

XRF technology has taken a giant leap forward with the next generation of portable analyzers – the handheld Thermo Scientific Niton XL3t. Building on the success of the award-winning Niton® XLt Series, the Niton XL3t x-ray tube-based XRF analyzer continues to lead the market through excellence in innovation.

Thermo Scientific Niton XL3t



Niton XL3t Series analyzers provide many distinct advantages:

- **Very easy to use – even by non-technical personnel**
- **Lab-quality performance in a handheld instrument**
- **Improved cycle time for high sample throughput**



PMI for critical applications.



A History of Innovation

A history of breakthrough technologies distinguishes Thermo Scientific Niton x-ray fluorescence (XRF) analyzers. In 2002, we pioneered the use of miniaturized x-ray tubes in handheld XRF analyzers. Since that time, the performance and features of Niton XRF instruments have improved continuously. Now we introduce a groundbreaking new generation of portable XRF analyzers, combining advanced electronics and materials technology with the most powerful x-ray tubes ever used in a handheld XRF instrument: presenting the Niton XL3t.

Featuring a high-performance thermoelectrically cooled detector, 80 MHz real-time digital signal processing, and dual state-of-the-art embedded processors for computation, data storage, communication, and other functions, the Niton XL3t incorporates many new features directly benefiting the customer. From the integrated, tilting, color, touch-screen display to the customizable menus for ease of use, these ergonomic new analyzers are both the lightest weight and most ruggedly constructed x-ray

tube-sourced handheld XRF analyzers ever made. Niton XL3t instruments can be used for many nondestructive testing applications, including analysis of metal alloys, screening of electronics and consumer goods for prohibited substances, mining exploration and grade control, and more. For example, the Thermo Scientific Niton XL3t 800 Series is the definitive tool for scrap metal recycling, casting and fabrication, manufacturing and Positive Material Identification (PMI). Alloy grade ID and QC testing typically take 1 to 2 seconds, with accurate alloy chemistry in as little as 3 to 5 seconds. Similarly, compliance testing for meeting the demands set forth in the Consumer Product Safety Improvement Act (CPSIA), Proposition 65, Restriction of Hazardous Substances (RoHS), and other regulations is faster than ever before with the Niton XL3t 700 Series, including screening of incoming materials, stocks and outgoing finished goods. Detection limits for all banned substances are improved – especially for cadmium – with the 50 kV x-ray tube sample excitation system.

The Niton XL3t's analytical power alone puts it in a field by itself. With its many standard



Screen toys and consumer goods with confidence

features and available options, it stands far above the competition. Integrated USB and Bluetooth™ communications provide direct data transfer to the user's PC or networked storage device, eliminating cumbersome data syncing procedures required by PDA-based XRF analyzers. A clip-on weld mask and folding test stand help users safely analyze difficult to measure samples. Additionally, the optional heat shield extends the hot-surface testing capability from 600°F (315°C) to 1,000°F (538°C), protecting both the analyzer and the operator's hand from these elevated temperatures. Add the optional integrated sample imaging system and 3 mm small spot feature to locate areas of interest in a sample, such as a small component or button, then store the image of each sample analyzed along with measurement results; or choose the Helium Purge Light Element Analysis Package for direct analysis of Mg, Al, Si, and P.

Take advantage of the standard Niton Data Transfer (NDT©) PC software suite to customize the instrument, set user permissions, generate custom reports and print certificates of analysis, or to remotely monitor and operate the instrument hands-free. Whether you need an analyzer for metal alloy analysis, RoHS compliance or toy and consumer goods screening, mining or mineral exploration, art conservation, or archaeometric analysis, the Niton XL3t combines the analytical performance of lab-grade instrumentation with the high-speed performance, ease of use, and cutting-edge technology customers have come to expect from their Niton analyzers.

Thermo Scientific Niton XL3t analyzers represent just one of our handheld analyzer solutions, which include XRF tools for metal alloy identification, lead-based paint testing, RCRA metals in soil, toy and consumer goods screening, RoHS and WEEE compliance screening, and many other analysis needs.

