C142-E037A

SHIMADZU
Excellence in Science

Energy Dispersive X-ray Fluorescence Spectrometer

EDX-7000
EDX-8000

EDX-7000/8000

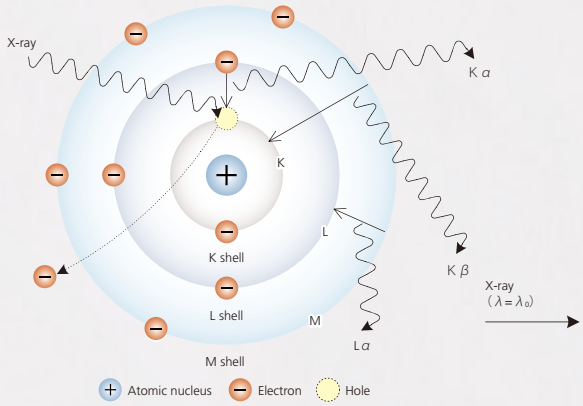
Energy Dispersive X-ray Fluorescence Spectrometer

One EDX over all others

Principle and Features of X-ray Fluorescence Spectrometry

Principle of Fluorescent X-ray Generation

When a sample is irradiated with X-rays from an X-ray tube, the atoms in the sample generate unique X-rays that are emitted from the sample. Such X-rays are known as "fluorescent X-rays" and they have a unique wavelength and energy that is characteristic of each element that generates them. Consequently, qualitative analysis can be performed by investigating the wavelengths of the X-rays. As the fluorescent X-ray intensity is a function of the concentration, quantitative analysis is also possible by measuring the amount of X-rays at the wavelength specific to each element.



Electron Paths and Principle of X-ray Generation Expressed as a Bohr Model

Supports Various Applications in Many Fields

Electrical/electronic materials

- RoHS and halogen screening
- Thin-film analysis for semiconductors, discs, liquid crystals, and solar cells

Automobiles and machinery

- ELV hazardous element screening
- Composition analysis, plating thickness measurement, and chemical conversion coating film weight measurement for machine parts

Ferrous/non-ferrous metals

- Main component analysis and impurity analysis of raw materials, alloys, solder, and precious metals
- Composition analysis of slag

Mining

- Grade analysis for mineral processing

Ceramics

- Analysis of ceramics, cement, glass, bricks, and clay

Oil and petrochemicals

- Analysis of sulfur in oil
- Analysis of additive elements and mixed elements in lubricating oil

Chemicals

- Analysis of products and organic/inorganic raw materials
- Analysis of catalysts, pigments, paints, rubber, and plastics

Environment

- Analysis of soil, effluent, combustion ash, filters, and fine particulate matter

Pharmaceuticals

- Analysis of residual catalyst during synthesis
- Analysis of impurities and foreign matter in active pharmaceutical ingredients

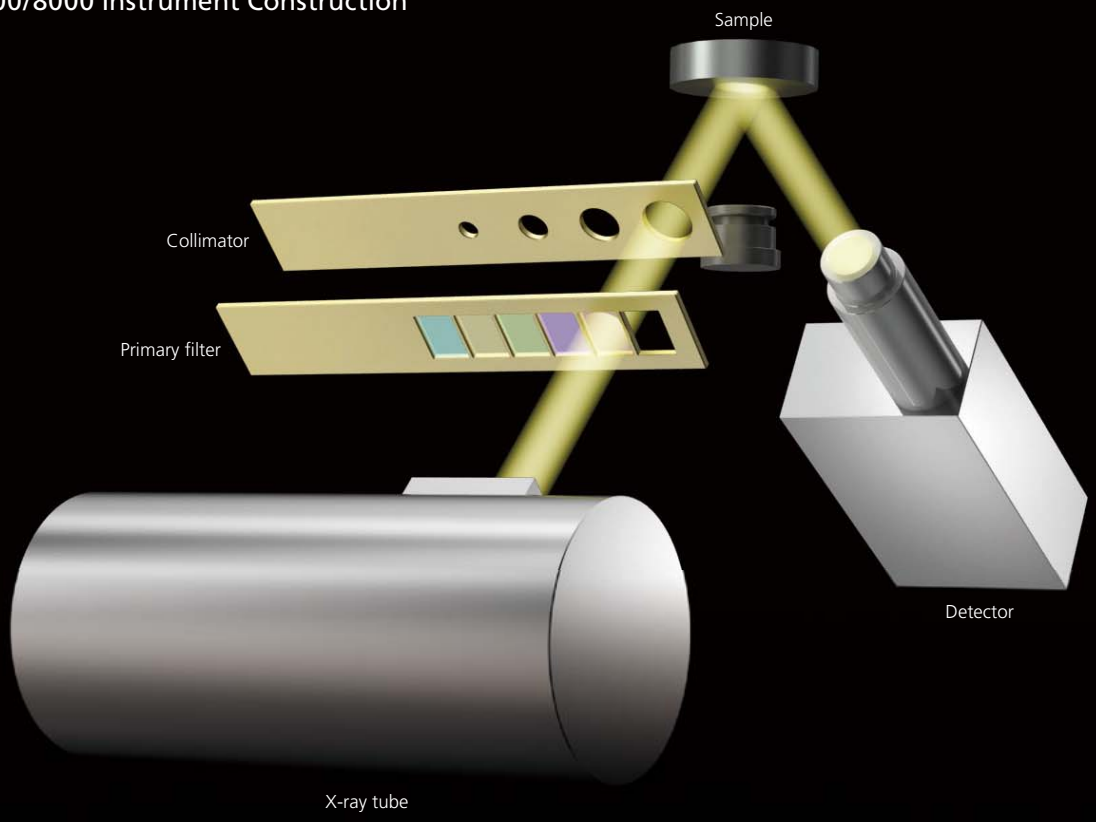
Agriculture and foods

- Analysis of soil, fertilizer, and plants
- Analysis of raw ingredients, control of added elements, and analysis of foreign matter in foods

Other

- Composition analysis of archeological samples and precious stones, analysis of toxic heavy metals in toys and everyday goods

EDX-7000/8000 Instrument Construction

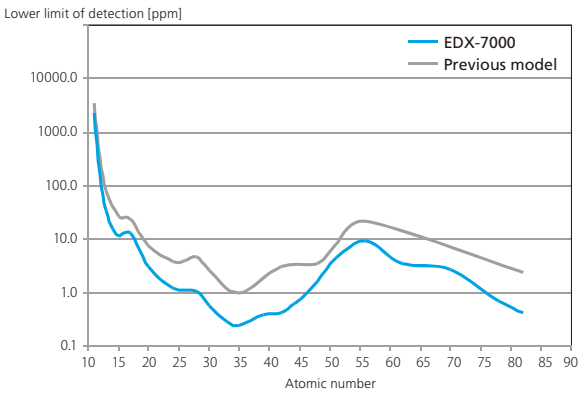


Unrivaled Analytical Performance

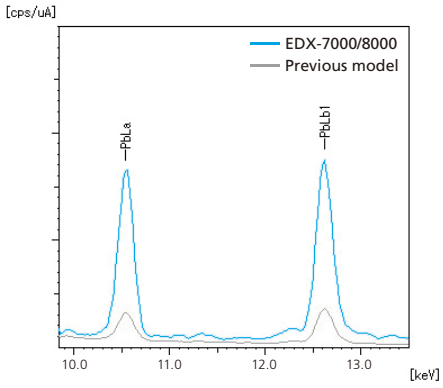
The high-performance SDD detector and optimized hardware achieve a high level of sensitivity, analysis speed, and energy resolution that were previously unattainable. The EDX-8000 system also permits detection from $_6$C.

High Sensitivity – Lower Limit of Detection Improved 1.5 to 5 Times! –

The high-performance SDD detector and combination of optimized optics and primary filters achieve previously unheard-of high levels of sensitivity. The sensitivity is higher than the previous Si (Li) semiconductor detector across the entire range from light to heavy elements.



