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Fast analysis for
RoHS & WEEE

EDX3000D



ALL-NEW UNIQUE VIDEO POSITIONING SYSTEM!

Energy Dispersive X-Ray Fluorescence Spectrometer
EDX 3000D



More accurate testing results are always the persistent pursuit of Skyray people and we still keep in mind that we provide better services for our customers.

Newly developed EDX 3000D inherits this idea. It not only inherits the five characteristics of accuracy, rapidness, non destructive, direct viewing and environmental protection of Skyray EDX series spectrometers, but also adopts patented product SNE of Skyray to increase the accuracy of testing results.

Sample chamber with newly added automatic switch makes operation more convenient, and automatic sample platform newly designed assures accurate testing.

Technical specifications

Model: **EDX 3000D**
 Analytical range of elements: From sulfur (S) to uranium (U)
 Analysis range: 1ppm-99.99%
 Detection limit: The detection limit can reach 1ppm for hazardous substances (Cd/Pb/Cr/Hg/Br) restricted in RoHS directive
 Measurement time: 60~200s
 Revolution: Energy revolution is 155±5eV
 High voltage: 5~50kV
 Tube current: 50~1000µA
 Ambient temperature range: 15~30℃
 Power supply: AC 220±5V (AC purified stabilized voltage power supply is suggested)
 3-D super-large sample chamber and the size is Φ450x90mm
 24 elements can be analyzed simultaneously
 Weight: 110kg

Configurations

Movable sample platform
 Enhanced metal element sensitivity analyzer
 Amplifier circuit
 Signal-to-Noise Enhancer (SNE)
 PC and ink-jet printer

Performance

Automatic filters switching system
 Automatic collimators switching system
 Triple safety protection mode
 Independent matrix effect correction models
 Multi-variable non-linear regression procedure
 Sample chamber can be opened and closed automatically
 Software positions sample platform and minimum displacement is 0.01mm



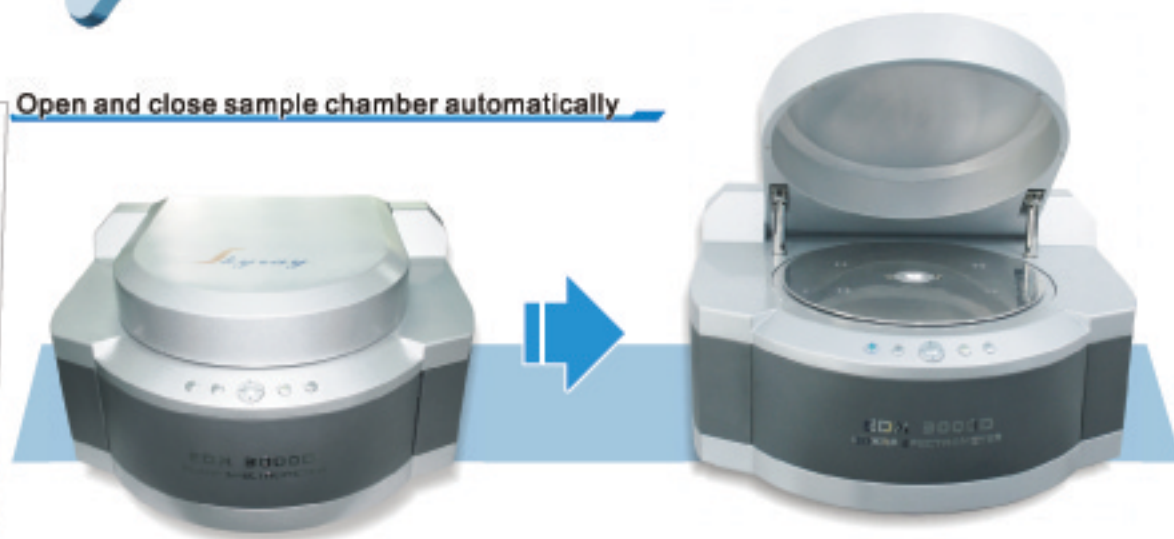
- EDX 600
- EDX 660
- EDX 2800
- EDX 3000
- EDX 3000B
- EDX 3000C
- EDX 3000D**
- EDX 3600
- EDX 3600B
- EDX 6000
- EDX 8000
- EDX Pocket-I





