



High Sensitivity Fluorescent X-ray Analyzer

SEA6000VX HS  **finder**



Improved hazardous metal testing efficiency in microscopic areas with high sensitivity and high speed measurements

The SEA6000VX HS Finder enables control of hazardous substances over entire surfaces and measurement of microscopic points at a specified area. These tasks cannot be done by conventional instruments.

High Sensitivity Fluorescent X-ray Analyzer

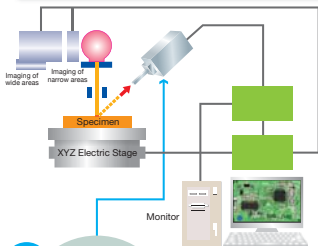
SEA6000VX

HS  **finder**

with hazardous element high speed mapping and measuring function



Instrument Configuration



World class speed

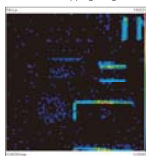
High speed mapping measurements

Rapidly obtains two dimensional element mapping images with its high-speed stage and greatly improved sensitivity of microscopic areas. Reinforces mapping of Pb on circuit boards and is equipped with a special Pb mapping filter. Eutectic solder can be detected after several minutes of mapping.

High resolution image



Two minute mapping image of Pb

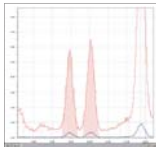


Superior environmental analysis

High Sensitivity

Equipped with a detector that does not need liquid nitrogen. A general-purpose bench top with a Vortex, the world's best high count rate detector.

Great strides in high sensitivity realized by "optimized complete X-ray optic system", high count rate detector, and large areas. Remarkably improved sensitivity of 1mm beam, realizing 10 times the sensitivity of conventional instruments

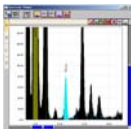


Blue line: conventional 1mm beam. Red line: SEA6000VX 1.2mm square beam. Sample: Pb and Hg (100ppm) in polyethylene.

High resolution image



Optional area spectral display and concentration calculation of mapping results



2 minutes high speed mapping

Mapping image with contrast is obtained in 2 minutes of scanning. Presence of Pb becomes clear by overwriting detailed sample images.

Meeting Your Needs for High Sensitivity in Micro Areas

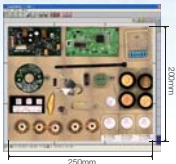
Continuous multi-point measurements

Up to 500 points can be set and continuously measured as with an auto-sampler. Measuring large samples exhibits tremendous throughput.



Multi-point continuous measurements

Labar savings by setting up to 500 points for auto continuous measuring



High speed measurement of trace metals in micro-areas

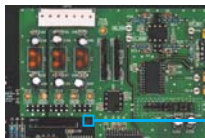
Rapid measurement of trace metals and thin films in microscopic areas.

	Cd, Pb, Cr in brass	Pb in Sn	Cd, Pb, Hg, Br, Cr, in plastic
□3mm	80sec	40sec	70sec
□1.2mm	150sec	40sec	80sec

The detection lower limit of Cd is 30ppm and the other elements is 200ppm

Measure Cl concentration in PCB Assemblies

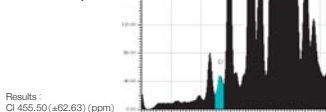
To meet halogen-free needs, high sensitivity in microscopic areas is realized in measuring Cl and Br. Since the irradiation method is top-down, pinpoint measurement positioning is possible even on boards that have uneven surfaces.



Analysis area: Square 3mm
Measuring time: 300 seconds



Cl Spectrum



Example of RoHS analysis

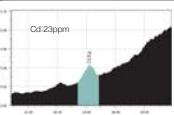
In a sample that combines multiple substances, measuring can be done by using a micro X-ray beam aimed at a specific spot.

Example of Cd analysis in a Cu alloy

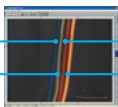
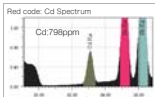
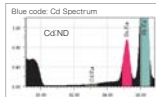


Analysis area : □1.2mm square

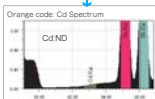
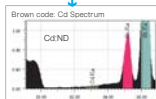
Cd Spectrum



Cd analysis of harness material



Analysis area : □1.2mm



Microscopic area coating thickness measurements

The SEA6000VX is capable of coating thickness measurements typical of the SFT series including coating thickness measurement of ultra-thin Au films. Analysis of hazardous substances such as Pb in plating can be measured simultaneously with coating thickness measurements. For example, possibilities include composition measurement of hazardous substances in Pb-free solder plating, Sn plating of lead frames, and electroless Ni plating.

