



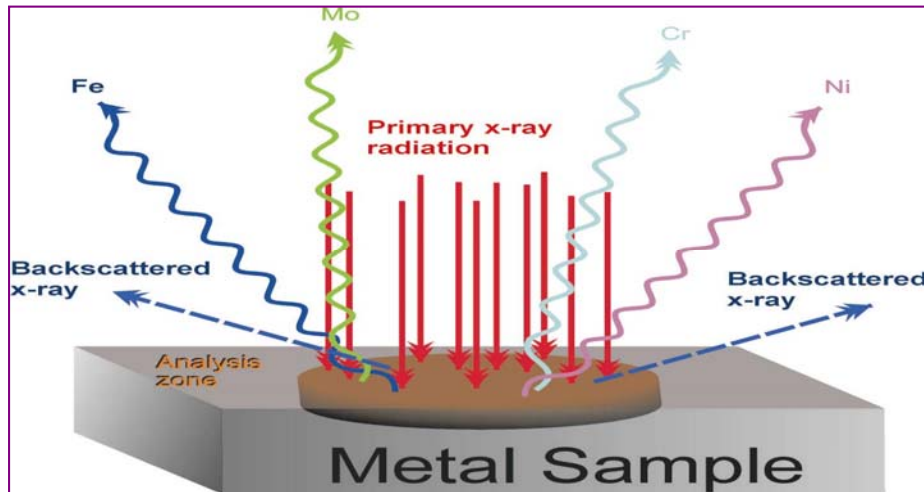
SPECTROLAB

The RH-6600D “ RoHS “ (WEEE) Analyzer
For analyzing all elements including RoHS materials such as
Cd Cadmium, Hg Mercury, Hexa valent Chromium (Cr6), and
Poly-Brominated Bi-Phenyl Ethers (PBDE)
Plus all other elements from Mg to U



The Model RHS-6000 is a remarkable new compact EDXRF analyzer designed for the analysis of RoHS elements as defined by the Restriction of Hazardous Substances legislation now used in many countries around the world. The general analytical requirements are for the determination of a number of components present in electrical or electronic products or substrates and include Cd Cadmium, Hg Mercury, Hexa valent Chromium (Cr6), and Poly-Brominated Bi-Phenyl Ethers (PBDE)

Energy Dispersive X-ray Fluorescence technology is an inexpensive, reliable and extremely sensitive technique that can be used to measure the concentration of these hazardous materials in the ranges specified and is the technology employed in the RH-6600D analyzer



This is how the RH6600D Xray fluorescence spectrometer works?

How XRF works

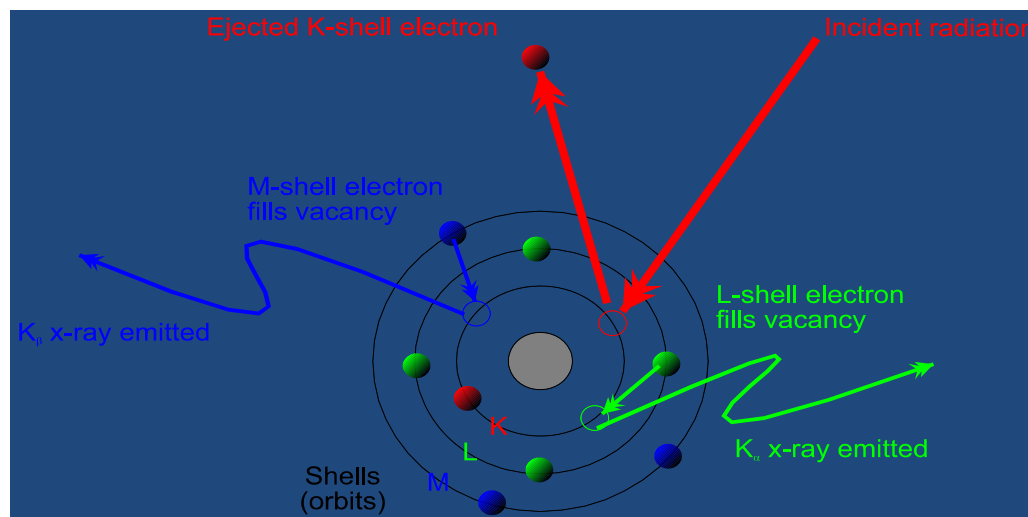
X-rays have a unique ability to ionize or “excite” elements present in materials including those specified in RoHS. When elements such as Mercury have been ionized by Xrays the electrons quickly return to a relaxed or stable state. In so doing they will emit fluorescent photons whose energy levels are “signatures” of specific elements present. Spectrolab XRF analyzers utilize this phenomenon by imaging ionizing x-rays onto a sample and measure the energy levels of the returning fluorescent x-rays (the elements’ “signature”), The quantity and energy of X-rays measured determines the relative concentration of each individual element present. An onboard microprocessor then provides a complete elemental analysis of the sample and displays it on to a high brightness screen. All of this is done in just a few seconds, The analyzed results are stored in an Excel test report.

