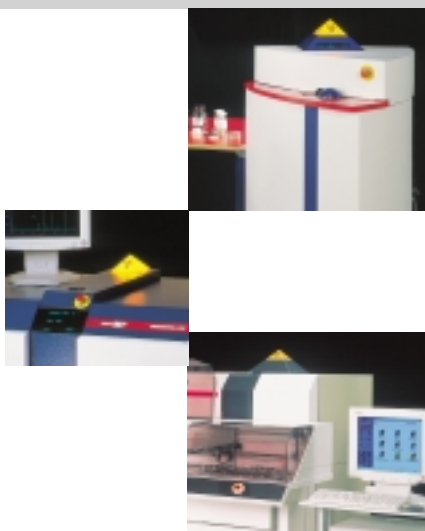


WinXRF version 3

Analytical Software for ARL X-Ray Fluorescence Spectrometers

The comprehensive and user-friendly WinXRF software supports the spectrometer operation and data handling. Specifically designed to work under Windows® 2000, it integrates the latest HTML/Internet technologies. Shortcuts make it possible to start analysis with just one click, keystroke or touch screen.



Durable benefits

WinXRF maximizes your productivity by optimizing all analysis and instrumental factors. It offers the following benefits:

- Speed, universal reduction in time
- Simple operation: very fast learning, no specific knowledge required
- Comfortable use: guided operation for less error, e.g. powerful sample registration, instrument check with SPC, tasks controlling the whole analysis and started with just one mouse click or one key stroke, etc.
- Analytical Assistant facilitates quick and easy definition of analytical programs and calibrations
- Support of X-ray Diffraction** and XRF analysis in one package. Allows to integrate both techniques in calibration and analysis routines
- Makes your instrument more versatile: quantitative, qualitative, semi-quantitative or standardless analysis mode for routine and numerous non-routine analytical requests
- Reduces operating costs and increases the instrument availability thanks to optimized control and standardization, recalculation, etc.
- Better traceability helps compliance with ISO 9000, reducing the risk of non-quality and the high associated costs
- Rich functionality: WinXRF can provide a complete solution, eliminating in most cases the need for extra software or specials
- Investment protection: regular updates and easy upgrade paths enable you to maintain your equipment up to date and to add new functions when you need them

(**): Available on some instrument types



- Synergy with WinOE, sister program for Optical Emission (OE) instruments. Same software for both techniques rationalizes training and reduces complexity
- Everything from one single source and partner: Thermo offers complete laboratory solutions integrating not only XRF and OE instruments, but also automation and laboratory management solutions.

Your needs

Are your analytical requirements both variable and specific? Do you need to improve the productivity of your laboratory while assuring a high quality level? Are you in challenging new analytical fields?

Our solution

WinXRF is the answer. It offers extensive functionality providing versatile analysis modes, powerful results processing, advanced communication and quality assurance tools.

() WinXRF features, options or other Thermo products marked with an asterisk are described in separate data sheets. Please refer to them for more details.*

UniQuant® is a registered trademark from Omega Data Systems B.V.

With the latest release 3, Thermo Electron Corporation is first to integrate HTML/Internet technologies. These major user interface improvements make it even more simple and comfortable to use and reduce the learning phase.

Two modes of navigation are available to best suit the user. Mode switching is performed on-line. Large, user-friendly icons allow easy access to key functions at a glance.

WinXRF Analytical Assistant makes quantitative analysis easy to define

Analytical programs and calibration are defined with the help of the on-line Analytical Assistant. Calibration curves are calculated using the multi-variable regression (MVR) program. Correction models eliminate the influence of interfering elements in multicomponent matrices and achieve better accuracy of analysis. These models are:

- Line overlap correction
- Additive correction on intensities
- Additive correction on concentrations
- Lucas-Tooth: Multiplicative correction on intensities
- Traill-Lachance: Multiplicative correction on concentrations
- Traill-Lachance +AC: Multiplicative and

additive correction on concentrations

- Traill-Lachance +: Additive and multiplicative correction on concentrations
- COMprehensive LAchance (COLA) using theoretical alphas to be determined by the fundamental parameters program NBSGSC*, which calculates theoretical correction factors (alphas) for metals, pressed powders and fused beads. Interelement correction factors (theoretical alphas) are calculated and used as known coefficients in the MVR. This minimizes the number of standards necessary to produce calibrations and improves the accuracy of analysis.