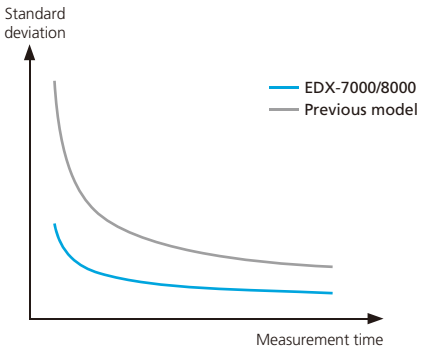
Comparison of the Lower Limit of Detection in a Light Element Matrix



Profile Comparison for Lead (Pb) in Copper Alloy

High Speed – Throughput Increased by up to a Factor of 10 –

The high fluorescent X-ray count per unit time (high count rate) of the SDD detector permits highly precise analysis in a shorter measurement time. This feature is achieved to the maximum when analyzing samples that generate a lot of fluorescent X-rays, such as samples with a metal as the Main component element.



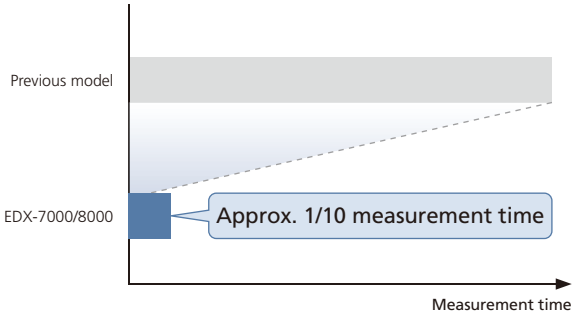
Relationship Between Measurement Time and Standard Deviation (Variance in Quantitation Values)

Extending the Measurement time to increase the fluorescent X-ray count can improve the precision (repeatability) of X-ray fluorescence spectrometry.
The EDX-7000/8000 incorporates a high-count-rate SDD detector that achieves highly precise analysis of the target in a shorter Measurement time than the previous model.

Comparison Using Actual Samples

Repeatability using the EDX-7000/8000 and the previous model were compared for lead (Pb) in lead-free solder.

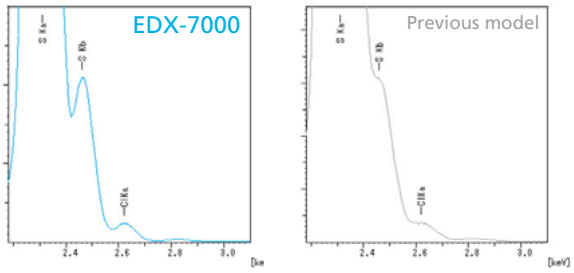
Sample External Appearance



Measurement time Required to Reach the Target Analysis Precision

High Resolution

The EDX-7000/8000 instruments achieve superior energy resolution compared to previous models by incorporating a state-of-the-art SDD detector.
This reduces the effects of overlapping peaks of different elements, enhancing the reliability of the analysis results.

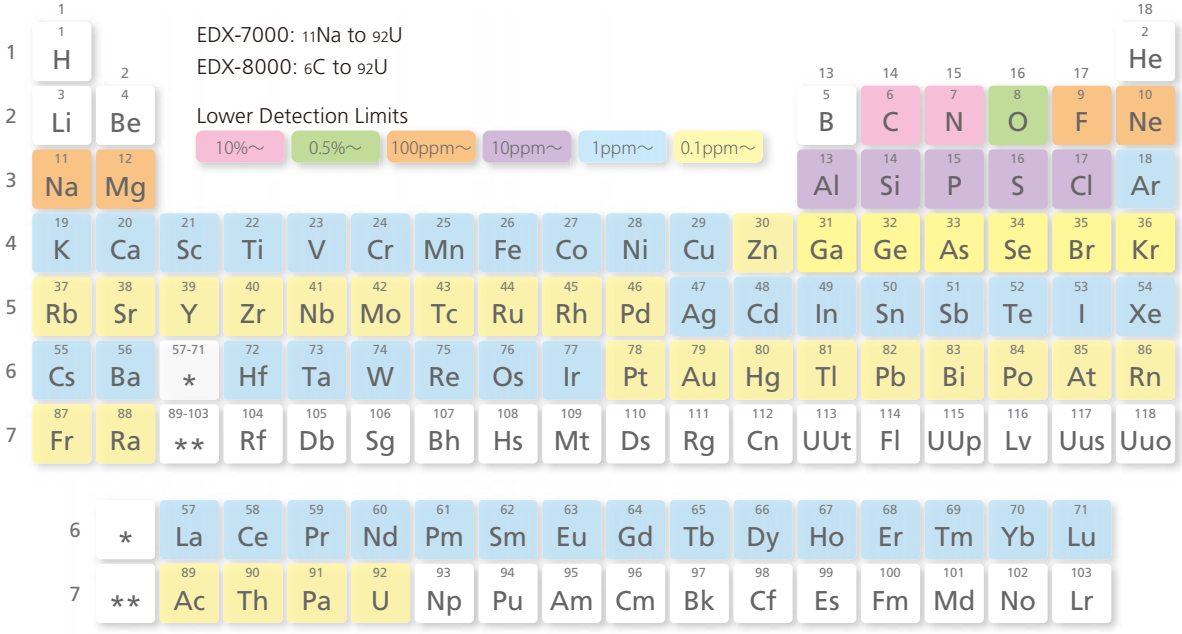


Comparison of Energy Resolutions (sample: PPS resin)

No Liquid Nitrogen Required

The SDD detector is electronically cooled, eliminating the need for cooling by liquid nitrogen. This frees the user from the chore of replenishing the liquid nitrogen and contributes to lower running costs.

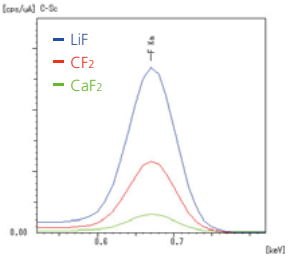
Range of Detected Elements



- An optional vacuum measurement unit or helium purge unit is required to measure light elements (15P and below) with the EDX-7000.
- An optional vacuum measurement unit is required to measure light elements (15P and below) with the EDX-8000
- Lower detection limit vary depending on the sample matrix or coexisting elements.

Ultra-Light Element Analysis by EDX-8000

The EDX-8000 features an SDD detector with a special ultra-thin-film window material that is able to detect ultra-light elements such as carbon (C), oxygen (O), and fluorine (F)



Profile of Fluorine (F) by EDX-8000

Extremely Flexible

Accommodates all types of samples from small to large, from powders to liquids. Options include a vacuum measurement unit and helium purge unit for highly sensitive measurement of light elements and a 12-sample turret for automated continuous measurements.

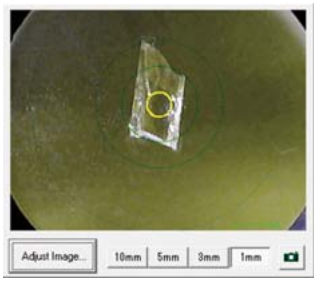
Sample Observation Camera and Collimators

Automatic collimator switching in four stages: 1, 3, 5, and 10 mm diameter

Select the irradiation chamber from four values to suit the sample size.
Select the most appropriate irradiation diameter for the sample shape: 1 mm diameter for trace foreign matter analysis or defect analysis; 3 mm or 5 mm diameter for small sample volumes.

Sample observation camera included standard

Use the sample observation camera to confirm the X-ray irradiation position on a specific position to measure small samples, samples comprising multiple areas, or when using a Micro X-Cell.



