

PORTABLE ALLOY ANALYSIS

Charting a
New Course
to the Future



NITON

THE NEW STANDARD IN PORTABLE ALLOY ANALYSIS

Metal alloy verification is crucial to the success of many businesses, regardless of application: ■ Quality Control ■ Scrap Sorting ■ PMI ■ Failure Analysis.

In late 1998, NITON® Corporation revolutionized the alloy analysis industry with the introduction of its XL-800 Series Alloy Analyzer – the first ever high-performance, handheld x-ray fluorescence (XRF) device for alloy composition and grade verification. Since that time, NITON products have become the standard for material analysis in applications ranging from scrap metal sorting to petrochemical PMI (positive material identification), to in-house QA/QC of alloy components in manufacturing.

Once again, NITON has transformed the analytical instrument industry with the release of two portable alloy analysis instruments: The isotope-based XLi™ Alloy Analyzer and the x-ray tube-based XLt™ Alloy Analyzer.



The **XLi 800 Series** expands the realm of isotope-based XRF analyzers; dramatically improving precision and functionality, while enhancing the ergonomic form-factor and further reducing the weight and size. The bottom line is extraordinary performance, productivity and ease of use.

Key XLi features include:

- Attractive, ergonomic form factor
- High-strength, injection molded and environmentally sealed housing
- Patented high-speed electronics for superior performance
- Integrated touch-screen display with advanced and intuitive user interface
- Hot-swappable batteries to allow continued use without power-down
- Integrated barcode reader for fast, easy data entry
- New Infiniton™ source configuration eliminates source replacement and never slows down!
- A full suite of traditional source options
- Benchtop docking station to facilitate fixed-site use
- A full PC interface and custom report generator
- Operate remotely from a PC
- Internet-based diagnostics and troubleshooting
- New features and software upgrades via internet

The **XLt 800 Series** charts new territory in portable XRF analysis, providing the user with the speed and efficiency of x-ray tube excitation, while greatly reducing the regulatory demands typically encountered with isotope-based systems. In most cases, the XLt can be shipped from state to state and country to country with minimal paperwork and expense.

Key XLt features include:

- Attractive, ergonomic pistol grip design
- High-strength, injection molded and environmentally sealed housing
- Patented high-speed electronics for unequaled performance
- Integrated touch-screen display with advanced and intuitive user interface
- Hot-swappable batteries to allow continued use without power-down
- Integrated barcode reader for fast, easy data entry
- High performance x-ray tube excitation
- Faster testing times
- Laboratory-quality analytical precision
- Reduced regulatory requirements
- Eliminates the need for multiple sources
- Never slows down
- Benchtop docking station to facilitate fixed-site use
- A full PC interface and custom report generator
- Operate remotely from a PC
- Internet-based diagnostics and troubleshooting
- New features and software upgrades via internet





The Infinite Source for your NITON XLi Analyzer

In the past, portable XRF analyzers have used ^{109}Cd as the main excitation source, sometimes combined with secondary ^{55}Fe or ^{241}Am sources for enhanced excitation of one or two additional elements.

NITON has developed a patent-pending technique for processing the spectrum produced by a specially packaged ^{241}Am source, that allows efficient excitation of all of the elements conventionally associated with only ^{109}Cd and ^{55}Fe sources, as well as those for which ^{241}Am is normally used. NITON's new Infiniton source paves the way for an XRF analyzer equipped with a single isotope source, enabling simultaneous analysis of a full suite of 22 elements — a source that never slows down and never requires replacement. In other words, the XLi 818 with the Infiniton source is virtually maintenance free.

Analytical Performance

Both the XLi and XLt offer analytical performance and testing speed that is unsurpassed in the industry, providing higher precision analysis at greater than three times the speed of NITON's older systems. The graph below demonstrates the dramatic improvement in instrument precision in comparison to our older systems, and the superior performance of x-ray tube excitation over that of an isotope.