Fast qualitative analysis

Two forms of digital scanning are available. Step scanning allows precise definition of peaks with a resolution of 0.001°.

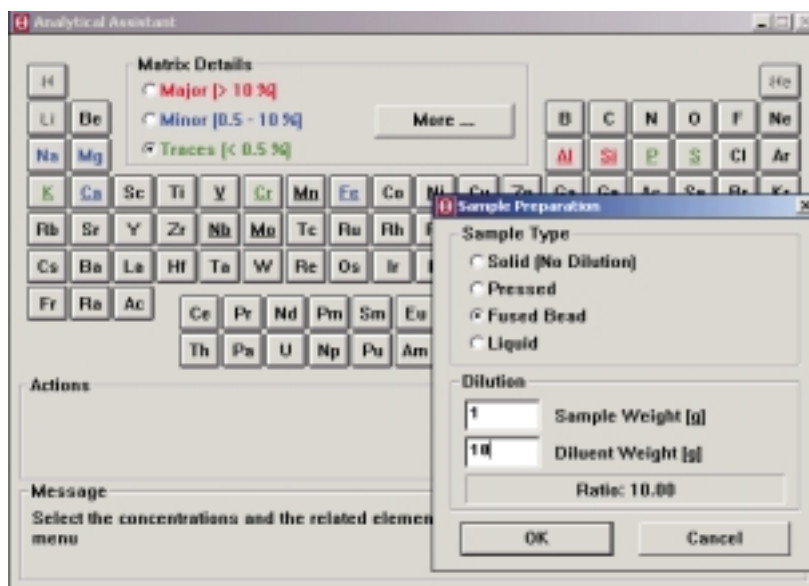
For rapid qualitative analysis, continuous digital scanning can quickly acquire spectra at speeds up to 128°/min.

Interactive color graphics, zoom capability and automatic or manual peak identification help interpreting qualitative scans. Up to three scans can be superimposed (one may be a real time acquisition) with 2θ angle, wavelength or energy scale, cursor positioning and labeling facilities. Cursors coordinates as well as scan parameters can be printed. Background positions and 2θ real values can be transferred from a scan into the line library automatically.

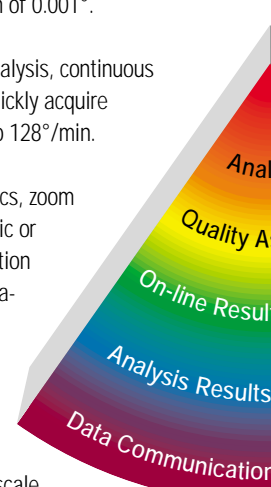
Total elemental analysis

QuantAS*: Quantitative Analysis using Scans

Concentration levels in liquid or solid samples can be determined through the user-friendly optional QuantAS package. 5 scans covering the spectrum of 70 elements from F to U are performed. Smoothing, background subtraction, peak identification, overlap and matrix corrections, calculation of semi-quantitative concentrations and normaliza-



Analytical assistant for easy analytical program set up



tion are all done automatically for a fast and easy semi-quantitative analysis of unknown samples. Various options, like the calculation of an unanalyzed element or compound and Type standardization are available for ultimate accuracy.

UniQuant® state-of-the art standardless analysis

The optional UniQuant®* provides standardless analysis for up to 79 elements when specific standards are not available, when samples can only be obtained in small quantities or as irregular shapes. Unknown liquid samples can also be analyzed very efficiently. Various options, like the calculation of an unanalyzed element or compound, the sample dilution (if unknown), multi-element mono-layer or thin layers are available for ultimate accuracy.

The QuantAS and UniQuant® optional modules are fully calibrated and installed in the factory, making them ready for immediate use on user's site.

Statistical Process Control

Are costs of non-quality an issue for you?

Operating your instrument without efficient and timely control is like driving in the dark without headlights on: it may work but you are unable to anticipate any sudden obstacle. You must stop frequently to correct your direction. It will take you longer, cost you more fuel not to mention the high repair costs should you not be lucky...

Thermo's SPC is the package that checks your instrument most proactively: it throws light on abnormal response patterns to warn you before it goes out of control.

It works on-line, fully integrated in WinXRF and supports the most complete set of SPC rules. It also increases your productivity: the optimization of the control and stan-

dardization frequency maximizes the instrument availability and cuts operating costs. You save time while you assure a predictable and higher quality level.