Examples

Open and close sample chamber automatically



Automatic collimator and filter switch, for samples of different sizes

Used for RoHS substances, plating coating and full element analysis, one machine for multiple purposes

Electro-refrigeration Si PIN semiconductor detector, with no liquid nitrogen refrigeration

Specially developed measurement software, with user friendly operation interface

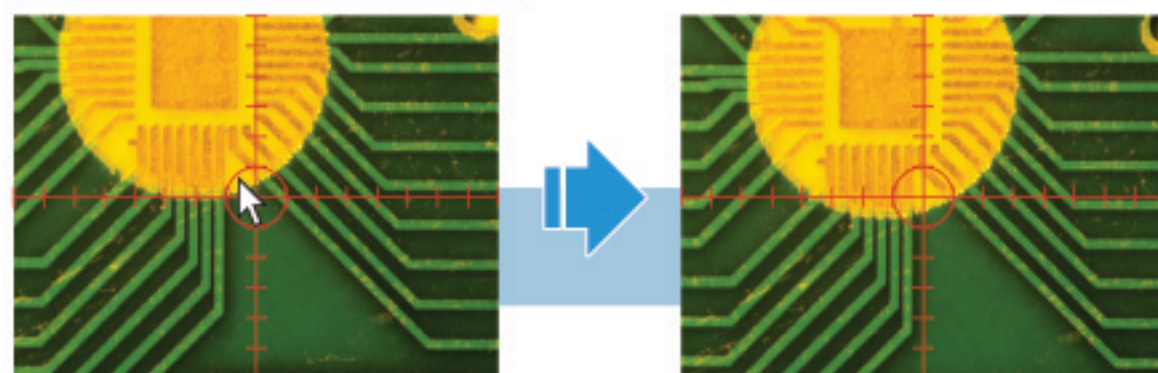
Inbuilt high resolution camera, convenient for users to analyze samples at any moment

An attractive and fashionable design

Precise automatic movable platform, can adjust the position of sample more accurately and conveniently

Unique light path enhancement system, convenient for users to observe samples more accurately

Sample positioning system newly developed with automatic movable platform, starts measurement with one mouse click

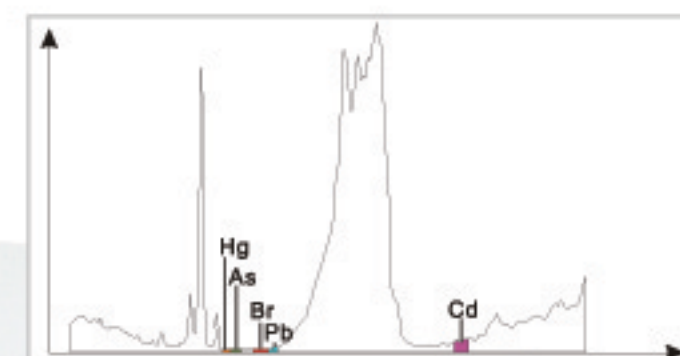


Click the part to be tested in the sample view, EDX 3000D will move the sample to specified location and test it