■ Sn-Ag/Cu coating thickness/Composition ratio
Hazardous substance analysis (Pb) in plating
Area: 0.2mm square, Film FP method
Time: 100 seconds (Pb filter), 30 seconds (no filter)

	Thick Sn-Ag [μm]	Comp ratio Ag [wt%]	Haz Sub Pb [ppm]
1	5.34	2.83	291
2	5.30	2.63	297
3	5.31	2.64	347
4	5.34	2.73	303
5	5.31	2.67	329
6	5.33	2.67	334
7	5.33	2.75	291
8	5.30	2.74	262
9	5.35	2.72	303
10	5.36	2.91	308
AVE	5.33	2.73	306.5
SD	0.02	0.09	24.6
CV	0.4%	3.2%	8.0%

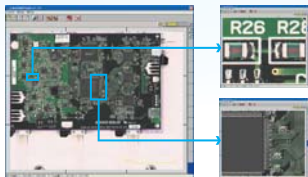
■ Au/Ni/Cu coating thickness
Area: 0.2mm square, Cal method
Time: 30 seconds

	Au [μm]	Ni [μm]
1	0.054	5.11
2	0.055	5.11
3	0.054	5.12
4	0.055	5.08
5	0.054	5.10
6	0.055	5.13
7	0.053	5.08
8	0.053	5.09
9	0.054	5.08
10	0.055	5.14
AVE	0.054	5.10
SD	0.0008	0.02
CV	1.5%	0.4%

Technologically Enhanced Operability

High Resolution

Able to obtain 250x200 wide area sample images with technology that ensures high positioning precision by maintaining 20um resolution throughout the entire area.



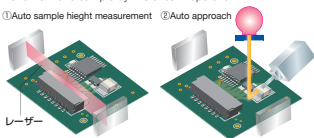
Position Designation

Digital zoom is done by simply rotating the mouse wheel, allowing you to check part numbers on a board at any location on even wide sample images (left).

Auto-approach

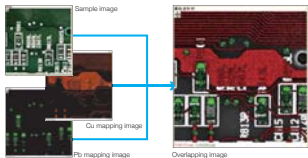
Height adjustment is done manually by top-down irradiation type XRF analyzers, but the SEA6000VX has an auto approach function that automatically approaches the results of an auto sample height measurement using a laser sensor. This not only improves operability but prevents damaging the instrument or a sample by mistakes in operation.

- ① Auto sample height measurement ② Auto approach



High Precision Overlap Function

High precision analysis over a wide area is enabled by the complete overlap of sample image and mapping image by employing a telecentric optic system and high precision XY stage. With a non-telecentric lens, analysis is very difficult without matching points specified on the sample image with points on the mapping image when measuring undulating samples.



By overlapping the sample image and mapping image, areas that contain target elements are easily specified. Position precision of overlapping is within 100um.

Pb analysis by high precision overlapping

Overlapping sample images up to a maximum of 3 elements and sequence change is possible. Many tools, such as semi-transparent display and hue adjustment of overlapping images, are provided, greatly improving analysis performance.

Analysis by overlapping displays

Introducing examples that displayed overlapping by mapping a board with Cu in red, Sn in blue, and Pb in green.

Figure 1. Pb displayed on surface

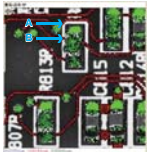


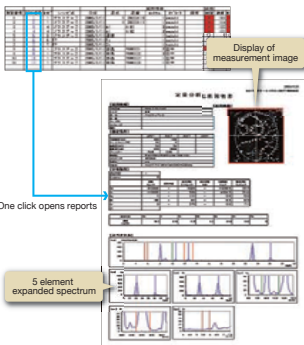
Figure 2. Sn displayed on surface Figure 1



From figure 1 we see that Pb is contained in both A and B. From figure 2 we see that Sn is contained only in A. In other words, A is Pb in solder and B is Pb in chip resistors.

Continuous measurement reporting

Measurement results are transferred to Excel by one-click. Results, such as sample information, date of measurement, etc., can be verified in a list. By clicking on the sample number, a quantitative report that includes conditions, the sample image, and spectrum are created in an A4 format and used as the measurement report.



Various Mapping Applications Made Possible by SEA6000VX

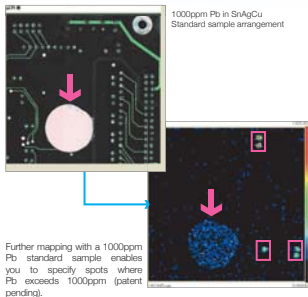
Pb 1000ppm mapping

1000ppm level Pb mapping is possible in 30 minutes by overlapping mapping repetitions. Two dimensional mapping of elements at low concentrations is possible by overlapping mapping repetitions, but this requires an enormous amount of time using conventional instruments.

*Time required in the example below. Time may differ with conditions.