Features of the RH-6600D

- Portable desk top EDXRF analyzer
- CE Software for additional computer control
- Responsive, bright, color touch screen display
- Uses Silicon Drift or Silicon PIN Detector systems for ultra fast analytical times with optimized precision for trace elements.
- One-button operation for fast accurate analysis
- Determines concentration within seconds.
- Identify and characterize a wide range of elements including Mercury, Cadmium, & others
- Identify toxic elements in samples or finished products as in a RoHS requirement
- Can be used for all EDXRF analysis on all materials from S to U
- Quickly and easily create analysis certificates
- Safe and secure closed-beam system.
- Requires minimal training and easy to use
- A unique compact instrument taking up minimal desk space.
- Can be networked for easy access to test results as they are being generated.

How XRF works

X-rays have a unique ability to ionize or “excite” elements present in materials including those specified in RoHS. When any element has been ionized by X-rays the electrons quickly return to a relaxed or stable state. In so doing they emit fluorescent photons whose energy levels are “signatures” of the specific elements present. Spectrolab XRF analyzers utilize this phenomenon by imaging ionizing X-rays onto a sample and measure the energy levels of the returning fluorescent x-rays (the elements’ “signature”). The quantity and energy of X-rays measured determines the relative concentration of each individual element present. The onboard microprocessor then provides a complete elemental analysis of the sample and displays it on to a high brightness screen. All of this is done in just a few seconds, The analyzed results are then stored in an Excel test report.



How the RoHS analyzer makes an X-ray fluorescence photon (EDXRF)

Typical Applications

- RoHS hazardous materials identification
- Any Multi element analysis and identification
- Coating thickness measurements
- Alloy analysis and Alloy PMI
- Hazardous metals Inspection: Including Hg, Cd, Cr, Pb
- Electroplating liquid analysis
- Scrap recovery
- Perfect for all types of sample , metal objects, electronics, precious metals etc
- A unique compact instrument taking up minimal desk space.
- Can be networked for easy access to testing results as they are being generated.

Overview

Nondestructive RoHS and Precious Metals Analysis plus Gold Karat ID

XRF is a widely used, proven and accepted method of chemical analysis used for the determination of the purity and quantity of all elements in any type of sample including both solids and liquids, films, coatings, powders or gels. XRF analysis is a multi-elemental testing alternative to optical emission spectroscopy but is much quicker and less expensive. XRF provides on-the-spot analysis of materials including hazardous substances and is an excellent method of analyzing Gold, Silver, Platinum, PGM metals and impurities.

The Spectrolab RH-6600D series XRF analyzer is an easy-to-use, cost-effective method to measure the alloys and elements present in recovered materials with one nondestructive and nonintrusive test.

Customized Reporting

Data can be exported easily to a spreadsheet format and the integrated memory can be accessed remotely when the RH-6600D is networked via its Windows CE operating system. Customized results and reporting certificates including analytical results, an image of the tested sample, the company logo, and more, can be generated via the optional PC Software with the click of a button.

Accessories:

Sample cup for liquids and powders

Ring holder



1. Introduction

The Restriction of Hazardous Substances Directive 2002/95/EC, RoHS, short for Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment, was adopted in February 2003 by the European Union

The RoHS directive took effect on 1 July 2006, and is required to be enforced and become law in each member state. This directive restricts the use of six hazardous materials in the manufacture of various types of electronic and electrical equipment. It is closely linked with the Waste Electrical and Electronic Equipment Directive (WEEE) 2002/96/EC which sets collection, recycling and recovery targets for electrical goods and is part of a legislative initiative to solve the problem of huge amounts of toxic e-waste. Details are as below:

Reduce and eventually eliminate the use of prohibited substances at source (RoHS)

The maximum permissible levels in a homogenous material will be

Cadmium Cd	100 ppm
Mercury Hg	1000 ppm
Lead Pb	1000 ppm
Hexavalent chromium	1000 ppm
Polybrominated Diphenyls	1000 ppm
Polybrominated Diphenyl Ether	1000 ppm

And to recycle as much of the product as is possible after its useful life in order to minimize issues relating to the disposal of such products (WEEE)

2. Instrument RH6600D.

RH6600D is specially designed to measure the restricted items to comply with RoHs and WEEE directives. The instrument parameters are as follow:

X-ray Source	Collimators	Filters	Detector system	Measure Time
50 watts x-ray tube	8 sizes of collimators from 8mm to 0.1mm. Auto changed by the program	5 different groups of filters for 5 calibration curves. Auto loaded by the program.	High resolution Si-Drift and Pin detector s with DMCA analyzer	100-200 seconds per sample according to detector type

Standard calibration curves included in the RoHs program:

1. Aluminum alloys/ Magnesium alloys
2. Iron alloys
3. Copper alloys
4. Solder alloys
5. PE and PVC material

3. Test performance RH6600D.

<h1>Test performance</h1>						
No.	Calibration	As(ppm)	Br(ppm)	Cd(ppm)	Hg(ppm)	Pb(ppm)
1	PE	29.5	766.3	137.3	21.2	93.2
2	PE	27.6	767.6	134.7	27.4	103.5
3	PE	29.8	768.5	132.2	26.3	95.2
4	PE	29.8	766.0	135.1	25.8	106.8
5	PE	29.7	770.7	134.5	25.7	104.6
6	PE	30.2	764.2	137.9	23.6	96.7
7	PE	29.2	770.6	137.7	26.9	102.1
8	PE	29.5	768.8	139.8	25.4	98.0
9	PE	28.6	764.8	132.2	25.4	101.5
10	PE	27.2	765.0	135.2	25.6	102.8
11	PE	28.1	764.1	128.8	24.4	96.7
12	PE	29.3	767.2	134.1	27.7	101.6
13	PE	29.6	771.7	133.8	23.8	100.6
14	PE	30.1	766.6	137.8	25.5	103.4
15	PE	30.2	764.8	132.8	22.4	99.5
16	PE	28.6	763.5	138.6	27.1	99.7
17	PE	27.7	766.8	137.9	20.8	98.5
18	PE	30.5	768.3	136.4	26.5	95.8
19	PE	29.0	767.0	127.4	25.7	96.5
20	PE	27.8	766.1	137.2	25.6	99.9

$$SD = \sqrt{\frac{\sum_{i=1}^n (N_i - \bar{N})^2}{n-1}}$$

$$\bar{N} = \frac{\sum_{i=1}^n N_i}{n}$$

SD — standard deviation

n - Test times

\bar{N} — Average value

Relevant standard deviation

$RSD = \frac{SD}{\bar{N}} \times 100\%$

\bar{N} (ppm)	29.11	766.93	135.07	25.13	99.83
SD(ppm)	0.95	2.26	3.15	1.87	3.44
3s	2.86	6.77	9.45	5.60	10.31
RSD(%)	3.28%	0.29%	2.33%	7.42%	3.44%
Certified value(ppm)	29.1	770.0	135.1	23.7	98.0

Conclusion.

The excellent performance as shown of the Spectrolab RH-6600D proves that it is best choice for RoHs & WEEE compliance measurements.

Configuration and specification options

	<i>E Series</i> <i>Normally not used for RoHS</i>	<i>S Series</i> <i>Standard System</i>	<i>D Series</i> <i>Optimised Performance</i>
Detector	Proportional Cntr	Si-Pin detector	SDD detector
Description	D serial with external computer. E serial with integrated touch-screen industrial computer inside the machine.		
Content Range	20ppm-99.99%	2ppm-99.99%	1ppm-99.99%
Element Range	Ti-U	S-U	S-U
Calibrations	High concentration RoHS + Cr Hg, Gold: + Ni, Cu, Zn, Ag, Au	RoHS materials Gold:+ more than 20 metals 2.Alloy analysis and PMI 3.Coating thickness measurement	RoHS materials Gold: + more than 20 metals 2.Alloy analysis and PMI 3.Coating thickness measurement
Calibration Mode	Empirical calibrations	Standardless FP+ Empirical calibrations	Standard less FP+ Empirical calibrations
X-ray Tube power	50 watts	50 watts	50 watts
Resolution	900ev	165ev	135ev
Test time	120s average	60s average	30s average
Max CPS	50.000	50.000	100.000
Collimator	1.5mm	3mm 1mm	1mm 0.5mm(Micro spot)
Precision	<0.05%	<0.05%	<0.02%

RH-6600D “RoHS Analyzer “

The RH-6600D D series is recommended for all types of analysis and provides the fastest analytical or measure times and highest sensitivity.

The RH-6600D S series is recommended for general RoHS analysis applications and routine XRF analysis including precious metal applications.

The RH-6600D E series is recommended only when high concentrations of RoHS elements are present due to its reduced sensitivity detector

Spectrolab in Xray Fluorescence

Hand Held XRF

Portable XRF

Wavelength Dispersive XRF

Energy Dispersive XRF

Process control XRF

RoHS Analyzers

Gold and precious metal analyzers

Jewelry analyzers

Sulfur in Oil analyzers

Our partners in Xray technologies Anaspec, HTek, Ametek, Varian

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