



Steel MacTM
L I M I T E D

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NITON XL3t - Portable XRF Analyzer

Specification Sheet

NITON XL3t

NITON XL3 Series



The NITON XL3 Series – Purpose-built for the Rigorous Demands of Handheld XRF Analysis

From the inside out, these revolutionary instruments were designed to make our customers more successful. Capitalizing on the explosive growth of consumer electronics, they incorporate 80 MHz real-time digital signal processing and dual state-of-the-art embedded processors for computation, data storage, communication, and other functions. The very best in technology has been engineered into the Thermo Scientific NITON XL3t and XL3p analyzers to provide users with high-performance today, scalability for tomorrow, and a robust foundation to develop future features and applications.

The XL3t's 50 kV, 2-watt miniaturized x-ray tube with multiple primary filters provides optimized excitation from chlorine (periodic table element 17) through the transuranic elements. The optional Helium Purge Light Element Analysis Package extends the analytical range of the NITON XL3t down to magnesium (element 12), while the patented Infiniton radioisotope source of the NITON XL3p offers the most economical lifecycle cost of any handheld XRF analyzer.

For applications including RoHS compliance screening, mining, archaeological research, and archaeometry for the restoration of art and artifacts, the Thermo Scientific NITON XL3t can also be equipped with our patent-pending small-spot focus and integrated visualization technology. Users who select the small-spot option have the choice of switching between full-area analysis for large samples and a 3mm small-spot area to analyze small areas of interest on samples. An optional internal camera records a digital image of the test area along with each sample analysis for documentation.

The NITON XL3 Series offers a choice of high-performance x-ray detector options, which are optimized by application, and feature the only fully-integrated and environmentally sealed VIP™ color touch-screen display for easy viewing of sample results under

all lighting conditions and at almost any angle. Couple this with integrated Bluetooth™, USB, and serial communications, and cumbersome download procedures or PDA synchronization become a thing of the past. Users are able to drag and drop data files directly from their instruments to their PCs or networked storage devices.

An RFID reader/writer has been incorporated into the front of the instrument, allowing identification of previously tagged samples, while at the same time permitting the user to "print" a radio tag for sample lot identification.

Of course, portable instruments are only as good as their batteries. Employing 3rd generation lithium-ion batteries, users experience greater than 8 hours of continuous use from each of the two standard packs included with their Thermo Scientific NITON analyzers. When operating their instruments in the lab or office, the included AC power supply permits users to recharge the batteries directly in the instrument.

Software

Taking advantage of the 533 MHz ARM 11 CPU plus a 300 MHz dedicated math coprocessor, the most advanced analytical software routines have been employed in the XL3t and XL3p, providing users with greater testing speed, much higher precision, improved detection limits, and reduced interferences in comparison to our previous generation instruments of only a few years ago.

Whether the application requires our proprietary advanced Fundamental Parameters (FP) software for metal alloy analysis, RoHS compliance screening, or mine sample analysis, or is more specialized requiring complex empirical modeling, results are processed with the fastest possible calculation times to eliminate the lag that occurs on more primitive instruments employing off-the-shelf components and resource-hungry Windows™ CE operating systems.

The Beginnings of a Revolution



Thermo Fisher's historic line of award-winning NITON handheld XRF Analyzers

In 1987, Dr. Lee Grodzins, a leading physicist from the Massachusetts Institute of Technology, founded a radon testing company; its name was NITON® Corporation, after the original name of the radioactive element first isolated in 1908.

With funding in part from the United States Environmental Protection Agency, this fledgling company went on to develop the first one-piece, handheld XRF analyzer. Based on technology that led to four patents, the XL-309 was introduced for lead paint analysis and rapidly won recognition, both from the marketplace and the scientific community.

A culture of innovation led to ongoing technological advances: the introduction of the XL-700 Series for analysis of heavy metals in soils; the XL-801S, the first handheld, lab-quality XRF analyzer for metal alloy analysis; the XL-II 801S with improved ergonomics and enhanced ease-of-use; and the simultaneous launch of the groundbreaking XLi and XLt instrument platforms.

During this journey, these hi-tech marvels have been awarded two R&D 100 Awards, the Northrop Grumman Material Director's Award, the BusinessWeek IDEA and red dot design awards, and nine patents, all while helping to make our world a cleaner, safer place. Notable accomplishments include the invention of the Infiniton™, the only XRF analyzer that never requires source replacement, and the first use of miniaturized x-ray tubes in one-piece, handheld XRF analyzers.