Thermo's upgrade policy ensures happy customers year after year...

Keeping your instrument up-to-date protects your investment. You make it compliant with today's hardware, software and communication system's environments. You enjoy the benefits of the latest improvements in technology and you receive a full range of very useful new functions introduced with each new release.

Spectrometers controlled by prior versions of WinXRF or by XRF386 can be quickly updated to WinXRF 3 directly on your site. Only an update of the computer may still be required and for the earliest versions, also an update of the instrument communication interface. A wizard enables effortless, fast and secure importation of your current database into WinXRF 3.

Previous spectrometers from the ARL 8400 and 8600 series would require in addition a retrofit of the new generation electronics to the spectrometer.

Are your requirements evolving over time? No problem! WinXRF allows you to add optional features easily anytime. So why not do it when you need them? Simply ask your Thermo representative for detailed information.

New with WinXRF

- Web-style User Interface
- Analysis Shortcuts
- Automatic Program Choice
- Analysis Recalculation
- Sample Results Averaging
- Even more Traceability
- Black-box SPC
- Graphical Status & Alarm Monitoring
- And a lot more Enhancements



Either peak to peak hopping or scanning can be used for standardless analysis

Easy routine quantitative analysis with WinXRF tasks

WinXRF assists the operator in achieving their routine tasks by means of highly automated functions, using black box intelligent modules and thanks to an unmatched adaptable software design.

Flexible sample and analysis processing definition

WinXRF Tasks define every aspect of your sample analysis procedures. You apply each task with just one click! It then guides you through the whole analysis process by controlling a variety of parameters, in particular:

- Registration: 10 fields of up to 12 characters each are available to describe your samples. They can be identified just before analysis or pre-defined
- Selection of the analytical category and of the associated files (program, quality or type standard)
- Result display formats, storage, printing and transmission, modification permission, quality check, etc.

"One click" analysis

Shortcuts can include the Analysis Task and a sample identification mask. Only one click on the icon or one keystroke is necessary to start your analysis with the appropriate procedure and with the sample identity predefined! Shortcuts are even better accessed through a touch screen option (direct finger pointing on screen).

The Sentry* option allows you to enter samples identities with validation rules more easily, to describe repetitive quantitative analysis batches or to read sample identities from bar codes. With the Remote Sample Definition* option you can receive the sample identities from another computer.

Flexible batch for all kinds of analyses

Automatic analysis of a set of samples includes programmable delay between measurements and environment selection (vacuum \leftrightarrow helium) with a liquid cassette detection security. It permits different

kinds of analyses to be performed on the same sample, not only quantitative, but also qualitative (scans or intensities), semi-quantitative (QuantAS) or standard-less (UniQuant[®]). In addition, a batch can call another batch for quick programming of a complex operational cycle.

WinXRF makes quantitative analysis efficient

- Up to 100 elements per program including pseudo-elements with formulae calculation and manual input of elements
- Type Standardization: allows ultimate accuracy for specific alloy types against a calibration
- The automatic program choice function selects the optimum analytical program, quality or type standard according to the analysis result. Particularly suited for the best calibration curves selection per alloy family
- Automatic result recalculation: helps you save time and operating costs. Allows you to verify a standardization, to update a type standard, to check production samples, or also to include any value obtained by other techniques to apply matrix correction to XRF concentrations, etc. without re-analyzing samples.

Calibration with Multi Variable Regression

WinXRF incorporates a powerful Multi

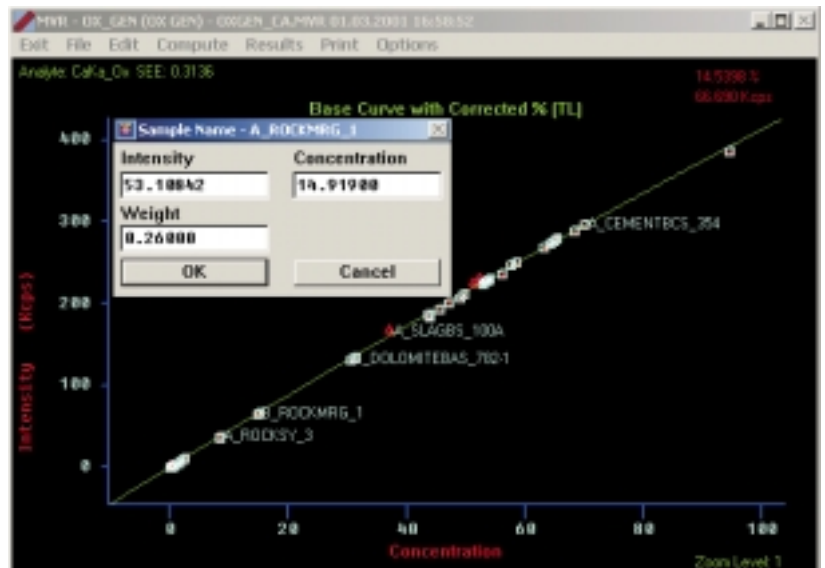
Variable Regression program (MVR) allowing you to create, add or update calibrations at any time. It features interactive color graphics for fast and accurate calibration curve calculation, and is based on the least squares regression technique to find the polynomial coefficients of the best fit curve.

