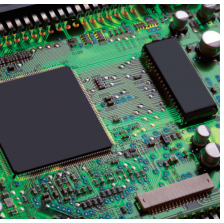
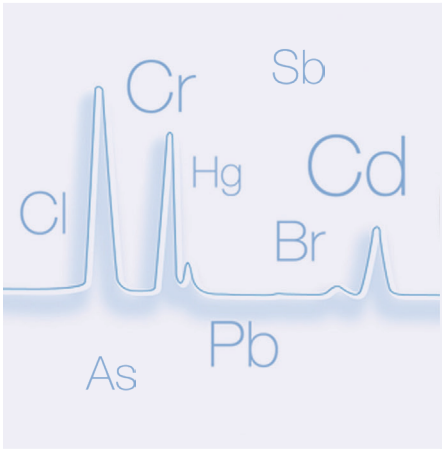


MESA-50

X-ray Fluorescence Analyzer



Speedy, Small, Simple, Smart and Safe Elemental Analysis for you

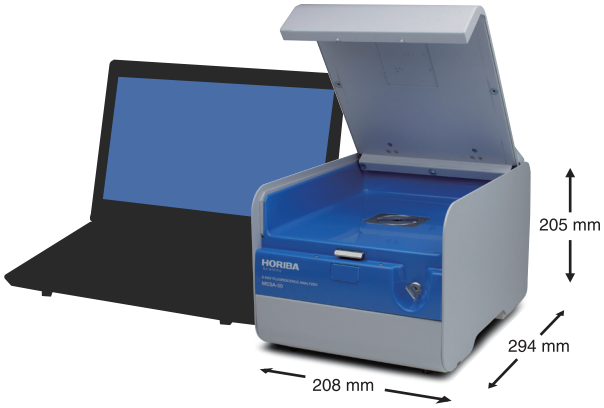
Touch and

What is the MESA-50 Series?

HORIBA MESA-50 Series is a portable benchtop Energy Dispersive X-ray Fluorescence (EDXRF) analyzer with user-friendly operation.

EDXRF analyzers are a fast and easy screening tool which allows elemental analysis on various sample state (solid, liquid, and powders) non-destructively.
Among them, the MESA-50 Series is the compact benchtop EDXRF analyzer with X-ray shields compliant with IEC 61010-1/JAIMA S0101-2001.
In addition to the small footprint, it is equipped with a rechargeable battery inside and it is designed as LN_2-less and pump-less design.

The MESA-50 Series enables you to perform your measurement in a variety of installation environments.



<Sample capacity>
Chamber size: 190 x 225 x 40 [W x D x H (mm)]
Maximum loading mass: up to 3 kg

Uniqueness

- Portability enabled by the internal battery
- Chamber with X-ray shields ensures your safety
- LN_2-less and pump-less optics allow for a compact design
- Recipe preset function facilitates fast and easy operation


For quick desktop analysis


For quick screening

For field work


For science education in schools

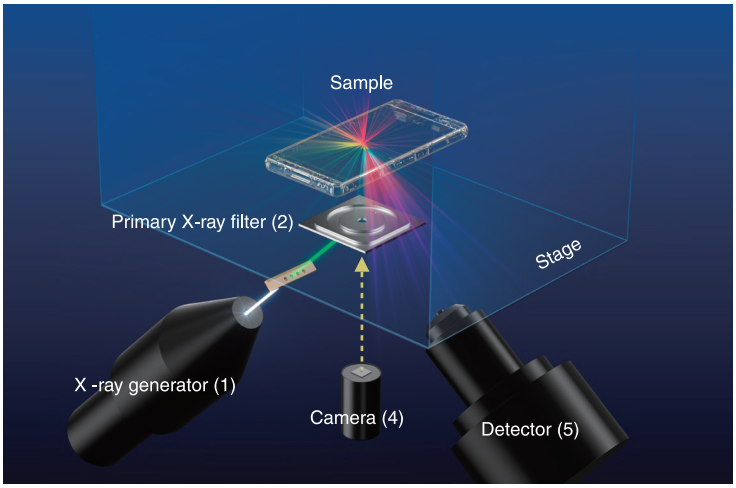

For cross validation after another analysis


For analysis in a N_2 purging glovebox*

*Please do not use it in Ar purged or He purged or other active gas purged box.
It will cause discharge ignited by high voltage of X-ray generator.