Plastic



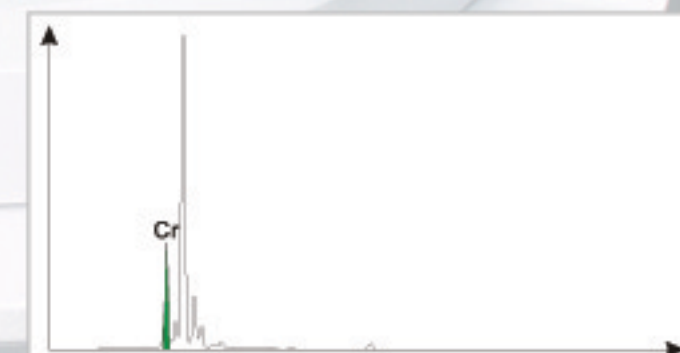
Spectrum



Stainless steel



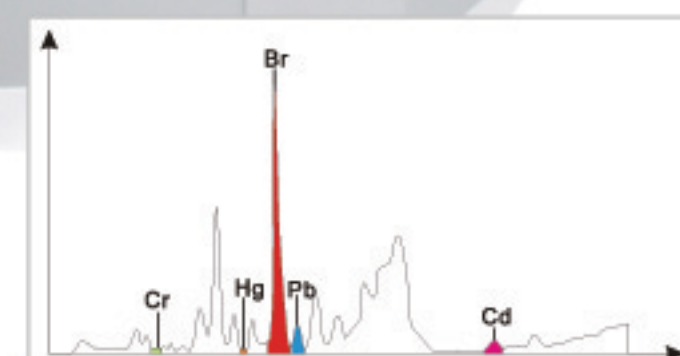
Spectrum



PCB



Spectrum





What is RoHS and WEEE Directive ?

On 13 Feb, 2003, European Union issued Directive 2002/95/EC on RoHS and Directive 2002/95/EC on WEEE. The EU directives RoHS and WEEE have been implemented. New electrical and electronic equipment put on the market from 1 July 2006 shall not contain lead(Pb), mercury(Hg), cadmium(Cd), hexavalent chromium (Cr⁶⁺), polybrominated biphenyls(PBBs) or polybrominated diphenyl ethers(PBDEs).

Testing standards for substances restricted by RoHS Directive

Hazardous substances	Standards (mg/kg)
Cd	100
Pb	1000
Hg	1000
Br(PBBs & PBDEs)	1000
Cr ⁶⁺	1000

Restricted substances and their typical uses

Pb	
Solders	
Paints	Pigments and driers
Glass materials	Pb is allowed in fluorescent lamp
Ceramic materials	Pb is allowed in certain electronic ceramic materials
Iron, aluminum and copper materials	A certain amount of Pb is allowed
Plastic	PVC stabilizer and pigments
Batteries	Pb is allowed in acidic batteries for vehicles