Correction for matrix and interelemental effects can be performed. Additive corrections of first or second order as well as multiplicative non-linear corrections are available, including self analyte correction.

The use of third party generated Fundamental Parameter alphas in MVR emphasizes the versatility of WinXRF software.

The calibration curve can be displayed with raw or corrected intensities. Curve fit correlation includes analytical information such as Standard Error of Estimate, Limit of Detection, Background Equivalent Concentration and Sensitivity, and shows samples excluded from calculations. Sample names and calibration data can be displayed for easy identification and direct calibration tuning.

Tables allow the easy input of calibration standard data, with import/export facility from/to files in CSV (Comma Separated Values) format, directly compatible with Excel.



Multi Variable Regression (MVR) calibration data

Instrument Quality Assurance

SPC-Basic: pro-active control cannot be simpler!

Seamlessly integrated in WinXRF, SPC-Basic, performs the routine instrument check using statistical process control techniques, and features:

- Scheduled analysis of control samples: on-line evaluation by SPC software and immediate feedback with simple messages for any element failing the tests
- Up to 16 different rules supported: automatic detection of out-of-control states using control limits, bias, trends, statistical distribution checks, etc.
- Global instrument and specific analytical programs control using dedicated control samples
- Flexible strategies can be configured for differential correction actions according to the SPC tests result
- SPC-Basic operates as a black box, the user interface is limited to the information feedback screen: it cannot be simpler! It requires no statistical knowledge.

Severity	Element	SPC Chart	Descriptions
Fatal	Cu	X	Print above UCL
Warning	P	X	Run of N above the mean
Warning	Si	R, s	Run of N below the mean

Information on failed element tests returned by SPC

System standardization

Either full or selective standardization can be performed anytime, on operator decision,



Graphical representation of status

at scheduled intervals or as a response to a control request.

Audit trails: traces your instrument activity and your analyses operation

Monitoring and logging of instrument alarms and status using lists, graphics and statistical tools;

- Monitoring and logging of standardization, type standardization update and calibration changes
- Results modifications are documented by a justification. They can appear in displays, printouts and transmissions and can also be saved in a log file.

Data communication options

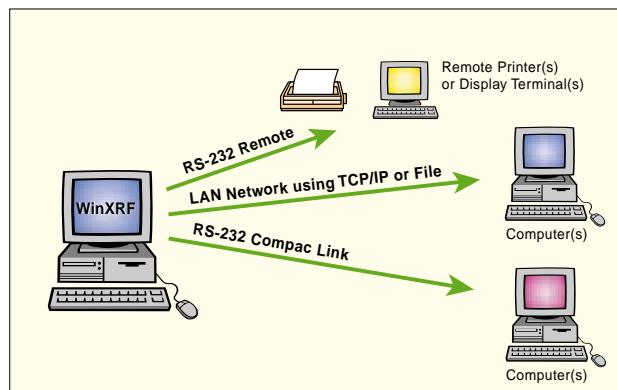
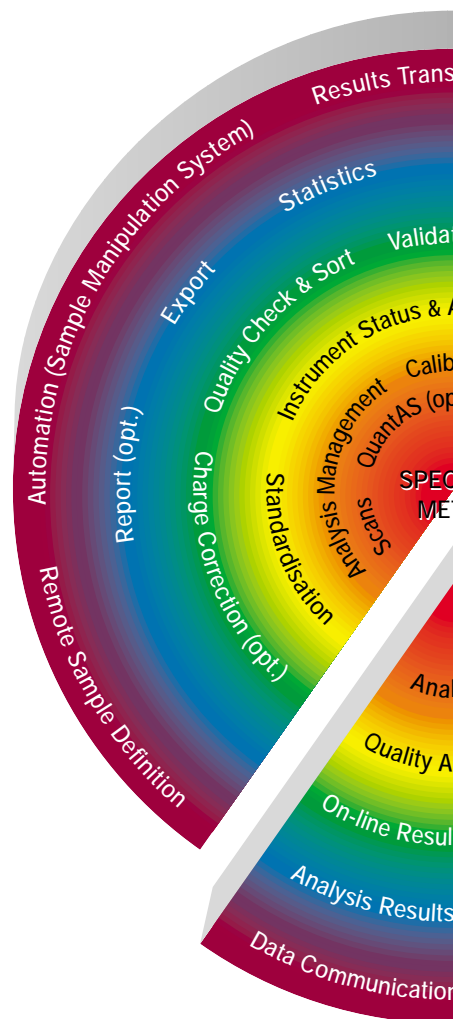
Do you need to display or print results in the process control room? Transmit them on-line to a process computer? Via LAN network TCP/IP? To your favorite spreadsheet program on your office computer? Or to a departmental file server? WinXRF can do it all, automatically.