Modes of Operation

Alloy Grade with Chemistry™ Mode

Alloy Grade with Chemistry mode provides rapid chemical composition analysis, along with a grade identification based on min/max element specifications. The built-in alloy grade library contains specifications for more than 300 common alloy grades. NITON offers standard libraries based on US common designations, or DIN specifications. Users can easily customize the library by editing existing specifications or adding custom alloys to the library at any time. Typical testing time is only 2–5 seconds for most alloy grades!

Signature Match Identification™ Mode

Signature Match mode is designed for very fast throughput in sorting of mixed materials. When an unknown alloy is tested, the instrument quickly matches its spectral signature or “fingerprint” against a library of stored alloy signatures. Users can store spectral signatures for up to 500 alloys. Typical testing time in Signature Match mode is just 1–3 seconds, making it ideal for sorting high volumes of material.

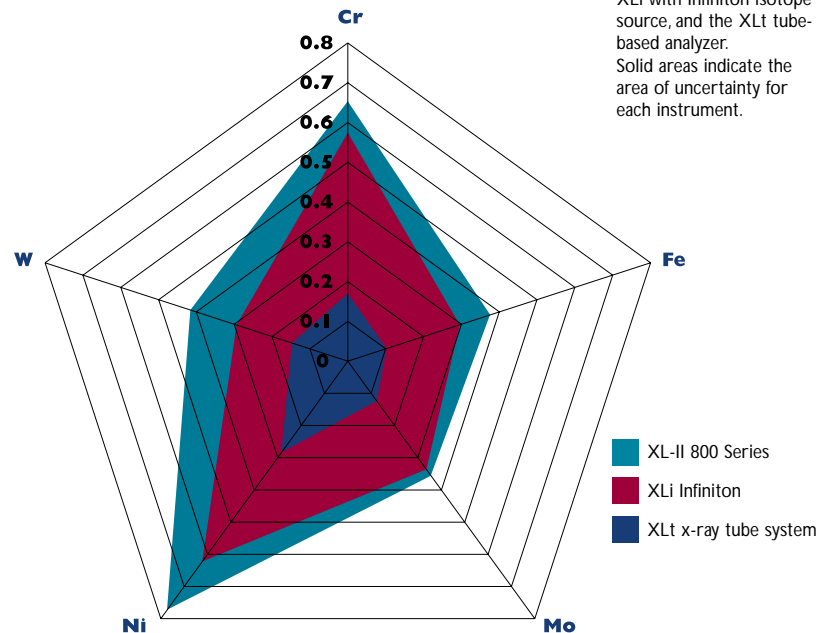
Super Chem™ Mode

Super Chem Mode is a special, high performance testing mode that provides the fastest, most accurate chemical analyses and grade identifications based upon “type standardization” criteria stored by the user.

The user stores the spectral signature of a certified or well-analyzed and documented alloy standard, along with the documented composition of that standard. When an unknown is measured, the instrument first performs a signature match to determine the grade. It then determines the chemical composition of the measured sample, based upon ratioed intensity differences empirically calculated against the concentration data.

This mode produces the most accurate chemistry analyses, most quickly – for those specific alloys that have been stored. Super Chem Mode is ideal for testing alloy products and components against tight specifications for production Quality Control.

Instrument Error Comparison
Hast C-276 (20 second test time)



Pass/Fail™ Mode

Pass/Fail mode provides a quick “YES” or “NO” match against a single alloy selected by the user from Alloy Grade, Signature Match or Super Chem libraries. Pass/Fail is typically even faster than Signature Match mode, since the unknown is compared against only one alloy. This mode is ideal for use on the shipping/receiving floor to quickly confirm correct grade labeling and accurate product delivery.

Whatever the Application, **NITON** is the Solution



Scrap Metal Recycling

The business of metal recycling has become more complex and challenging over the years, as consumers have become more demanding and metal markets more volatile. The modern recycler must be able to make decisions quickly and adapt to changing market conditions in order to remain profitable in this competitive industry.

The XLi and XLt analyzers provide the recycler with the information necessary to make quick, confident decisions on material purchases, and the speed and throughput necessary to quickly sort volumes of materials and take advantage of sales opportunities.

