

RoHS Compliance Screening with the Thermo Scientific NITON® XL3t Handheld XRF Analyzer

Thermo Scientific NITON XL3 Handheld RoHS Analyzers - Simply Superior



Introduction

The European Union's Restriction of Hazardous Substances (RoHS) Directive (2002/95/EC), aimed at limiting pollution caused by electrical and electronic equipment, prohibits manufacturers from using homogeneous materials, parts and subassemblies that contain more than 1000 ppm each of mercury (Hg), lead (Pb), hexavalent chromium (Cr^{VI}), polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE), or more than 100 ppm of cadmium (Cd). Since the regulations took effect on July 1, 2006, manufacturers in many countries have sought a cost-effective analytical sample testing solution that will ensure the materials they use are RoHS compliant.

Similar regulations have been or are being promulgated in many countries outside of the EU. China's "Administrative Measure on the Control of Pollution Caused by Electronic Information Products" legislation, or "China RoHS," has a broader scope and provides fewer exemptions than the EU's regulations. As of March 1, 2007, all products sold in China or imported into China must meet new product labeling requirements detailed in the first phase of the directive. California's Proposition 65, which took effect on January 1, 2007, and is similar in restrictions and scope to the EU Directive, sets the stage for an ever-expanding trend toward laws promoting "green" manufacturing.



Even analysis of individual components on populated PCBs poses no challenge to the Thermo Scientific NITON XL3t 700.

The Challenges Ahead

In order to ensure compliance, suppliers, fabricators, assemblers and enforcement agencies must perform verification testing on components. Industries have developed programs that involve heavy reliance on material declaration and certification for compliant ("green") components. However, the only way to insure compliance is via testing. Manufacturers have developed QA/QC protocols to screen components and finished products at all phases of the production process in order to fulfill the due diligence requirements of these directives; challenges include verifying supplier declarations and certifications, screening small components after they have been integrated into circuit boards or other complex heterogeneous materials, and providing legally defensible data to verify compliance.

It has been increasingly critical for manufacturers to be able to test the individual components in finished goods and subassemblies quickly and nondestructively, with no disassembly. As the longtime leader in portable XRF (x-ray fluorescence) analysis, Thermo Scientific NITON analyzers have the unique capability to provide superior handheld XRF solutions for screening and analysis of plastics, metals and electronics equipment for substances prohibited under the RoHS Directive and similar legislation.

The Thermo Scientific NITON Solution

Thermo Fisher Scientific is pleased to offer the Thermo Scientific NITON XL3t, the state-of-the-art in handheld XRF technology. NITON XL3t analyzers include the first application of a 50 kV miniaturized x-ray tube – the most powerful x-ray tube ever used in a handheld XRF instrument. This tube, combined with a multi-position filter wheel, provides dramatically lower detection limits, in some cases surpassing even those of competing benchtop analyzers. The NITON XL3t is the result of engineering lab-grade features into a handheld

package. This unique instrument provides:

- Fast, reliable, nondestructive elemental analysis in a handheld instrument weighing less than 3 lbs (~1.3 kg)
- Quantification of total Pb, Cd, Hg, Cr and Br within a matter of seconds, providing timely pass/fail designations
- An optional integrated color CCD camera and sample imaging system to visually identify, locate, specify, and save the image of the analysis area together with elemental analysis results
- An optional revolutionary small-spot feature, with an x-ray spot size 3mm in diameter, allowing users to better isolate and analyze individual small components such as leads or terminations on a populated PCB
- Integrated Bluetooth™ and USB communications for direct data file transfer to user's PC or networked storage device
- Built-in tilting color touch screen display for easy viewing of results regardless of sample position

With the pull of a trigger, the Thermo Scientific NITON XL3t 700 Series analyzer provides rapid quantitative analysis of cadmium, lead, mercury, total chromium, total bromine and other elements of interest in samples in as little as 30 seconds or less. RoHS screening using the NITON XL3t reduces costs and eliminates production delays associated with waiting on lab results, while allowing for a much larger number of samples to be tested in a shorter period of time. This greatly reduces the chances that RoHS-restricted materials will enter the manufacturing process.

NITON XL3t 700 Series analyzers measure metal alloys, including solder alloys used in electronics, and all kinds of plastics and polymers quickly and simply, without the need for special calibrations or other user input. Even high levels of fire retardants, such as bromine and antimony, present no analytical difficulty for the XL3t.

All data, including pass/fail results, element concentrations, qualitative sample information and XRF spectra (from Chlorine (Cl) through Uranium (U)), are encrypted and saved in memory for traceability and archiving. A unique thickness algorithm is also included for the user, enabling the XL3 700 Series to accurately test samples only 0.1 mm thick.

Analysis of Small Parts and Solder Joints on Heterogeneous Samples

Rapid nondestructive analysis of small electronic components on heterogeneous samples, like populated circuit boards, is challenging for any size of analytical instrument: individual components are small and mounted close together, making them difficult to analyze, and are themselves typically heterogeneous in composition. NITON XL3t 700



RoHS screening from incoming material to finished product with the NITON XL3t 700.

Series analyzers meet and even exceed the challenge, out-performing many benchtop XRF instruments.

The NITON XL3t features an optional small-spot x-ray area, combining high performance, portability and cutting-edge technology, the hallmarks of all Thermo Scientific NITON analyzers. The NITON's optional small spot analysis package lets you switch on the fly between normal test mode, for analyzing larger, homogeneous materials, and small spot mode for locating, isolating and measuring individual small components. The small-spot focus feature, combined with the first CCD camera integrated into a handheld XRF analyzer, is ideal for positioning, analyzing, and recording the analytical results of small components – something previously only achievable with benchtop XRF analyzers. Integrated visualization technology displays a picture image of the sample on the instrument screen which is stored along with the analysis data for easy reference, data management, and data integrity.

Conclusion

Thermo Scientific NITON XL3t 700 Series analyzers provide electronics manufacturers and distributors with a real solution to the problem of screening of plastics, metals and electronics for compliance with RoHS and similar regulations, making NITON analyzers a core element of many comprehensive compliance plans. Handheld, nondestructive NITON XL3t analyzers are ideal RoHS screening tools from inspection of incoming materials to the analysis of finished products. Portable XRF analysis gives real-time results, making it possible to quickly verify or refute the validity of supplier certifications. Because the testing is nondestructive, when necessary, selected samples can subsequently be analyzed using traditional destructive lab techniques. Increased testing permits manufacturers to “trust but verify,” translating into better compliance at lower cost than other available methods.

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