1 mm dia. Collimator Selected

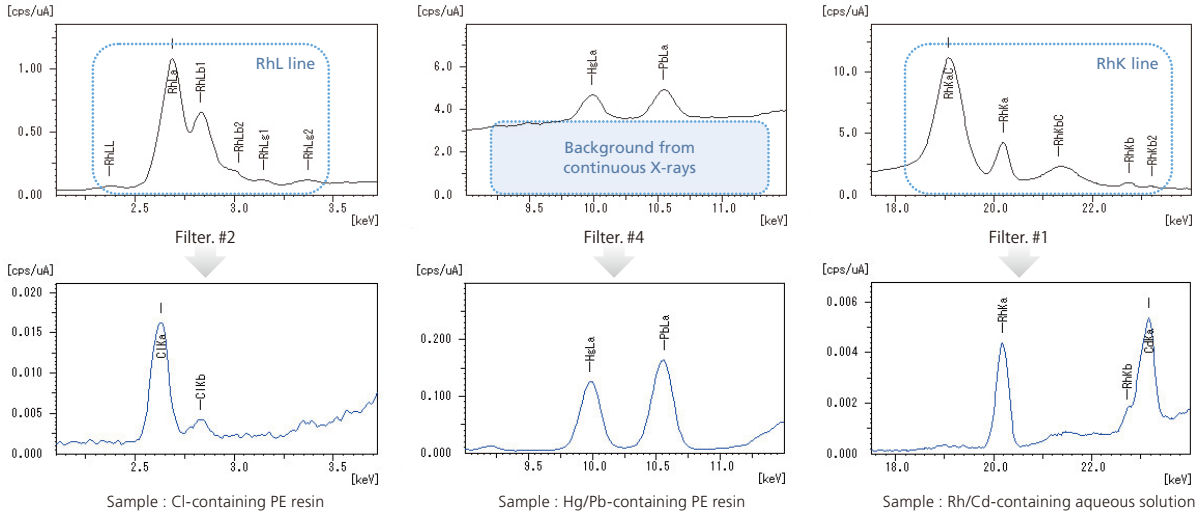
5 mm dia. Collimator Selected, Using Micro X-Cell

Automatic Replacement of Five Primary Filters

Primary filters enhance detection sensitivity by reducing the continuous X-rays and the characteristic X-rays from the X-ray tube. They are useful for the analysis of trace elements.
The EDX-7000/8000 incorporates five primary filters as standard (six, including the open position), which can be automatically changed using the software.

Filter	Effective Energy (keV)	Target Elements (Examples)
#1	15～24	Zr, Mo, Ru, Rh, Cd
#2	2～5	Cl, Cr
#3	5～7	Cr
#4	5～13	Hg, Pb, Br
#5	21～24 (5～13) *	Cd (Hg, Pb, Br)

* This filter also cuts the background in the energy range shown in parentheses ( ).



Effect of the Primary Filters

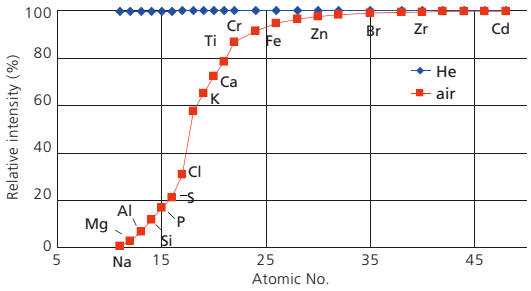
Freely Combine Collimators and Primary Filters

The collimators and primary filters are driven independently and can be combined to address specific requirements. Select the optimal combination from 24 (6 filters x 4 collimators) available options.
Quantitative analysis using the FP method is possible with all combinations.

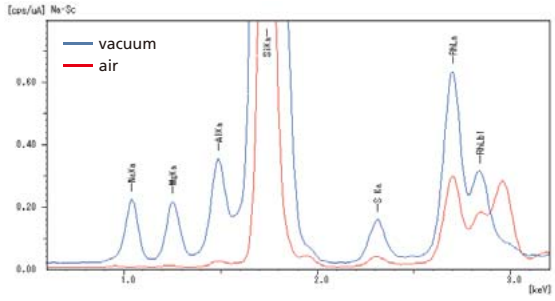
Optional Vacuum Measurement Unit and Helium Purge Unit

Sensitivity for light elements can be increased by removing atmosphere. Two options are available: a vacuum measurement unit and a helium purge unit.

The helium purge unit is effective when measuring liquid samples and samples that generate a gas and cannot be measured in a vacuum.



Relative Sensitivity of Measurements with Helium Purging and in Air
(sensitivity in vacuum = 100)

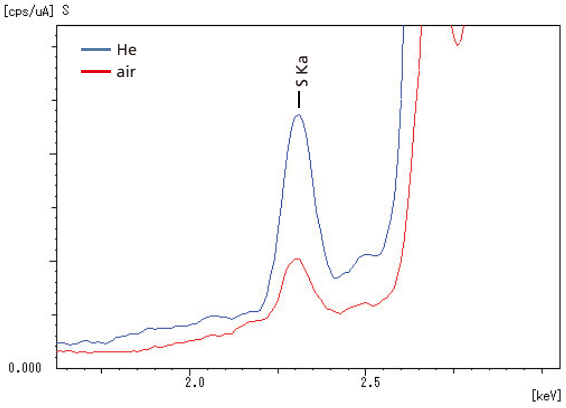


Profile Comparison in Vacuum and Air
(sample: soda-lime glass)

Advanced Helium Purge Unit (Option)

This proprietary system (Patent pending : PCT/JP2013/075569) efficiently purges the instrument with helium gas to achieve an approximately 40 % reduction in purge time and helium gas consumption compared to previous units.

(Option for EDX-7000)



Profile Comparison in Air and Helium After Purging
(sample: sulfur in oil)

12-Sample Turret (Option)

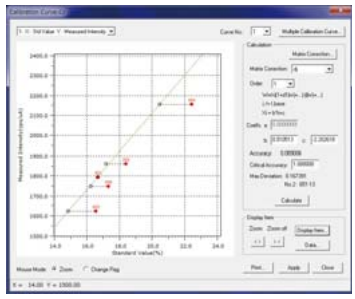
The addition of the turret allows automated continuous measurements. It improves throughput, especially for measurements in a vacuum or helium atmosphere.

Comprehensive Quantitation Functions

Calibration Curve Method

A standard sample is measured and the relationship with the fluorescent X-ray intensity plotted as a calibration curve, which is used for the quantitation of unknown samples. Although this method requires selection of a standard sample close to the unknown sample and creation of a calibration curve for each element, it achieves a high level of analysis accuracy.

This method supports all types of corrections for coexistent elements, including absorption/excitation correction and correction for overlapping elements.



Fundamental Parameter (FP) Method

This method uses theoretical intensity calculations to determine the composition from the measured intensities. It's a powerful tool for the quantitative analysis of unknown samples in cases where preparation of a standard sample is difficult. (JP No. 03921872, DE No. 60042990. 3-08, GB No. 1054254, US No. 6314158)

The instrument offers both the bulk FP method for the analysis of metals, oxides, and plastics, and the thin-film FP method that supports composition analysis and thickness measurements of plating and thin films.

Automatic Balance Setting Function (Patent pending)

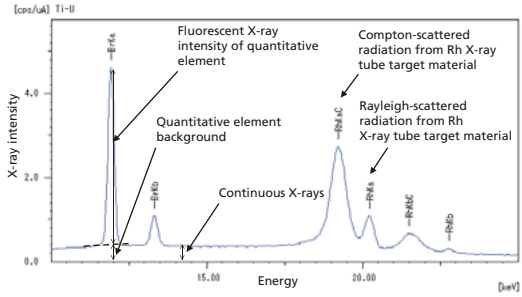
A balance setting is required to use the FP method on principal components such as C, H, and O. The software automatically sets the balance if it determines from the profile shape that a balance setting is required.

Background FP Method

The background FP method adds scattered X-ray (background) calculations to the conventional FP method, which only calculates the fluorescent X-ray peak intensity (net peak intensity).

(Patent pending : PCT/JP2013/78002, PCT/JP2013/78001)

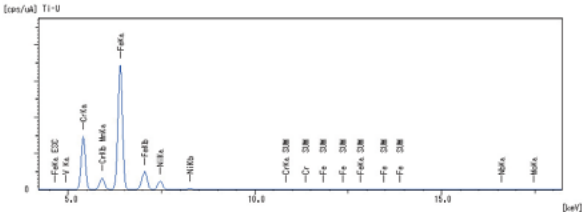
This method is effective at improving quantitation accuracy for small quantities of organic samples, film thickness measurements of irregular-shaped plated samples, and film thickness measurements of organic films.



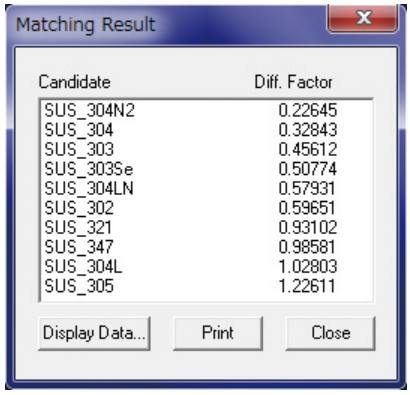
Matching Function

The matching function compares analysis data for a sample with an existing data library and displays the results in descending degree of confidence.

The library contains content data and intensity data and the user can register each type. The content data values can be entered manually.