Feel! MESA-50

Key Feature 1 - The Optical System



1 Powerful X-ray generator
Up to 50 kV, 200 µA, 10 W with Pd target

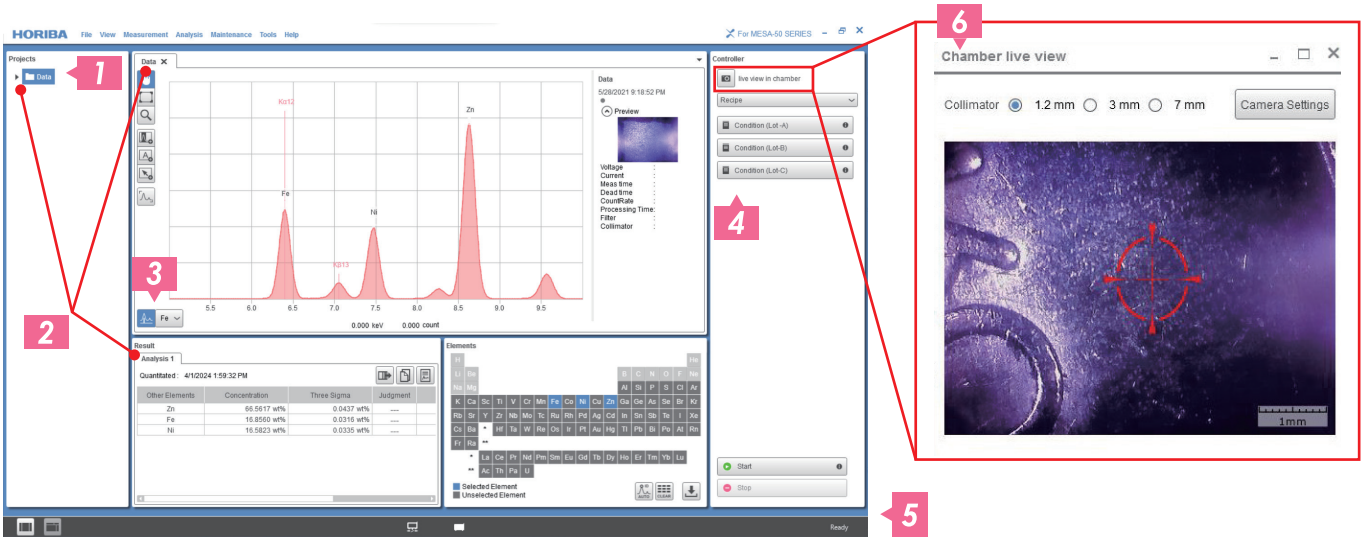
2 Switchable X-ray filters
Enhances S/N by cutting off background

3 Switchable multi-collimators
Selectable down to 1.2 mm up to 7 mm

4 High resolution CMOS camera
Identifies an analysis position on a sample

5 Silicon drift detector
Achieves high performance without LN_2

Key Feature 2 - The Software (V3 Software)



1 Auto data save
Saves the data automatically.
It reduces the risk of losing data.

2 Multiple windows
Displays multiple windows to show a XRF spectrum, periodic table, and a quantitative result at once.

3 Spectrum search/marker function
Incorporates a database of the peak positions. Users can identify the peaks in a spectrum easily even without knowledge of peak position.

4 Recipe function
Allows users to save settings for measurement. It is helpful for routine analysis.

5 Safety function
Shows the status of the X-ray generator.
The interlock system inactivates a start button when the chamber door is opened.