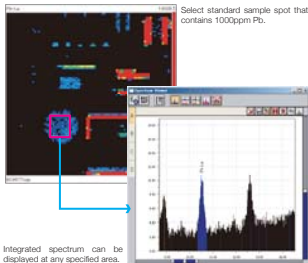
Measurement Example

- Mapping of Pb-free board / Map area: 60mmx60mm
- Beam size: square 1.2mm / Mapping reps: 16 times
- One point measuring time: 8ms / Time required: 30 minutes



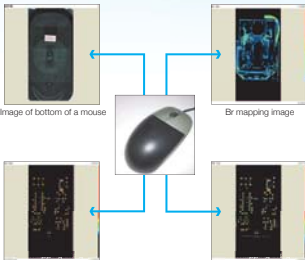
Area integrated spectrum function

An integrated spectrum can be displayed by designating any area of the mapping image. This is because spectral information is held in each pixel. The existence of an element can be determined and simple composition integration is also possible by verifying spectrum for information difficult to identify only from a mapping image.



See-through mapping

Beginning with Pb on internal boards, various mapping images of elements can be obtained without taking apart products with unknown internal structures, such as laptop computers and cell phones. By comparing mapping images of elements obtained by penetrating X-rays, various information can be obtained about the structure and internal components.

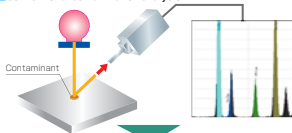


See-through mapping enables you to easily inspect for the existence of targeted elements without disassembling the sample product.

Contaminant Mapping Analysis

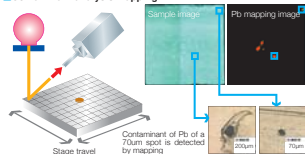
Conventionally, contamination analysis uses a microbeam to irradiate comparatively large contaminants and by observation with unaided eyes or a microscope, but in this case no more than element analysis can be performed.

Conventional contamination analysis



The SEA6000VX enables detection of an entire sample and contamination less than several tens of μm in size through high sensitivity and by high speed mapping.

Contaminant analysis mapping



■Options

Joystick controller

Lets you directly control stage movement (front, back, left, right, up, down).



Sample placement jig

Jig holds samples, such as boards, to the stage so that the sample position does not shift during high speed scanning.



Sample Placement Film

Used in combination with the sample placement jig, this adhesive film prevents the effects of motion and material of stage by securing a sample when measuring such samples as plastic.



Signal Tower

3 step lamp shows operating conditions of the instrument (main power source, X-rays, shutter).



Exclusive Measurement Table

SEA6000VX exclusive table. Lets power supply unit to be placed compactly.

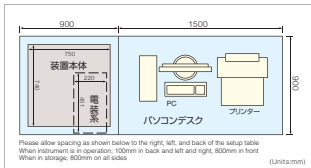
Helium Purge

Enables detection of sodium by helium purge between the detector and sample

■Specification

Elements	Atomic nos. 12 (Mg) to 92 (U) *Atomic nos. when using helium purge 11 (Na) to 92 (U)
Sample state	Solid / Powder / Liquid
X-ray source	Air-cooled X-ray tube (W target) Voltage: 15kV, 30kV, 40kV, 50kV Current: 20 to 1000uA
X-ray direction	Top-down Irradiation
Detection	Vortex Si semiconductor detector (No liquid nitrogen required)
Analysis area (beam size)	Square 0.2mm, 0.5mm, 1.2mm, 3mm Electric switching
Sample Observation	High resolution CCD camera, 2 system
Chamber	580 (W) x 450 (D) X 150 (H) mm, Both point analysis and mapping for entire 250 (X) X 200 (Y) mm
Filter	6 mode electric switching
Controller	Desktop PC and 19" LCD monitor
Options	Helium purge, Joystick controller, Signal tower, Dual monitor, Exclusive measurement holder, Placement jig, Placement film, Environment standards, Printer, Precision control software.
Mapping functions	Align with sample image, Area integrated spectral display, Quantitative integrated function
Qualitative functions	Spectrum measurement, Auto-ID, Comparison display
Quantitative functions	Bulk CAL, Bulk FP, Film CAL, Film FP
Data Process	Microsoft Excel, Microsoft Work
Safety functions	Door interlock, Crash protection, Instrument self-diagnosis
Power requirements (Electric box included)	AC100V to 240V +/-10%, 7.5A

■Setup Example



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<http://www.sint.com>



SII NanoTechnology Inc.
RBM Tsukiji Bldg.Shintomi 2-15-5, Chuo-ku Tokyo 104-0041, Japan
TEL:+81-3-6280-0062 FAX:+81-3-6280-0073

For maintenance service and consumables
Epoload Service Inc.

RBM Tsukiji Bldg. Shintomi 2-15-5, Chuo-ku Tokyo 104-0041, Japan
TEL: +81-3-5540-7300 FAX: +81-3-5540-7320