Analyte	Result		[3-sigma]	Proc.-Calc.	Line
Fe	70.058	%	[0.065]	Quant.-FP	FeKa
Cr	18.632	%	[0.028]	Quant.-FP	CrKa
Ni	8.679	%	[0.030]	Quant.-FP	NiKa
Mn	1.456	%	[0.004]	Quant.-FP	MnKa
Si	0.857	%	[0.015]	Quant.-FP	SiKa
Mo	0.206	%	[0.002]	Quant.-FP	MoKa
V	0.056	%	[0.003]	Quant.-FP	V Ka
P	0.039	%	[0.006]	Quant.-FP	P Ka
S	0.009	%	[0.005]	Quant.-FP	S Ka
Nb	0.008	%	[0.001]	Quant.-FP	NbKa

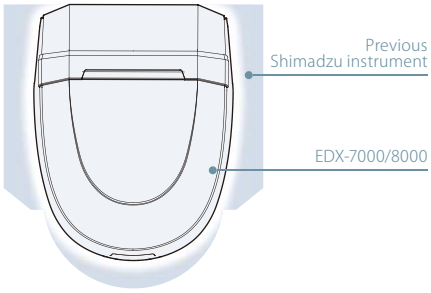


Matching Results

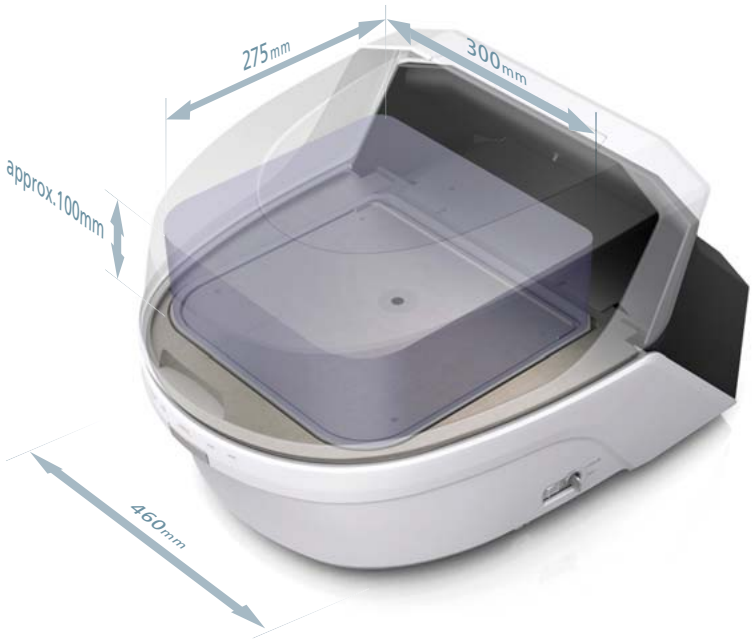
Functional Design

Large Sample Chamber with Small Footprint

Installed width is 20% smaller than the previous instrument due to its compact body size.
The EDX-7000/8000 can accommodate samples up to a maximum size of W300 x D275 x approx. H100 mm.



Body dimensions: W460 × D590 × H360mm
Comparison of footprint between
EDX-7000/8000 and previous instrument



High-Visibility LED Lamp

When X-rays are generated, an X-ray indicator at the rear of the instrument and an X-RAYS ON lamp at the front turn on, so that the instrument status can be monitored even from a distance.

PCEDX Navi Software Allows Easy Operation from the Start

PCEDX Navi software is designed to simplify X-ray fluorescence spectrometry for beginners, while providing the feature set and capabilities demanded by more experienced users.
The straightforward user interface offers intuitive operation and provides a convenient operating environment for beginners and experts alike.

Simple Screen Layout

Sample image display, analysis conditions selection, and sample name input on the same screen.

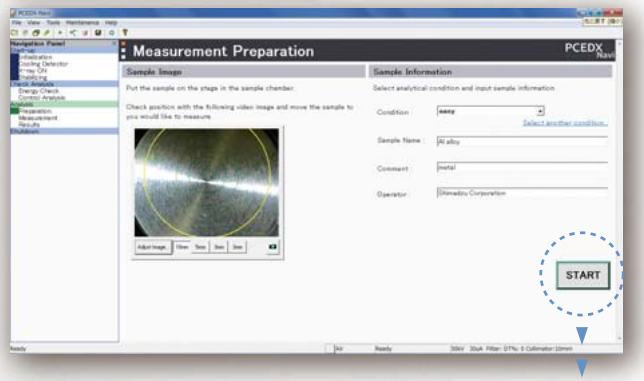
Collimator Switching from the Measurement Screen

Change the collimator diameter while observing the sample image.
The selected diameter is indicated by a yellow circle.

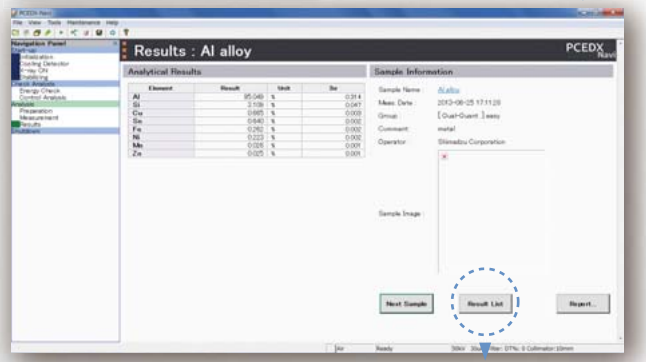
Automatic Storage of Sample Images

The sample image is loaded automatically when the measurement starts. Sample images are saved with a link to the data file.

Measurement Setup Screen



Results Display Screen

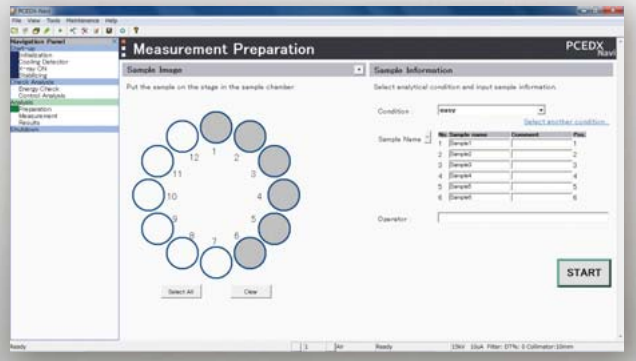


Results List (with images)

Once the measurement is complete, the element names, concentrations, 3σ (measurement variance) are displayed, together with the sample image, in an easy-to-understand layout.
Display the result list and individual report with a single mouse click.

Support for Continuous Measurements

PCEDX Navi supports measurements using the optional turret.
Switch between the sample image screen and sample positioning screen.

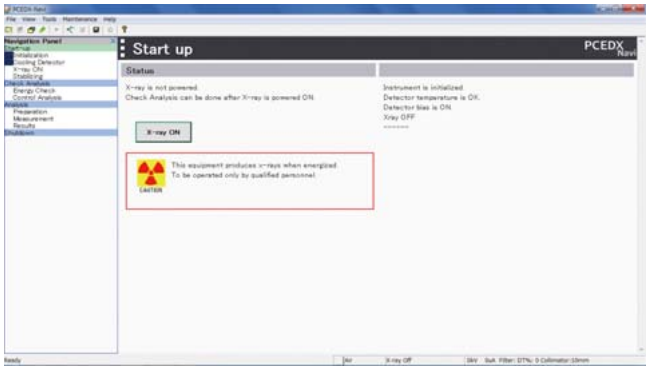


Measurement Setup Screen Using the Turret (sample positioning screen)

Functions to Enhance Usability

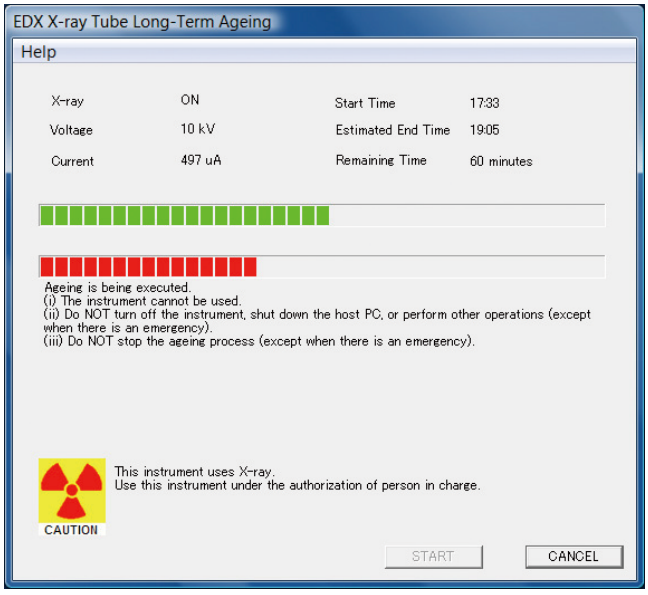
Easy Instrument Startup

PCEDX Navi offers instrument initialization and startup (X-ray startup) with simple mouse-click operations.
After instrument startup, the stabilization function operates for 15 minutes. Analysis and instrument checks are disabled during this period, ensuring that all users collect data in a stable instrument environment.