6 Camera image
Shows a measurement position on a sample, according to the analysis spot size.

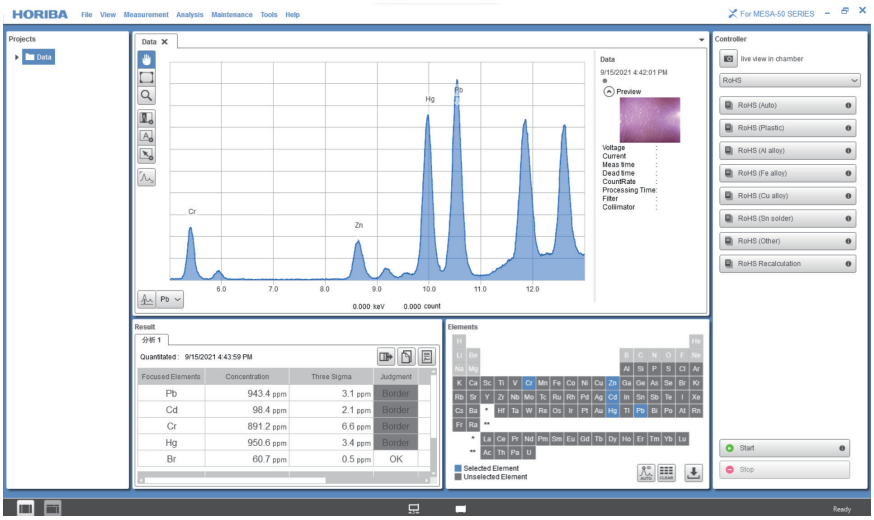
Optional Software Functions

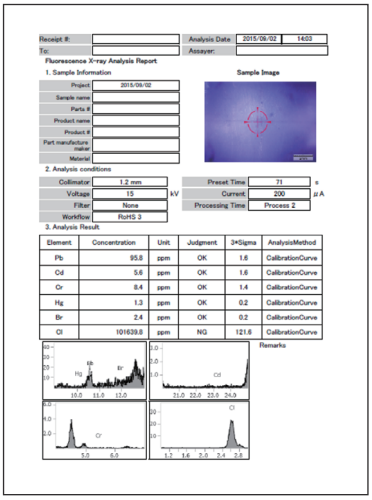
1. RoHS Module

The RoHS module allows users to start RoHS screening and halogen screening by just one click of a button. The module offers built-in workflow which enables automatic sequential measurement without special skill and knowledge of users.

Key Functionalities

- Built-in sequences for 6 types of sample matrix classification
  - Plastic, Al alloy, Fe alloy, Cu alloy, Sn alloy, and others
- Internal parameters optimized for the 6 types of sample matrix
  - Built-in calibration curves
  - Auto thickness correction for plastic matrix
- Pass or Fail Judgement
- Auto quit mode to save time for high concentration samples
- Report template specialized for RoHS-regulated elements

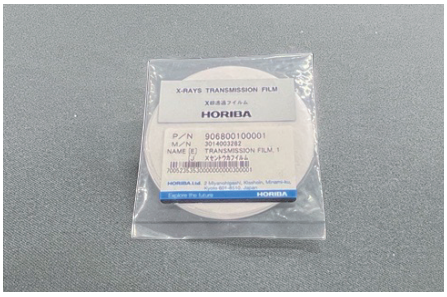




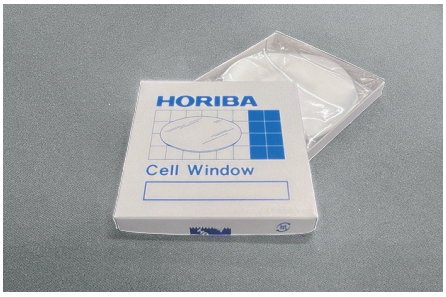
2. As/Sb Module

The As/Sb module is an additional module to the RoHS module. It can determine As and Sb concentration using the built-in parameters, and export a report which includes the result of As and Sb.

Standard Accessories



Transmission X-ray film (20 sheets/pc)
Size: φ64 mm
Material: PP
This is a film placed at the measurement position to protect the optics from sample leakage or contamination.



Cell window (100 sheets/pc)
Size: φ80 mm
Material: PET
This film covers a sample cell to analyze powdery samples or liquid samples. It is also compatible with other types of cell (See the next page).

Sample cell (2 pcs)
Size: 23 x 22 mm [φ x H]
Material: PP
This is a manually-assembled cell which can be used with a cell window to measure small fragments or liquid samples.