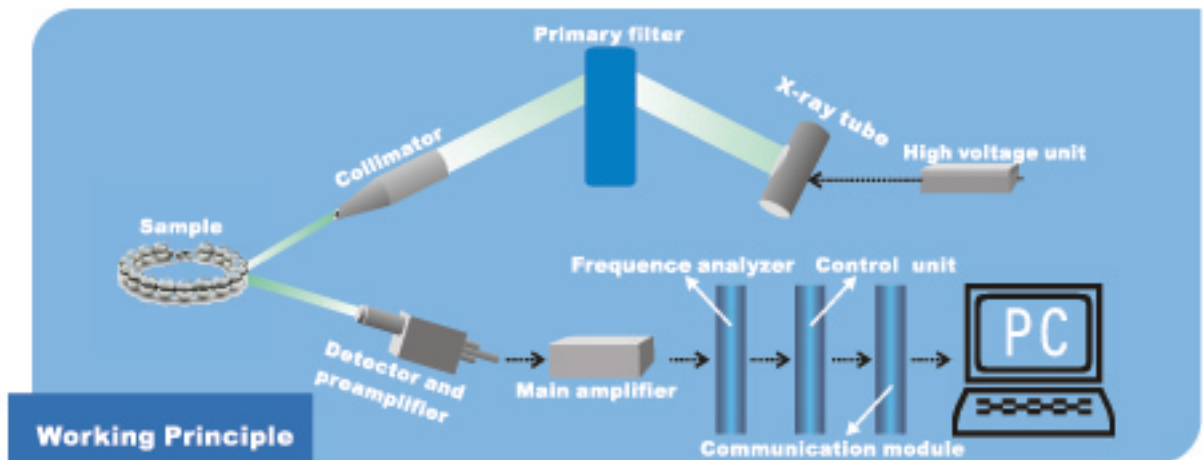
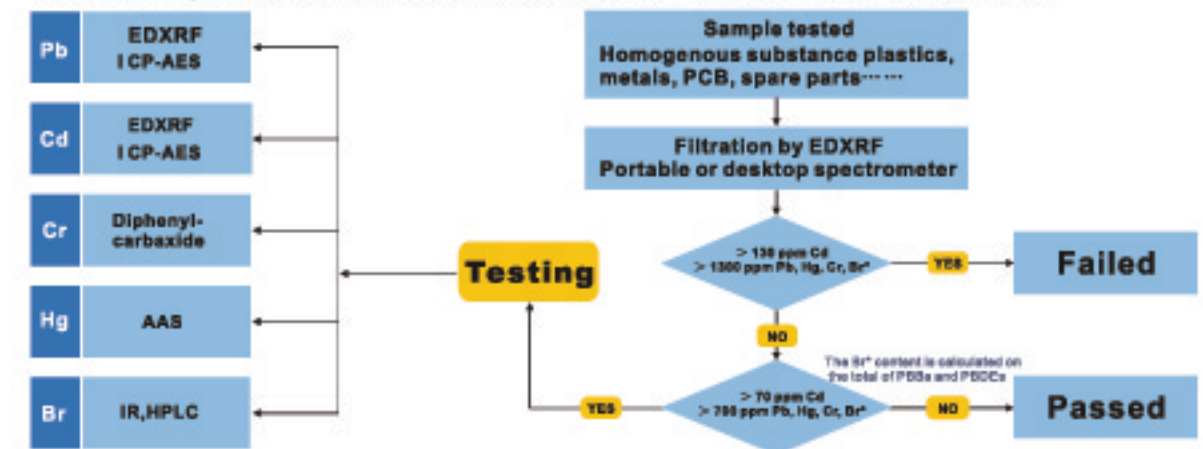
Cd	
Plastics	Stabilizer and pigments
Solders	Seldom used
Ceramic materials	Seldom used
Connectors	Relays and switches
Batteries	Cd is allowed in Ni-Cd batteries
Semiconductors	Optical sensors and solar cell panels

Hg	
Batteries	Prohibited (see battery directive)
Connectors	Relays and sensitive switches
Fluorescent lamps	A certain amount of Hg is allowed

Cr VI +	
Passivation layers	Commonly used for naked metal surfaces to enhance adhesion of plating layers
Anti-corrosive plating layers	Painting and plating layers
Chrome plating layers	Plating layer of chromium metal is not under control
Plasticizer	Commonly used to plastics plating process but not final products

PBB&PBDE	
Plastics	Brominated flame retardants

The analytical method of filtration for RoHS substances



Characteristic X-rays of elements

Each element will emit X-ray with its own energy when it is excited, this characteristic X-ray is called X-ray fluorescence. That is the basis for analysis.

Scatting

It is the background of the spectrum.

Photoelectron

It is what the detector analyzes.

The X-ray fluorescence intensities of interested elements in the sample are I_1, I_2, I_3, I_4, I_5 etc. And the element content is a function of X-ray fluorescence intensity I of the element. The general formula is as follows:

$$C = f(I_1, I_2, I_3, I_4, I_5, \dots)$$

The function is too complicated to calculate, and the empirical formula is as follows:

$$C = K_1 I_1 + K_2 I_2 + K_3 I_3 + K_4 I_4 + K_5 I_5 + \dots$$

C means

The content of element in the sample.

I_1, I_2, I_3, \dots mean

X-ray fluorescence intensities of elements in the sample respectively.

K_1, K_2, K_3, \dots mean

Coefficients to be calculated.

The coefficients K_1, K_2, K_3, \dots can be determined with the samples of known contents though the establishment of scale merit.