Automatic X-ray Tube Aging

When an X-ray tube has not been used for a long period, it requires aging before it can be used again. The software automatically performs the appropriate aging according to the period of non-use.



Condition Password Protection

The software offers password protection. Condition settings and changes can only be made by a person who enters the password.

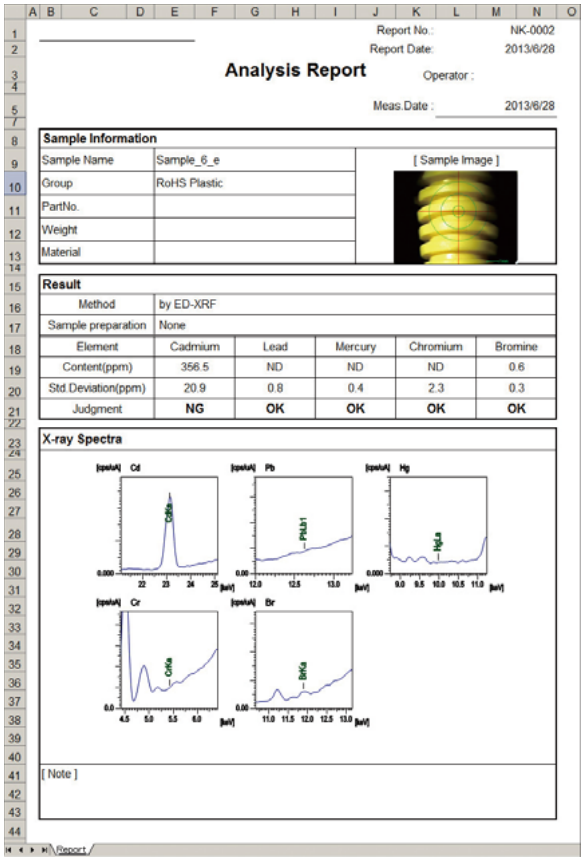
Incorporates General Analysis Software

EDX-7000/8000 incorporates PCEDX Pro software that has more flexibility functions. This software offers analysis, conditions settings, and data processing using familiar operations. It also allows loading of data profiles and quantitation values acquired with a previous Shimadzu EDX series instrument.

Various Data Output Formats

Report Creation Functions

Analysis data reports can be created in HTML or Excel format. A variety of templates is available.
The sample image automatically saved when measurement started is pasted in the report for confirmation of the measurement position.



Analysis Report

Report No.: NK-0002
Report Date: 2013/6/28
Operator :
Meas.Date : 2013/6/28

Sample Information

Sample Name	Sample_6_e
Group	RoHS Plastic
PartNo.	
Weight	
Material	

[Sample Image]

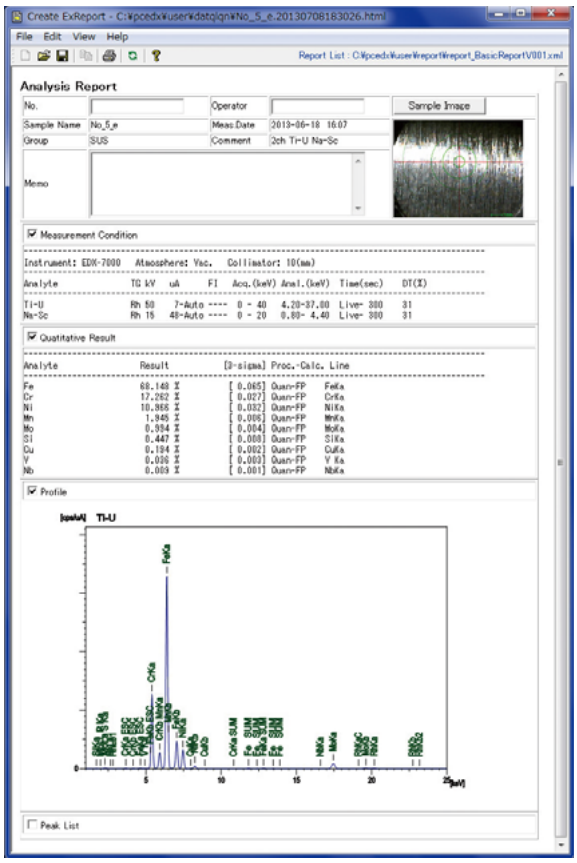
Result

Method	by ED-XRF				
Sample preparation	None				
Element	Cadmium	Lead	Mercury	Chromium	Bromine
Content(ppm)	356.5	ND	ND	ND	0.6
Std.Deviation(ppm)	20.9	0.8	0.4	2.3	0.3
Judgment	NG	OK	OK	OK	OK

X-ray Spectra

[Note]

RoHS Screening Report in Excel Format



General Analysis Report in HTML Format

*Microsoft Office Excel must be purchased separately.

List Creation Functions

Lists of the analysis results for multiple samples can be created in Excel format. Data can be selected in the list for detailed display or editing.
A variety of list generation templates is available, including a list of RoHS specific hazardous elements and user-defined lists of elements.

Add... Edit... C:\pcedx\user\datqlqn Folder... Create List Clear Report...

ExTBLFree Chart

No	Sample Name	Meas.Date	Analysis Group	Fe	Cr	Ni	Comment
				%	%	%	
1	SUS	2013/5/15	Solid_Air_10mm_60sec	70.689	18.924	8.091	Na-U LT60sec 10mm
2	Washer_Big	2013/5/15	Solid_Air_10mm_60sec	71.778	17.654	8.362	Na-U LT60sec 10mm
3	Washer_Small	2013/5/15	Solid_Air_10mm_60sec	70.900	18.612	8.973	Na-U LT60sec 10mm
4	Scissors	2013/5/15	Solid_Air_10mm_60sec	86.326	13.674		Na-U LT60sec 10mm
5	Tweezers	2013/5/15	Solid_Air_10mm_60sec	83.506	16.276	8.111	Na-U LT60sec 10mm
6	Screw	2013/5/15	Solid_Air_10mm_60sec	86.923	12.145		Na-U LT60sec 10mm

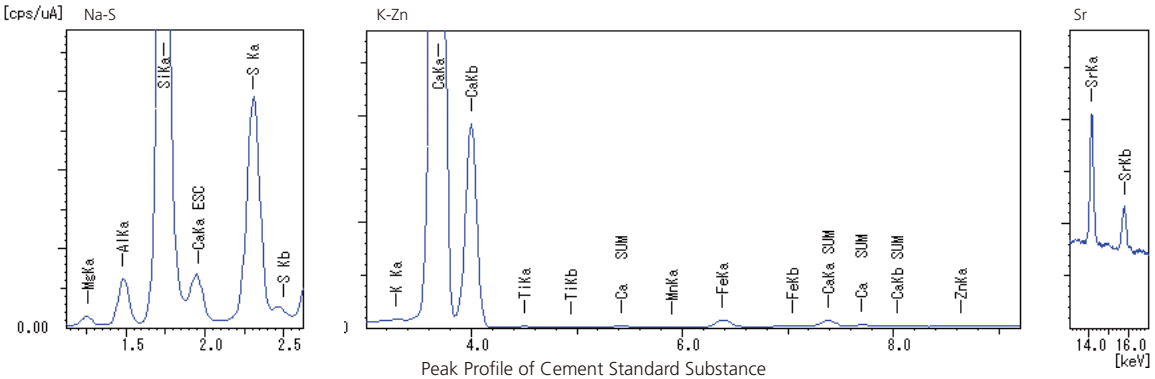
User-Definable List of Elements

*Microsoft Office Excel must be purchased separately.