Check out how to assemble the cell in the video! ➡

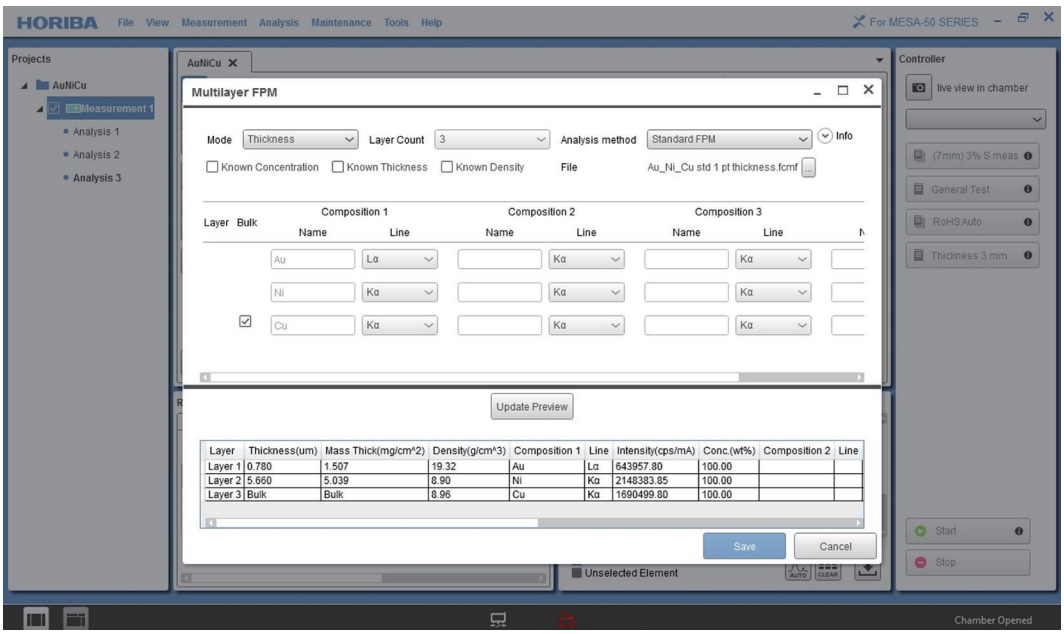
3. Multilayer FPM Module

The multilayer FPM module is an optional software for thickness calculation. The software calculates the layer thickness of a multilayer sample using user-defined layer modeling. It allows users to get layer thickness results even without standard samples. The total layer thickness covering from several to tens of µm can be detected and calculated*.

*Depends on the target elements, the sample matrix, and the measurement condition.

Key Functionalities

- Two types of output: Thickness or mass-thick can be selected.
- The modeling can be defined up to 4 layers including bulk and up to 4 compositions per layer.
- It is possible to enhance the accuracy by correction using 1 or 2 standard samples.
- The layer composition can be calculated if the elements are known in each layer.



Optional Accessories

Disposable cell (48 pcs/box)
This is a pack of disposable sample cups to place a sample in liquid, cream, or powder form for analysis.

Check out how to assemble the cell in the video! ➡

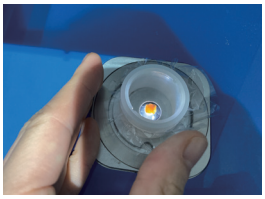
Cable fixing jig (1 pc)
This is a jig to fix a cable sample on the measurement position in the sample chamber properly.