ARLnet*: Package of result transmission solutions via LAN Local Area Network to up to 18 destinations, includes:

- *NetTCP/IP*: computer task-to-computer task transmission
- *Netfile*: transmission to files on local or network disks
- *Network Printers*;
- *Software Destination Switch*: automatically re-routes results to an alternate destination if the main one is unreachable.

COMPAC*: Transmission of results to up to 5 computers via serial lines using the Thermo Compac protocol.

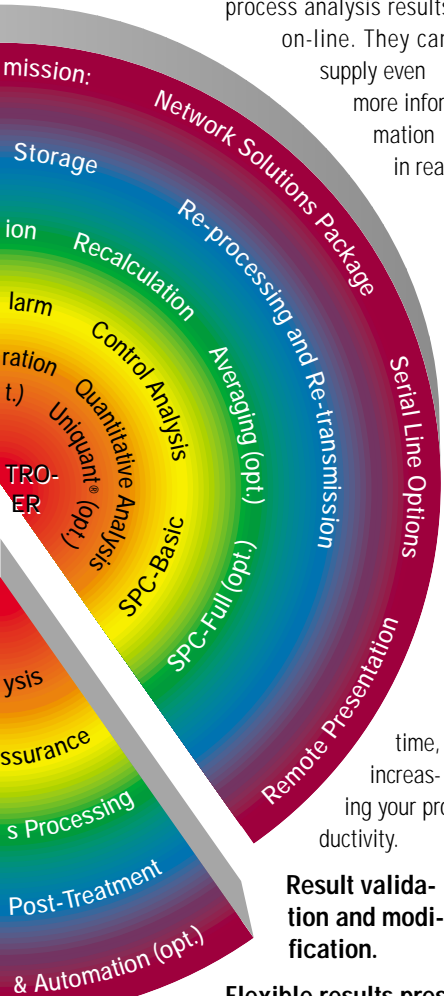
Remote*: transmission of results to up to 8 remote printers or visual display terminals via serial lines.



Open and versatile communication capabilities

Analysis results processing

Valuable functions allow you to process analysis results on-line. They can supply even more information in real



time, increasing your productivity.

Result validation and modification.

Flexible results presentation according to a variety of layouts. Values are displayed along with up to 25 attributes (user definable colors and font styles): you get a lot more information than just figures!

Storage, printing, transmission and transfer to SPC.

Quality Check: to check a result against pre-defined upper and lower limits of a target alloy or product specification.

Quality Sort: quickly identifies an alloy or product by matching the specifications.

Metaverage* (option): averaging of sample analyses according to pre-configured schemes. Averages are then processed as normal results.

Charge Correction* (option): calculation of furnace charge additions to correct the process.

SPC-Full, full Statistical Process Control package* (option): a very useful complement to SPC-Basic. Allows on-line graphical display, evaluation and printing of the instrument control samples data as well as of production samples (control charts). Provides the following features in addition to those of SPC-Basic:

- Comprehensive charting capabilities and limits calculation
- Allows automatic control charts display after each analysis
- Monitoring of instrument standardization
- Instrument status values
- On-line transfer of production samples results for production process control. With automatic feedback to WinXRF.