Powders (Fine/Coarse Particles) –Qualification and Quantitation of Cement–

The analysis of powder samples is a typical X-ray fluorescence spectrometry application. The samples can be press-formed or loose in the sample cell.

The following shows an example of the analysis of a cement standard substance using Na–U qualitative/quantitative analysis, which is the standard method for powder analysis. Accurate quantitation was achieved without using standard samples. Performing measurements in a vacuum achieved sensitive measurements of light elements.



Peak Profile of Cement Standard Substance

Sample Appearance
(Press formed at 250 kN for 30 s)

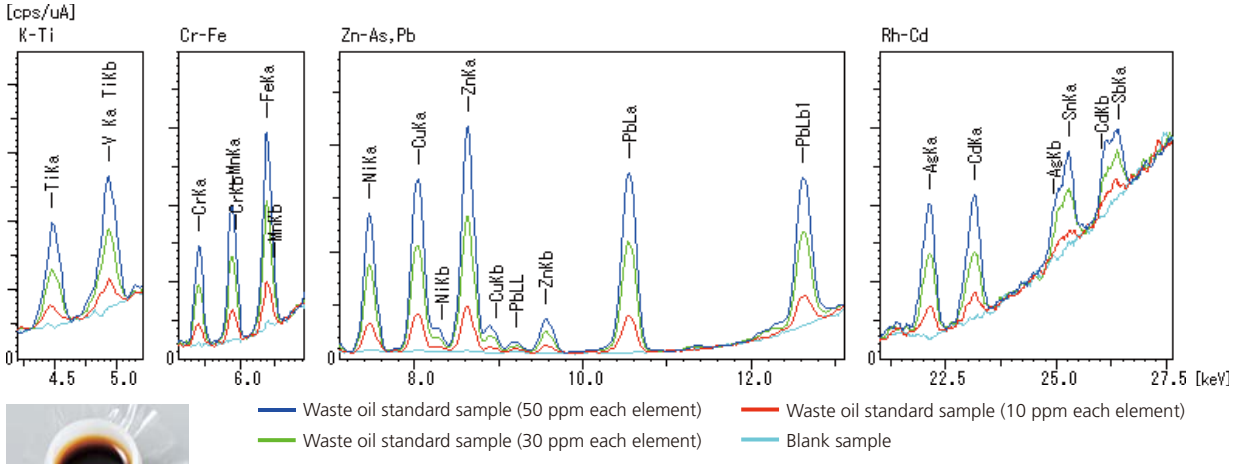
Element	MgO	Al_2O_3	SiO_2	SO_3	K_2O	CaO	TiO_2	Mn_2O_3	Fe_2O_3	ZnO	SrO
Quantitation value	1.75	3.95	21.86	2.44	0.11	69.60	0.079	0.011	0.18	0.002	0.023
Standard value	1.932	3.875	22.38	2.086	0.093	67.87	0.084	0.0073	0.152	(0.001)	(0.018)

Comparison of Quantitative Analysis Results and Standard Values by FP Method **Units: wt%**

Liquid, Slurry and Emulsion –Heavy Elements in Waste Oil–

To measure a liquid sample, simply add it to a sample cell with film on the bottom. This method is effective for the detection and quantitation of additive components and worn metals in aqueous solutions, organic solvents, or oils.

As shown below, the system achieves adequate detection of heavy elements in waste oil at ppm levels.

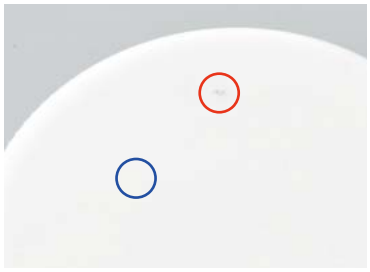


Overlaid Profiles of Heavy Elements in Waste Oil

Sample Appearance
(Sample cell, film, 5 mL oil)

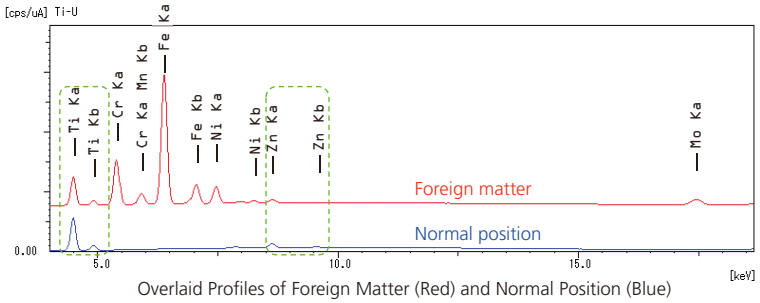
Foreign Matter Material Evaluation –Foreign Matter Adhering to Plastic Extruded Part–

EDX permits non-destructive elemental testing, making it effective for the analysis of foreign matter adhering to or mixed in with foods, drugs, or products. Using the sample observation camera and collimators makes it easy to identify trace foreign matter.
The 1 mm irradiation diameter is effective at reducing the effects of peripheral material, resulting in accurate quantitative matching. In the example, the material was identified as SUS316.



Sample Appearance

Red circle: foreign matter
Blue circle: normal position

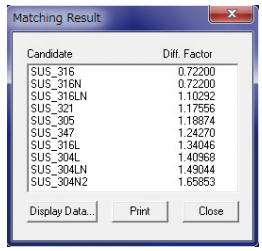


Overlaid Profiles of Foreign Matter (Red) and Normal Position (Blue)

Analyte	Result	
Fe	68.287	%
Cr	16.166	%
Ni	11.424	%
Mo	2.505	%
Mn	1.619	%

Quantitative Analysis Results for Foreign Matter by FP Method

The titanium (Ti) and zinc (Zn) peripheral material around the foreign matter are eliminated from the quantitation calculations.



Matching Results
(Matching results in internal library. Substance identified as SUS316.)

Food, Biological Samples, Plants –Mineral Composition of Algae, Small Samples–

EDX is used for the analysis of elements contained in foods and biological samples. It is effective for process control when adding elements to foods, evaluating the poor growth of crops, and identifying the region or origin.
The new background FP function achieves similar quantitation results with low sample volumes as from adequate sample volumes. It is effective in research applications when only small samples are available and in eliminating discrepancies due to differences in sample pretreatment by operators.

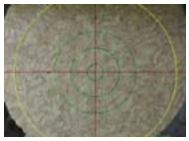


Image of Sample (Adequate Volume)

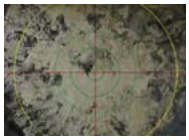
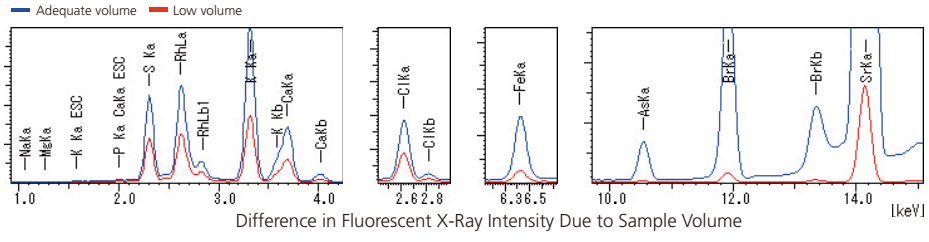
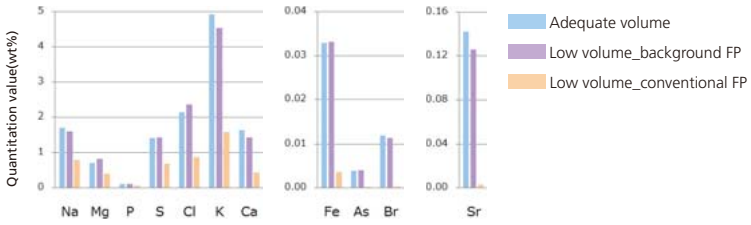


Image of Sample (Low Volume)

【Comments】
With conventional FP, the changes in fluorescent X-ray intensity due to the sample quantity and shape lead to quantitation errors. Background FP eliminates these effects to achieve stable quantitation values.