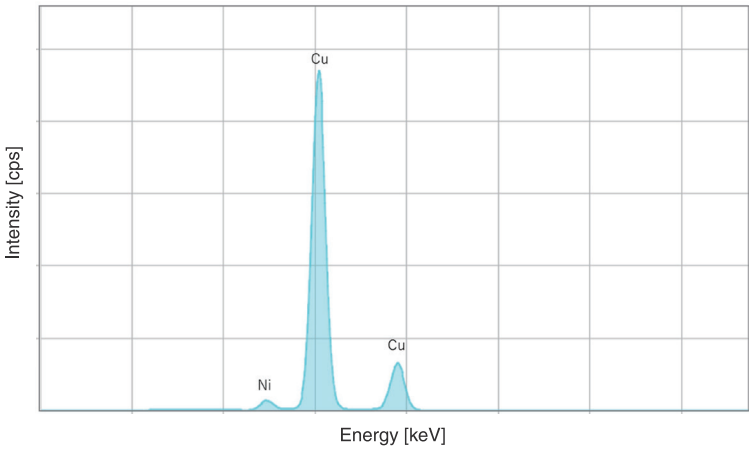
Offline license (1 pc)
This dongle of an additional offline license allows data processing on your laptop apart from the MESA-50 main unit.

Applications

1 Failure analysis / Contamination analysis

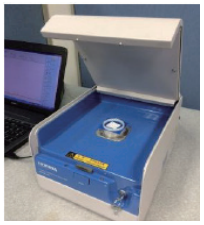
The MESA-50 Series offers you fast identification of failure or contamination happening in products, non-destructively. Thanks to the deep penetration of X-rays, you can analyze a contamination even embedded in plastic packaging as shown below.
In addition, thanks to the optical camera and small spot size, the MESA-50 Series is capable of analyzing even a small defect or contamination easily.

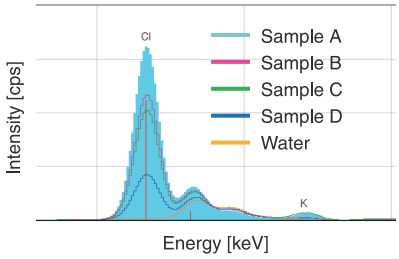


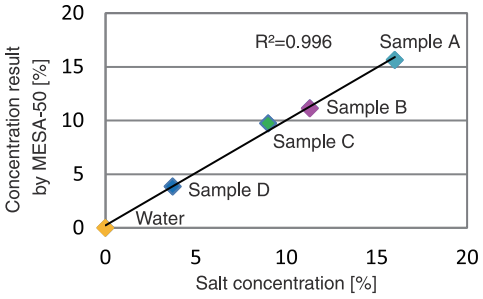


2 Food: Salt determination in sauce

For salt determination in food, the Mohr method is typically used to determine chlorides in water.
The method is based on titration and requires strong acids such as silver nitride and a skilled operator.
The MESA-50 Series provides a fast and user-friendly analysis of chorine without any strong acids and special treatment. As shown below, the results show good linearity of calibration curve plots with a regression ($R^2 > 0.99$).







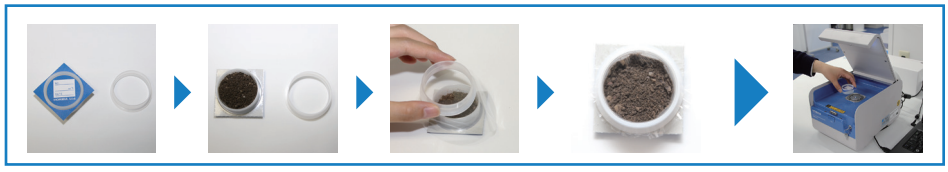
3 Environment: Harmful elements in soil

The MESA-50 Series allows non-destructive analysis of soil samples without the need to destroy or dissolve the sample. Therefore, it is suitable for screening and on-site analysis. It can also analyze multiple elements, allowing the simultaneous determination of different contaminants and elements in the soil.

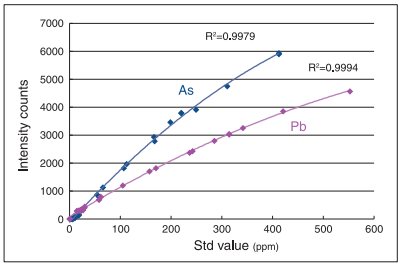
● Procedure

Assembles sample cell (put the soil sample in the liquid/powder cell) → Measure with the MESA-50 → Qualitative analysis (specify hazardous elements) → Quantitative analysis