NITON Corporation is proud to support the recycling industry through membership in both ISRI (the International Scrap Recycling Industries) and BIR (the Bureau of International Recycling).

Photo courtesy of Universal Metal Corp., Worcester, MA



PMI

- Incoming Materials
- In Stock Materials
- In Service Testing



API Recommended Practice 578, Material Verification Program for New and Existing Alloy Piping Systems from the American Petroleum Institute.

Positive Material Identification or PMI, is an integral part of process safety management in the petroleum refining and petrochemical industries.

In response to a series of accidents resulting from material mix-ups, many companies have instituted stringent PMI programs. Industry organizations have also worked to develop guidelines to assure that the nominal compositions of all alloy components in a process system are consistent with design specifications.

Since their introduction in 1998, NITON analyzers have become the industry choice for PMI. A combination of performance, portability, ease of use, and unparalleled attention to customer needs has made NITON the number one supplier of PMI instrumentation. This attention to customer needs was the driving force behind the design of these new instruments. Both the XLi and XLt are ideally suited to the testing of fillet welds and small components. These instruments were specifically designed to accommodate the rigorous demands of in-service PMI testing of components in excess of 800° F (430° C). The XLi will easily fit through 5" (130mm) NDT plugs. NITON's new XLi and XLt Series analyzers provide unsurpassed value in price, performance, durability, ease-of-use and routine maintenance costs. In addition, users now have a choice between the rugged reliability and design functionality of the XLi, or the regulatory advantages of the XLt.

NITON is a proud supporter of organizations such as ASNT (the American Society for Nondestructive Testing) and NDTMA (the Nondestructive Testing Management Association) that are dedicated to advancing the science and application of nondestructive testing methods.



Quality Assurance / Quality Control

Quality Assurance and Quality Control (QA/QC) are considered essential in virtually all manufacturing industries. Product components constructed using out-of-spec materials can produce results ranging from the inconvenient to the disastrous. MIL Spec documentation gives little assurance of product quality, with an estimated 70 percent of material mix-ups resulting from incorrect MIL Spec documentation.

Hundreds of NITON analyzers have been sold into manufacturing industries, from small metal fabricators to major aerospace manufacturers. These companies have come to rely on NITON instruments for material verification in their QA/QC programs.

In addition to the higher throughput and more precise analytical performance of the XLI and XLt analyzers, these analyzers come standard with a suite of software tools to enhance their value to your business. NITON's PC-compatible NDT[®] (NITON Data Transfer) software offers powerful reporting functions, remote operation and automatic analytical calculation capabilities that make these tools invaluable to your operation's quality assurance program.



Industries that depend on NITON Alloy Analyzers

Aerospace Manufacturing

- Aerospace Castings
- Aerospace Fastener QA/QC
- Failure Analysis



Pharmaceutical Manufacturing

- Component Validation
- Installation Qualification (IQ)
- Operational Qualification (OQ)



Electric Power Industry

- Plant Inspection
- Failure Analysis



Reliable alloy analysis is a necessity throughout a wide range of industries

Common Specifications

Principle of Operation	Analysis of multiple elements via X-ray fluorescence (XRF) spectroscopy
X-ray Detector	High-performance Si-PiN detector, Peltier cooled.
System Electronics	Hitachi SH-4 CPU ASICS high-speed DSP 4096 channel MCA
Batteries	(2) Rechargeable lithium-ion battery packs with Quick-swap capability. 6–12 hour use (maximum depends on platform and duty cycle), 2 hour recharge cycle.
Display	Backlit VGA touchscreen LCD
Analysis Range	22 Standard alloying elements in the range Ti(22) to Bi(83) Nonstandard in-range elements may be available. Please contact NITON, or your local NITON representative for details.
Testing Modes	Alloy Grade with Chemistry (Fundamental Parameters analysis) Standard Signature Store/Match Mode Super Chem ID Mode Pass/Fail Sort Mode
Data Storage	Internal: 3000 readings with x-ray spectra (maximum) Display stored readings and/or recalculate stored spectra in other test modes at any time.
Standard Accessories	Locking, shielded waterproof carrying case Shielded belt holster Spare lithium-ion battery pack with holster 110/220 VAC battery charger/adaptor PC interface cable NDT [©] (NITON Data Transfer) PC software Safety Lanyard Check/verification standard Weld collimator Integrated bar code scan engine for rapid/reliable entry of sample information
Training	U.S. – Call 1-800-875-1578 for schedule of no-cost radiation safety training in your area. Outside U.S. – Please contact your local NITON representative for training information.