Difference in Fluorescent X-Ray Intensity Due to Sample Volume



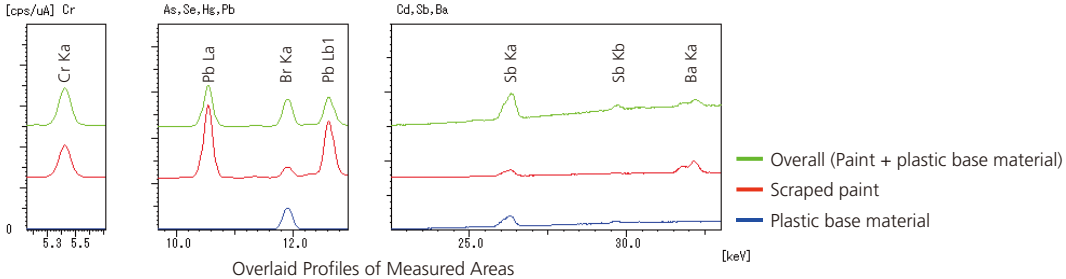
Comparison of Quantitation Values by Background FP and Conventional FP Methods

Hazardous Elements in Products —Eight Stipulated Elements in Toys—

EDX is ideal for the screening analysis of hazardous elements in products, such as electrical and electronic products, automobiles, and toys. No special equipment is required as chemical treatment is unnecessary.

In this example with a plastic toy, comparison between measured areas indicated that the painted area contains barium (Ba), chromium (Cr), and lead (Pb).

Sample Appearance



Overlaid Profiles of Measured Areas

Polyethylene Resin Standard Samples Containing the Eight Stipulated Elements in Toys

Units: mm N.D. = not detected

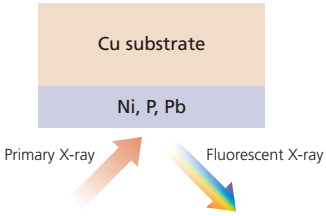
Element	Sb	As	Ba	Cd	Cr	Pb	Hg	Se
Overall	326	N.D	351	N.D	2697	5010	N.D	12.8
Scraped paint	293	N.D	983	N.D	2013	7918	N.D	19.1
Plastic base material	351	N.D	51	N.D	29	77	N.D	N.D

Quantitative Analysis Results by Calibration Curve Method

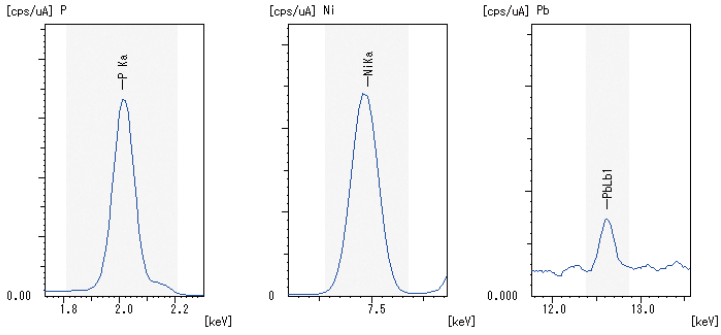
Plating, Thin Films —Film Thickness and Composition Measurements of Electroless Nickel Phosphorus Plating—

The film FP method permits the film thickness measurement of multilayer films, and simultaneous film thickness measurements and quantitation of the film composition.

In this example, the plating thickness was measured as 1.8 µm. In addition, quantitation of the Ni and P main component and the detected trace Pb impurity was achieved.



Schematic Representation of Sample



Peak Profiles of Ni, P, and Pb

Quantitative Analysis Results by Film FP Method

When using the film FP method, the substrate material, film deposition sequence, and element information can be set.

Layer	Info	Analyte	Result		[3-sigma]	Proc.-Calc.	Line
1	Layer1						
1	Layer	Layer1	1.805	um	[------]	Total	--------
1	Elem.	P	11.244	%	[0.036]	Quant.-FP	P Ka
1	Elem.	Ni	88.738	%	[0.145]	Quant.-FP	NiKa
1	Elem.	Pb	0.018	%	[0.003]	Quant.-FP	PbLb1
B	Base						
B	Elem.	Cu	100.000	%	[------]	Fix	--------

Sample Preparation

Solid Samples

• Large samples (> 13 mm dia.)

Simply mount in the instrument.

• Small samples (< 13 mm dia.)

Cover the bottom of the cell with film and add the sample.

Cover with film.

Cover the measuring window with film and place the sample on it.

Pretreatment of metal samples

To enhance the quantitation precision for metal samples or to eliminate the effects of contamination or oxidation on the sample surface, machine and polish the sample surface with a lathe and rotary polishing machine.

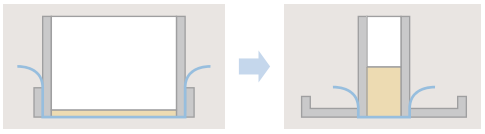
Machined and polished sample

Lathe

Liquid Samples

• Measurement in atmosphere or with helium purging

Cover the bottom of the cell with film and add the sample.



If a small volume of sample results in inadequate thickness (depth), use a Micro X-Cell.
(This also applies to powder samples.)

• Measurement in a vacuum

Perform measurements on sample dripped onto special filter paper and dried.

Powder Samples

Cover the bottom of the cell with film and add the sample (loose powder method).

Press form the powder with a press machine (briquette press method).

Press machine

Flat press heads

Pulverizing Samples

Pulverize samples with coarse particle sizes, or samples subject to effects of non-uniformity of mineral particles on the analysis surface.

Automatic Pulverizer

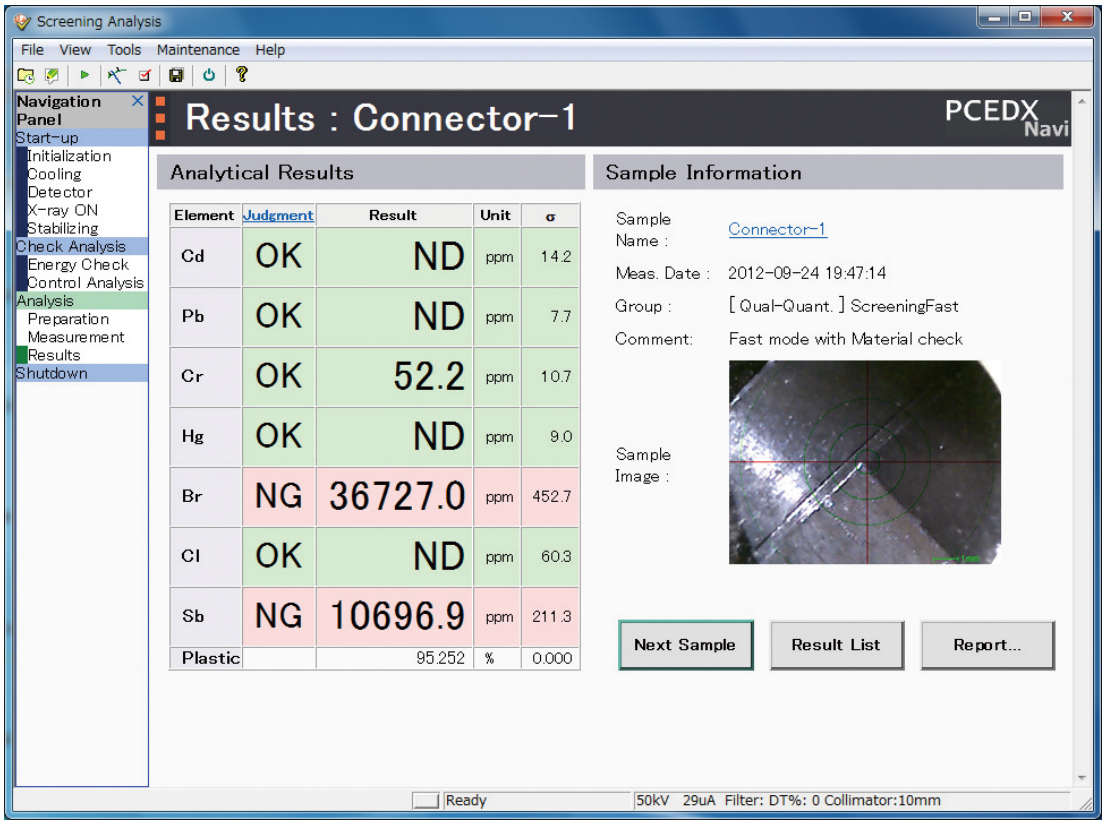
Glass Bead Method

The glass bead method provides highly accurate analysis of oxide powders, such as rock. The sample is glassified using a flux such as $Li_2B_4O_7$.