● Operation



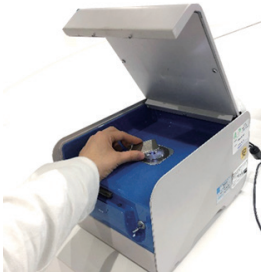
● Analysis of harmful elements in soil



Calibration curve example

4 Steel: Coating analysis (Multilayer FPM module)

EDXRF is widely used as a non-destructive coating thickness analysis tool thanks to the analysis depth. The MESA-50 Series offers an optional software module called Multilayer FPM, which allows thickness determination of each layer of a multi-layered sample (up to 4 layers including substrate) even without the standard samples. The below example shows the analysis result of Zn-Ni alloy coating on an steel plate.

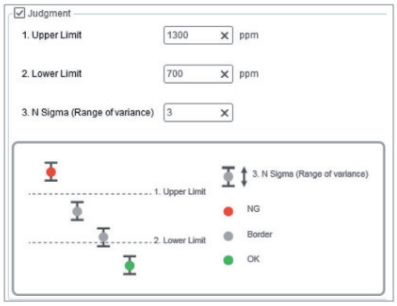


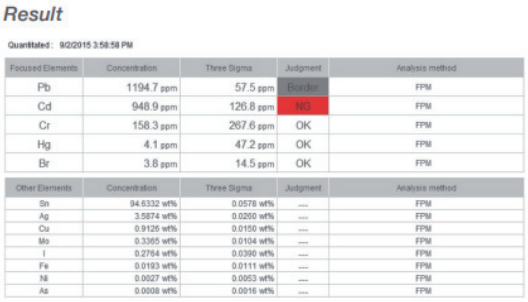
Sample: ZnNi coating (9 µm) on an steel plate

Sample	Thickness (µm)	Composiition (mass%)	
		Zn	Ni
1	9.08	85.60	14.40
2	8.99	85.55	14.55
3	8.92	85.61	14.39
Average	**9.00**	**85.59**	**14.41**
SD	**0.08**	**0.03**	**0.03**

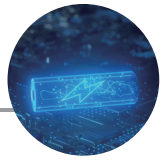
5 Electronics: RoHS screening analysis (RoHS module)

The MESA-50 Series is widely used for rapid screening to determine the presence of hazardous elements regulated by the RoHS Directive. IEC 62321-3-1 and ASTM F2617 introduce EDXRFs as a tool for determination of Cr, Br, Cd, Hg and Pb in electrical and electronic equipment, and the MESA-50 Series with the RoHS module (P.4) provides the analysis more user-friendly.