Precise analysis, regardless of sample size, shape or form



XLi Specifications

Weight	1.7 lbs (0.8 kg)
Dimensions	11.5 x 3.5 x 3.0 inches (292 x 89 x 76 mm)
Primary Excitation Source	²⁴¹ Am Maximum 30 mCi (1,110 MBq) OR ¹⁰⁹ Cd Maximum 40 mCi (1,480 MBq)
Secondary Excitation Source	Options ⁵⁵ Fe Maximum 20 mCi (740 MBq) AND/OR ²⁴¹ Am Maximum 14 mCi (520 MBq)
Operating Conditions	Ambient Temperature Range: 20°F to 120°F (-7° to 49°C) Humidity Range: 0 to 95% RH (non-condensing)
Safety Features	Password protected shutter operation (4) shutter-open indicator LED's Automatic shutter close and lock mechanism – activates in event of battery or power failure Sample proximity sensor (activation optional in U.S.) Two-handed safety interlock (activation optional in U.S.)
Shipping/Transport	May be carried, shipped or transported in included carrying case without requirement of exterior labeling. (US-only, regulations may vary depending on country) Conforms to 49 CFR 173.421 for “excepted package” instruments and articles, N.O.S. UN2911
Licensing/Registration	Distributed under State of Massachusetts Specific License (55-0238) and General License (53-0388). Contact NITON or your local radiation authority for information about specific regulations in your area.

XLt Specifications

Weight	3.0 lbs (1.4kg)
Dimensions	9.75 x 10.5 x 3.75 inches (248 x 273 x 95 mm)
Primary X-ray Source(s)	Low power 35kV/1.0W X-ray tube with Ag anode target
Operating Conditions	Ambient Temperature Range: 20°F to 120°F (-7°C to 49°C) Humidity Range: 0 to 95% RH (non-condensing)
Safety Features	Password protected operation Auto shutdown – stops producing x-rays on power failure (3) x-rays-on indicator LED's Two-handed safety interlock (activation optional in U.S.) Sample proximity sensor (activation optional in U.S.)
Shipping/Transport	May be carried, shipped or transported in included carrying case without requirement of exterior labeling. (US-only, regulations may vary depending on country)
Licensing/Registration	Contact NITON or your local radiation authority for information about specific regulations in your area.



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NITON was founded in 1987 by Professor of Physics, Dr. Lee Grodzins, to develop and market products using innovative x-ray and gamma-ray technologies. The company's first two products were patented radon-gas detection systems. Later, after two years of intensive development assisted by a series of federal research grants, the company introduced the first ever one-piece XRF analyzer, the NITON XL-309 Lead Paint Analyzer, in January, 1994.

NITON built its initial reputation for quality, value and innovative design with the XL-309 lead analyzer, and continued this tradition with the introduction of its first handheld alloy analyzer, the XL-800 in 1998.

In just a few years since that introduction, NITON has completely transformed the world of XRF alloy analysis. NITON has delivered over 3,000 XRF analyzers in countries worldwide, including nearly 1,000 instruments in 2001 alone. No other XRF instrument company has ever sold analyzers at this pace. Since late 1999, NITON has invested more than US \$4 million developing its new family of advanced, higher performance XRF analyzers, including the new XLi 800 and XLt 800 Series alloy analyzers.

To quote NITON President and CEO, Hal Grodzins:
"This is just the beginning..."

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