SPC-Full allows Quality Assurance Managers to document permanently their Quality system, e.g. for audit purposes, study and revision procedures.

Post-treatment

WinXRF includes a results storage database for basic post-treatment with selective retrieval using filters. The user can re-apply on-line functions such as result editing, quality check, transfer to SPC, etc. and re-transmit results. Moreover, it offers basic statistics calculation and the export to databases, spreadsheet or text processor applications (e.g. MS-Access, Excel, etc.) using a variety of compatible export formats.

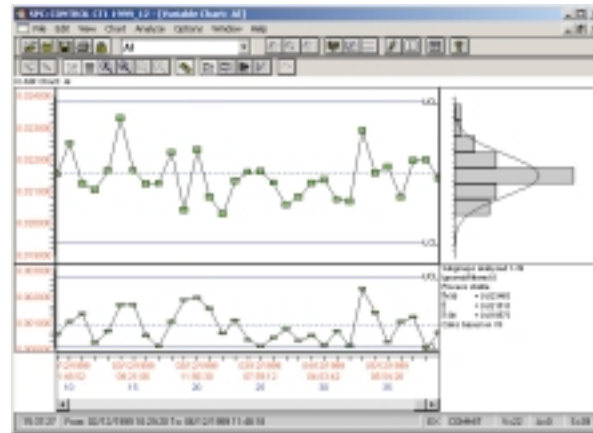
The **Report option*** (specialized software) allows you to create printed reports of analytical results using predefined or your own formats.

ARL Report Generator			Quality:		Type:	Program:	
Element	Min.	Max.	Average	Sigma	Sigma%	ARL	
C	0.1200	0.1320	0.1287	0.0037	2.8383		
Si	0.0190	0.0220	0.0197	0.0010	5.2254		
Mn	0.1630	0.1750	0.1684	0.0035	2.0532		
P	0.0760	0.0820	0.0786	0.0018	2.2416		
S	0.1490	0.1540	0.1510	0.0014	0.9366		
Cr	0.3350	0.3410	0.3390	0.0018	0.5230		
V	0.5360	0.5430	0.5390	0.0021	0.3841		
Mo	0.2700	0.2810	0.2271	0.0036	1.3142		
Ni	0.0260	0.0330	0.0290	0.0021	7.1386		
Ti	0.0730	0.0780	0.0763	0.0020	2.6837		
As	0.6300	0.6500	0.6450	0.0087	1.3427		
Sn	0.7900	0.8200	0.8075	0.0109	1.3495		
Nb	0.8170	0.8200	0.8192	0.0013	0.1586		
Al	0.4600	0.4800	0.4700	0.0071	1.5045		
Ca	0.2100	0.2300	0.2250	0.0087	3.8490		
7 samples Analysed between: 25-Nov-99 16:05:50 and 25-Nov-99 18:41:06							
Notes:				Report date: 26-Nov-99			

Powerful report according to a variety of layouts



An example of many different results presentations



Typical X-R Chart from SPC-Full option

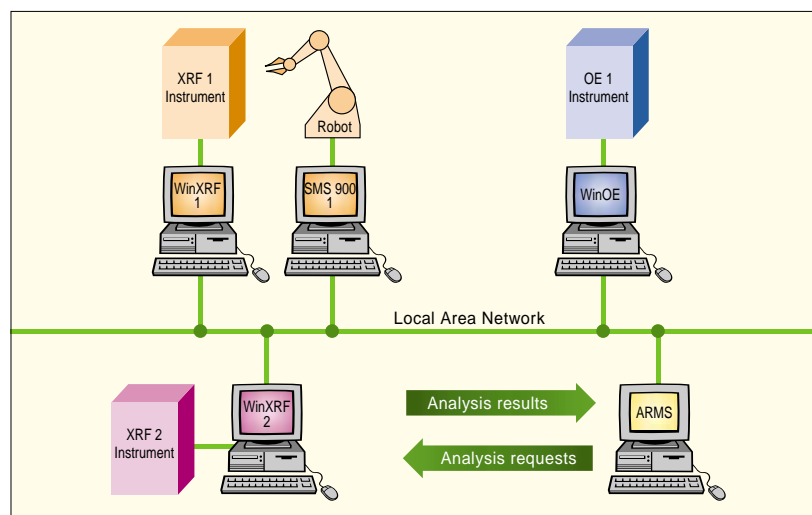
Utilities / Configuration

WinXRF provides comprehensive instrument configuration facilities together with full software customization functions. They allow use of your instrument according to your exact needs and contribute to the system performance. Some other utilities and tools:

- Security and data integrity with user accounts, password protection and up to 8 different access levels
- Language supported: English, French, German or Spanish, called through a single icon
- Translate* (option): text and message customization or translation into any language with a character set supported by Windows® 2000 Professional. Moreover, further languages are readily available on request. Ask your Thermo representative
- Database maintenance: import/export, backup. Periodic results databases simplify the management of their archiving
- Wizard to easily import your configuration database if you update your existing WinXRF software
- Reporting the software configuration and the user files.