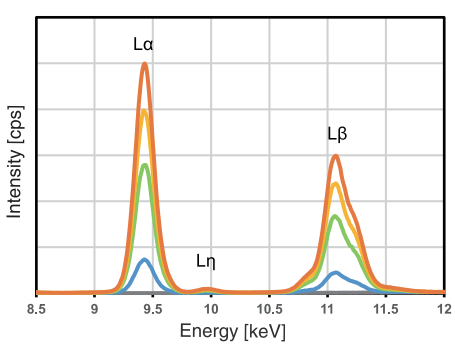


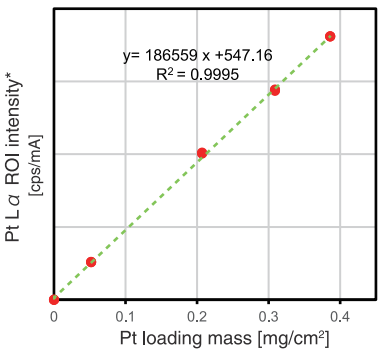


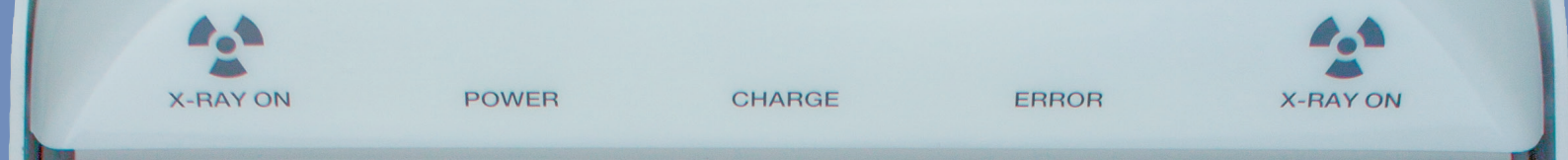
6 Energy: Pt loading mass determination



The MESA-50 Series allows a fast and non-destructive method for Pt catalyst loading mass determination in catalyst sheet of proton exchange membrane fuel cell. As shown on the right, several in-house samples (0.052 - 0.39 mg/cm^2) with different Pt loadings were analyzed to produce a calibration curve, which was used to determine the catalyst loading of the samples. The results showed that the curve had a good linearity and that the calculated result was consistent with the labeled value of the sample with good repeatability.







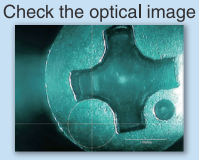
Simple Operation

1 Set a sample

Sample set position

Set a sample on the analyzer.

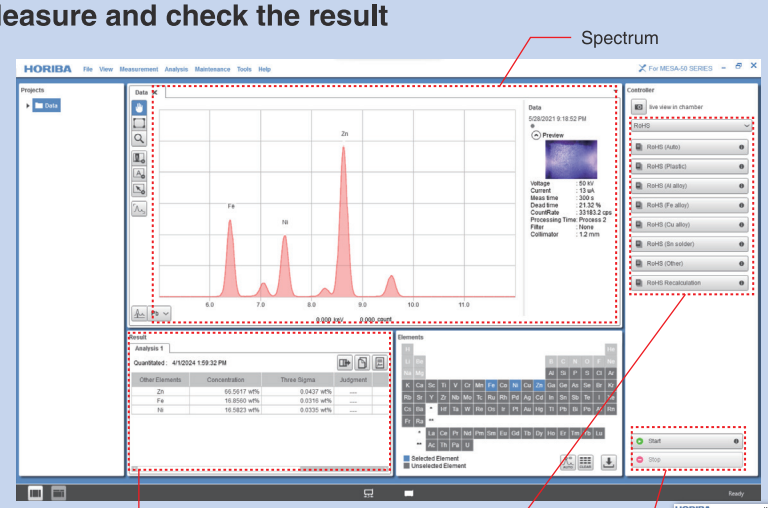
Check the optical image



Check out the actual operation video!

Click the link!!

2 Measure and check the result



Specifications

Measurement principle	Energy dispersive X-ray fluorescence (EDXRF)
Measurable elements	Al (13) to U (92)
Sample form	Solid, liquid, powder
Chamber size	190 x 225 x 40 mm [W x D x H]
Sample observation	Color CMOS camera image
Chamber environment	Ambient
X-ray tube	Max. 50 kV, 0.2 mA
X-ray spot size	1.2 mm, 3 mm, 7 mm (automatic switching)
Filter	Four types (automatic switching)
X-ray detector	SDD (Silicon Drift Detector)
Data output	Outputs reports in Microsoft Excel®, Word® or PDF
Operating System	Microsoft Windows®11
Languages	Japanese, English, Chinese
Power supply	AC 100 to 240 ±10%, 50/60 Hz
Power consumption	0.1 kVA or less (excluding PC)
Battery	Up to 6 hours depending on operation
Weight	Approx. 12 kg
Dimensions	208 mm x 294 mm x 205 mm [W x D x H]
Options	RoHS module, As/Sb module, Multilayer FPM module, disposable cells, cable fixing jig, offline license

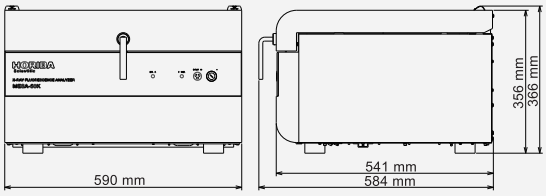
***MESA-50 is available in all the regions except the EU and the UK.**

Other Product Line-up

MESA-50K: For larger samples

Larger Chamber

Sample size: Max. 460 × 360 × 150 mm [W × D × H]



Check out our Website!

HORIBA

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