Niton XL3t Specifications

Weight	< 3.0 lbs (< 1.3 kg)
Dimensions	9.60 x 9.05 x 3.75 in. (244 x 230 x 95.5 mm)
Tube	Au anode 50kV maximum, 100uA maximum Ag anode with optional light element analysis package
Detector	High-performance semiconductor
System Electronics	533 MHz ARM 11 CPU 300 MHz dedicated DSP 80 MHz ASICS DSP for signal processing 4096 channel MCA 32 MB internal system memory/ 128 MB internal user storage
Batteries	Two 4 (or optional 6) cell lithium-ion battery packs
Display	Adjustable angle, color, touch-screen display
Standard Analytical Range	>25 elements from S to U
Optional Light Elements	Additional elements Mg, Al, Si, and P via helium purge
Data Storage	Internal >10,000 readings with spectra
Data Transfer	USB, Bluetooth and RS-232 serial communication
Security	Password-protected user security
Mode (Varies by Application)	Alloy Modes: Metal Alloy, Electronics Alloy, Precious Metals Bulk Modes: Mining, Soil Plastic Modes: RoHS Plastics, Toy & Consumer Goods Plastics, TestAll™, Painted Products Other Modes: Lead Paint, Thin Sample Custom Modes: Upon request (based on application feasibility)
Data Entry	Touch-screen keyboard User-programmable pick lists Optional wireless remote barcode reader
Standard Accessories	Locking shielded carrying case RFID reader Shielded belt holster Spare battery pack 110/220 VAC battery charger/ AC adaptor PC connection cables (USB and RS-232) NITON Data Transfer (NDT) PC software Safety lanyard Check samples/standards
Optional Features and Accessories	Portable test stand, stationary test stand, tripod stand Extend-a-Pole™ extension pole Welding mask HotFoot™ hot surface adapter Soil testing guard Internal CCD sample imaging system Variable spot size aperture
Licensing/Registration	Varies by region. Contact your local distributor.
Compliance	CE, RoHS

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Thermo Scientific Niton XL3t GOLDD+ Series Mining Analyzers

Elemental Limits of Detection in SiO₂ and SRM Matrices Using Mining Analysis

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The Niton® XL3t GOLDD+ Series x-ray fluorescence (XRF) analyzer is the ultimate choice in features and performance. The chart below details the sensitivity, or LODs¹, of the Niton XL3t GOLDD+ Series using mining analysis for an SiO₂ matrix, a typical soil matrix (SiO₂ with Ca/Fe), and SRM matrix.

Limits of Detection in ppm (mg/kg)							
	Time	60s per filter w/out He					
	Matrix	SiO ₂	SiO ₂ +Fe+Ca		SRM		
Elements	Ba	35	40		45		
	Sb	12	15		15		
	Sn	15	18		20		
	Cd	8	10		10		
	Pd	5	5		5		
	Ag	A/S	A/S		A/S		
	Mo	3	3		3		
	Nb	3	3		3		
	Zr	3	3		5		
	Sr	3	3		5		
	Rb	3	3		3		
	Bi	3	5		5		
	As	3	5		5		
	Se	3	3		3		
	Au	16	20		20		
	Pb	5	10		10		
	W	40	60		60		
	Zn	8	15		15		
	Cu	12	15		15		
	Ni	25	30		30		
	Co	20	100		100		
	Fe	35	N/A		N/A		
	Mn	60	65		85		
	Cr	20	30		35		
	V	10	20		35		
	Ti	10	20		60		
	Ca	50	N/A		N/A		
	K	40	N/A		N/A		
	Cl	60	50*	80	65*	75	65*
	S	70	55*	90	75*	125	90*
	P	250	200*	400	330*	300	230*
	Si	N/A	N/A*	N/A	N/A*	N/A	N/A*
	Al	500	220*	1000	500*	2500	1000*
	Mg	3500	750*	6000	1500*	6500	2000*

Element list shown is not exhaustive. For limits of detection for elements not shown, please contact a Thermo Fisher Scientific office or your local representative.

*LODs displayed with the use of helium.



Limits of detection (LODs) are dependent on the following factors:

- Testing time
- Interferences/matrix
- Level of statistical confidence

LODs are calculated as three standard deviations (99.7% confidence interval) for each element, using 60-second analysis times per filter.

Please Note:

Ongoing research and advancements in our Niton XL3t GOLDD+ Series analyzers will lead to continual improvement in many of the values detailed in this chart. Contact a Thermo Fisher Scientific office or your local representative for the latest performance specifications.

Actual analysis time is based on your requirements, and, in most cases, shorter times will give you the detection limits you require. For example, if analysis time was reduced from 60 seconds/filter to 15 seconds/filter, then the detection limits obtained would be twice the values shown in the chart. Similarly, increasing the analysis time will reduce the detection limits by the square root of the increased time.

A/S = Application-specific
N/A = Not applicable

1. Definition and Procedure for the Determination of the Method of Detection Limit, 40 CFR, Part 136, Appendix B. Revision 1.11. U.S. Environmental Protection Agency. U.S. Government Printing Office: Washington, DC, 1995.

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