Automation and laboratory management

Thermo has optional solutions available for fuller automation and integration into your process:



WinXRF is ready for integration to instrument, laboratory and even process automation

Remote Sample Definition*: allows WinXRF to receive sample identifications and analysis parameters from another application, avoiding the operator having to re-input them. You save time while you eliminate typing errors

Full instrument automation* with the ARL SMS-900 or ARL SMS-XY robotic systems. For even greater speed, higher productivity, lower operational costs, improved quality and reliability of results

Laboratory Management*: ARL ARMS provides production control laboratories with a very fast and automated system managing sample registration and result processing centrally for the whole laboratory.

Standard WinXRF features

- Graph ernet Explorer
- Quantitative and qualitative analysis of unknown samples
- Support of XRD** (X-ray Diffraction) and XRF analysis in one single package
- Analytical Assistant helping the operator in defining analytical programs, calibrations and basic operations of the instrument
- Analysis shortcuts integrated in WinXRF software. They can also be duplicated on the windows desktop with your own icon and can be called by shortcut keys
- Variable counting time on peak and background positions
- Automatic analytical program choice
- Multi-variable regression for calibration curve determination using a range of correction models including correction for curved background
- Sophisticated mathematical manipulations of element intensities permitting background and matrix correction procedures employing virtual elements
- Flexible results display and printing
- Dynamic precision scheme: variable number of decimals according to the concentration range
- Manual input of values
- Results validation and editing, with audit trail
- Quality check & quality sort
- Concentration results recalculation
- Results storage and basic post-treatment. Statistics. Export to other applications
- Instrument control with on-line integrated SPC
- System standardization, with audit trail
- Type standardization, with audit trail
- Instrument alarms and status monitoring with logging and graphical display tools
- Flexible sample identity
- User accounts: password protection and user definable rights
- Language: English, German, French or Spanish
- Remote diagnostics through modem connection
- Software and instrument configuration. Utilities, database maintenance tools
- Economy mode setting that reduces running costs and extends tube life.

Spectrometers

WinXRF 3 is available with all current X-ray fluorescence spectrometers: ARL OPTIM'X, ARL ADVANT'X, ARL 9800 series.

It is also available as an update kit on ARL 9400, on ARL 8400/8600, on earlier spectrometers starting with the ARL 72000 and ARL 74000 XRF systems.

Software options

- QuantAS: semi-quantitative analysis package
- Uniquant[®]: standardless analytical software package
- NBSGSC: theoretical alphas package with COLA model corrections
- ARLnet: LAN network results transmission package
- Remote Sample Definition through LAN network
- Sentry: sample entry software
- Compac: serial results transmission to computers
- Remote: serial results transmission to terminals
- Metaverage: sample results averaging
- Charge: for charge correction calculation
- Report: generation of printed reports
- SPC-Full: Full graphical statistical process control package extension
- SPC-Remote: for viewing and processing SPC studies produced by the SPC of WinXRF on another computer
- Translate: software texts translation and customization

- I/O: Minimum 1 free RS-232 port and 1 parallel port. Ethernet interface.

Computer options

- Screens: 19" CRT, 15" TFT, 17" TFT, 15" TFT touch screen (direct finger pointing on screen)
- Printers: Color DeskJet, Laser
- 2, 4 or 8 serial lines interface
- Mini-modem for long-distance transmissions via serial line
- Dot-matrix remote printer with continuous paper feeding
- VT-520 compatible text terminal for remote display

WinXRF computer specifications

- Runs on Windows[®] 2000 Professional with Internet Explorer 5.5 or 6.0
- Recommended specifications: Pentium III 800 Mhz, 256MB RAM with 17" screen, or higher
- Minimum: Pentium II 300MHz, 128MB RAM, 500MB free disk space and SVGA graphic adapter

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