In the spring of 2005, NITON became a part of Thermo Fisher Scientific and continued its innovative focus in miniaturization of traditional benchtop technologies, bringing specialized solutions from the laboratory to the metal yard and factory floor. These included the first portable XRF analyzer equipped with a helium gas purge for direct analysis of magnesium, aluminum, silicon, phosphorus, and sulfur in metal alloys, and the first handheld small-spot XRF analyzer for RoHS, WEEE, and ELV screening, featuring an x-ray spot 20 times smaller than conventional handheld devices. This small-spot analyzer includes an integrated sample imaging system to help users locate areas of special interest in a sample. Once located, it stores an image of the tested area along with its measured elemental composition.

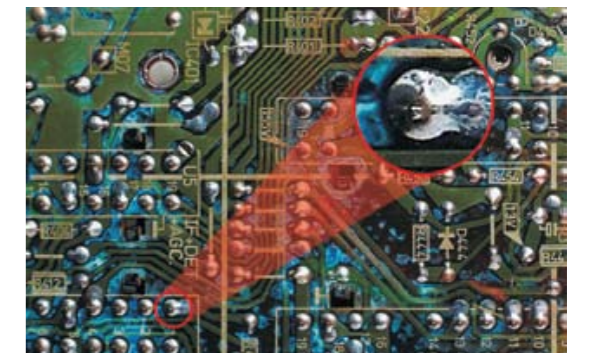
Continuing in Thermo Fisher's culture of innovation, 2007 brought the launch of the next generation of Thermo Scientific NITON XRF analyzers: the revolutionary NITON XL3 Series with the most

powerful sample excitation sources ever offered in handheld XRF analyzers. The x-ray tube-based XL3t analyzers feature 50 kV, 2-watt miniature x-ray tube sources with multiple primary filters. XL3p instruments use a new second generation patented Infiniton isotope source with dramatically improved performance over our previous generation of instruments.

Over the past two decades, Thermo Fisher Scientific has spear-headed the development of advanced miniature analog and digital technology for use in portable XRF instrumentation, taking the analytical capabilities of laboratory instruments and putting those capabilities into its users' hands. Today's NITON XRF analyzers offer better performance, greater versatility, and lower operating costs than our instruments from only a few years ago. These advanced instruments can identify and determine the elemental composition of most samples in just seconds.

Handheld Thermo Scientific NITON analyzers provide users with real-time, on-site results – eliminating delays associated with traditional laboratory analysis – with instruments that provide performance and features comparable or superior to those of larger, more expensive benchtop XRF systems.

Better detection limits, shorter measurement times, new advanced applications, increased productivity, higher profit, and lower long-term cost of ownership for our many thousands of customers around the world are the ultimate results of this journey.



Thermo Fisher's small-spot focus technology "zeros in" on small areas and individual components for analysis.

APPLICATIONS FOR HANDHELD XRF

Alloy Analysis

Whether the need is quality control, sorting of scrap material, or even failure analysis, verification of metal alloy grade and composition is crucial to the success of many businesses.

The NITON XL3 800 Series provides a variety of rugged solutions for the most demanding alloy analysis needs.

Confirmation of alloy chemistry provides aerospace manufacturers and petrochemical refiners with assurances that critical-use alloy materials will not be subject to premature or catastrophic failure. Scrap metal processing facilities maximize the return on purchased inventory when they "upgrade" alloys, while at the same time preventing charge-backs that result from shipment of incorrectly graded material. Other industries benefiting from alloy verification include pharmaceutical and medical device manufacturing operations, which can now document cGMP to the US Food & Drug Administration with our 21CFR Part 11 compliant systems, fabricators using their quality control program to differentiate themselves from the competition, and the alloy producers themselves – who verify alloy composition prior to charging the furnace, sort similar-looking finished product, and manage scrap inventory efficiently.

RoHS, WEEE & ELV Compliance

The European Union (EU) has enacted directives aimed at limiting the entry of toxic metals into the waste stream. EU Directive 2002/95/EC, "Restriction of Hazardous Substances (RoHS)," restricts the amounts of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls and polybrominated diphenyl ethers allowable in electrical and electronic equipment.

European Union legislation (e.g., RoHS) along with California's Proposition 65, China RoHS, and other similar legislation implemented in countries around the world continue to add pressure to manufacturing industries to eliminate lead in electronic interconnections. In response, and for competitive reasons, manufacturers have begun promoting the use of lead-free solder in purchased components and the elimination of all lead solder from products. The NITON XL3t 700 Series provides a fast, effective, and nondestructive means of screening solders, components, and packaging for compliance with the RoHS guidelines.

Mining & Mineral Assessment

Operating mines, as well as exploration properties and refineries, are typically located far from the convenience of modern civilization. Even when on-site laboratories are available, site conditions and sample preparation typically provide assay results to mine managers with turnaround time measured in days. On-site measurement of drill cores and cuttings with the NITON XL3 500 Series provides real-time feedback to exploration managers. Ore-grade assessment manages blasting, excavation, and hauling activities to optimize the site blend provided to the concentrator,



while preventing grade dilution or the erroneous transport of ore to the waste dump. Environmental professionals survey tailings piles to direct site cleanup procedures during mine-closure activities or when addressing acid mine drainage (AMD) issues. In-situ samples are analyzed by placing the analyzer directly on the drill cutting or rock face to provide screening results in seconds, while simple sample preparation will yield analytical results in agreement with traditional laboratory methods.

Environmental Testing

Clean air to breathe, water to drink, land to live on, and an environmentally safe place to call home are fundamental human rights. Whether it is a public health official responding to an elevated blood lead report of a child, an environmental specialist assessing an industrial site for metals contamination, or a remediation contractor working to make processes more efficient, and therefore more economical, the use of portable analytical equipment to drive inspection, remediation plans; and actual site clean-up is now well established. Whether it is inspecting a home for lead paint, analyzing dust samples to determine the spread of contamination, protecting workers from airborne exposure to high levels of pollutants, or surgically delineating the boundaries of site contamination, Thermo Scientific NITON XL3 600 Series analyzers provide users with definitive, defensible, and dependable results every day.

Art & Archaeometry

Archaeometry is essentially the application of scientific methodologies and techniques to archaeology for the collection of quantitative data from archaeological samples. Whether the task is reconnaissance survey, site mapping for excavation, restoration, or establishing the provenance of artifacts, the ability to obtain quantitative chemical data in a nondestructive manner is an important component in accomplishing these project goals. From pottery to paintings, and fabrics to feathers, archaeologists and conservators are revolutionizing site survey and object preservation through real-time data acquisition.

Thermo Scientific NITON analyzers are increasingly being chosen by leaders in the field as the keys to unlocking the secrets of these treasures from the past. NITON XL3 600 Series analyzers provide a fast, portable, and, most importantly, nondestructive means of analyzing delicate art and artifacts.



¹ Waste Electrical and Electronic Equipment
² End of Life Vehicles

Other Applications

Among other applications are coating thickness, toys/jewelry/consumer goods, recycled wood products (for CCA), or recycled glass for industrial applications, catalytic coatings for refining/fuel cells/autocats.

Accessories

In addition to the wide range of excitation sources, detector options and instrument calibrations to suit applications ranging from the routine to the custom, the XL3t and XL3p analyzers support a very comprehensive range of accessories, allowing analysis of virtually any type of sample.



Belt Holster – The rugged, molded instrument holster included as a standard accessory with every NITON XL3 Series analyzer provides dependable storage and transport of your XL3 instrument in the factory or on the jobsite. It keeps your XL3 safely by your side while climbing ladders or scaffolding – leaving your hands free for maneuvering.

Portable Test Stand – An optional shielded test stand provides users a safe platform for analysis of small and irregularly shaped samples. Collapsible for easy, convenient transport, its unique design allows easy setup/takedown in seconds. Utilizing smart RFID technology, it determines automatically when the XL3 instrument is docked and adjusts the instrument parameters for test stand use. It features integrated warning lights to alert users to instrument operation and sample inserts to precisely position samples for repeatable testing.



Weld Mask – An optional clip-on weld analysis mask narrows the test window to 3 mm, permitting isolation of weld beads from joined pieces for analysis and verification of proper dilution rate. It is ideal for analysis of all types of weldments, including fillet welds.

Additional Accessories

- **Sample Preparation Kits** – Assist users in preparing bulk (e.g., soil) samples for analysis. Includes mortar and pestle, stainless steel sieves, sample cups, and other items necessary for sample preparation.
- **Backscatter Shield** – Patented device prevents scattered radiation from light-matrix samples returning to the user's hand, especially those samples associated with RoHS, WEEE, and ELV analysis.
- **Extend-A-Pole™** – Telescoping extension pole with instrument cradle clamps to the analyzer and provides remote trigger activation. Features folding bi-pod supports to allow for effortless in-situ soil testing while standing upright.
- **Heat Shield** – Form-fitting heat shield protects the instrument and the user's hand from elevated temperatures associated with in-service PMI (Positive Material Identification) testing. Extends testing capabilities to 1000° F (~538° C).