Screening Analysis Kits (Option)

Ideal for RoHS, ELV, and Halogen Screening

The optional screening analysis kits allow even beginners to start RoHS, halogen, or antimony screening analysis right from the day of purchase. Simply mount the sample, select the analysis conditions, enter the sample name, and wait for the results. The analysis results are displayed with a pass/fail evaluation after just a few minutes.



Analytical results window using the RoHS, Halogen and Antimony screening kit

Internal Calibration Curves and Automatic Calibration Curve Selection

Internal calibration curves

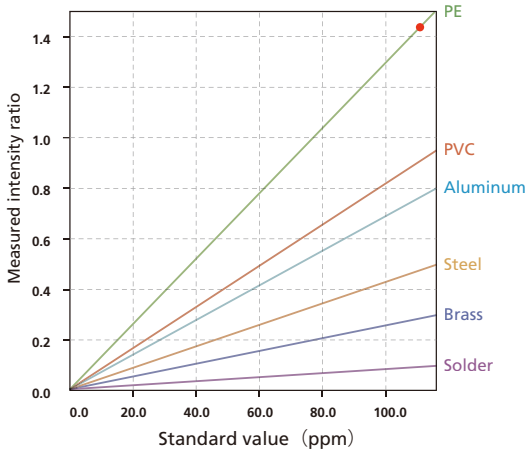
Internal calibration curves are provided for many materials, making it unnecessary to provide a large number of standard samples.

Automatic calibration curve selection

The software automatically selects the best calibration curve for the material, freeing the user from the need to select analysis conditions.
As an incorrect calibration curve selection can result in large error in the quantitation results, this function contributes to improved data reliability.

Shape correction

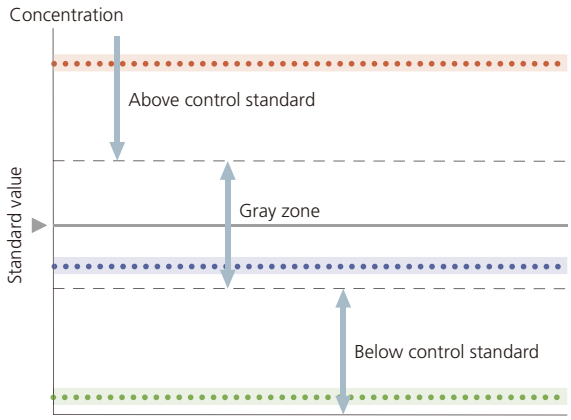
The fluorescent X-ray and scattered X-ray intensities are compared for each element (BG internal standard method) to eliminate the effects of the sample shape and thickness in the quantitation values.



Automatic Measurement Time Reduction

This function automatically switches to the next analysis channel if a controlled substance clearly has a high or low concentration, making evaluation possible while measurement is underway. This achieves more efficient screening analysis.

- Clearly above the control standard, so measurement is cut off.
- Gray zone. Measurement proceeds for the set time.
- Clearly below the control standard, so measurement is cut off.



Screening Simple Setup Screen

Threshold Values

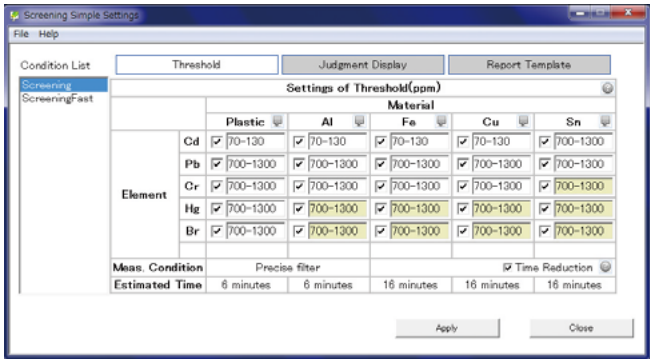
A threshold value can be set for each material and element. The screening evaluation method changes according to how the threshold values are set.

Evaluation Character String

Character strings can be set for display in the analysis results when the threshold value is not exceeded, in the gray zone, and when the threshold value is exceeded.

Report Template

Set the report style from among the templates supplied as standard.



Simple Setup Screen of RoHS Screening Analysis Kit

Three screening Analysis kits are available to suit different applications.

RoHS Screening Analysis Kit

Kit for screening cadmium, lead, mercury, chromium, and bromine. Polyethylene samples containing these five elements are supplied in the kit for instrument management.

RoHS and Halogen Screening Analysis Kit

In addition to cadmium, lead, mercury, chromium, and bromine, this kit also supports the screening of chlorine in plastics. Polyethylene samples containing these six elements are supplied in the kit for instrument management.

RoHS, Halogen, and Antimony Screening Analysis Kit

In addition to cadmium, lead, mercury, chromium, and bromine, this kit also supports the screening of chlorine and antimony in plastics. Polyethylene samples containing these seven elements are supplied in the kit for instrument management.

Specifications

Measurement principle	X-ray fluorescence spectrometry
Measurement method	Energy dispersion
Target samples	Solids, liquids, powders
Measuring range	$_{11}$Na to $_{92}$U (EDX-7000) $_{6}$C to $_{92}$U (EDX-8000)
Sample size	W 300 × D 275 × approx.H 100 mm (excluding radiuses)
Maximum sample mass	5kg (200g per sample when using turret, Gross mass 2.4kg)

X-ray generator

X-ray tube	Rh target
Voltage	4 kV to 50 kV
Current	1 μA to 1000 μA
Cooling method	Air-cooled (with fan)
Irradiated area	Automatic switching in four stages: 1, 3, 5, and 10 mm diameter
Primary filters	Five types (six, including the open position), automatic replacement

Detector

Type	Silicon drift detector (SDD)
Liquid nitrogen	Not required (electronic cooling)

Sample chamber

Measurement atmosphere	Air, vacuum*1, helium (He)*2
Sample replacement*	12-sample turret
Sample observations	Semiconductor camera

Data processor

Memory	2 GB min. (32-bit), 4 GB min. (64-bit)
HDD	250 GB min.
Optical drive	Super multi drive
OS	Windows 7 (32-bit/64-bit)*3

Software

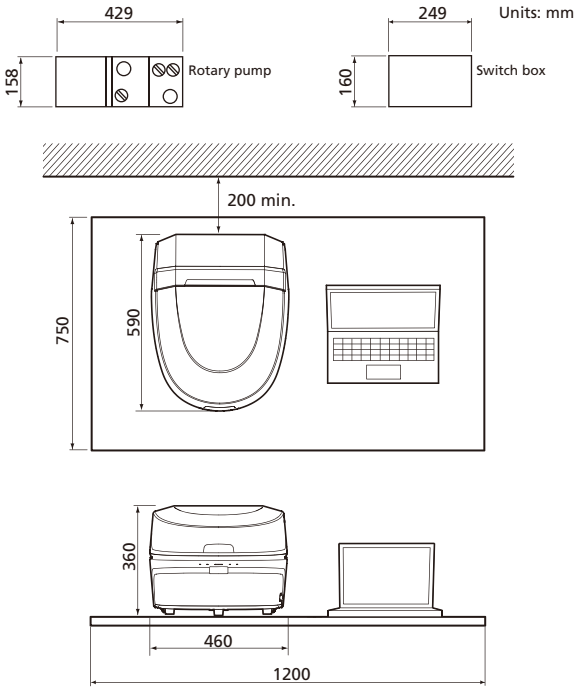
Qualitative analysis	Measurement/analysis software
Quantitative analysis	Calibration curve method, correction for coexistent elements, FP method, film FP method, background FP method
Matching software	Intensity/content
Utilities	Automatic calibration functions (energy calibration, FWHM calibration)
Instrument status monitoring function	
Analysis results tabulation function	

Installation

Temperature	10 °C to 30 °C (temperature fluctuation rate 2 °C/hour max., temperature fluctuation range: 10 °C max.)
Relative humidity	40 % to 70 % (no condensation)
Power supply	100 V AC ±10 %, 15 A earthed socket
Dimensions	W 460 × D 590 × H 360 mm
Weight	Approx. 45 kg

*1 Option for EDX-7000/8000
*2 Option for EDX-7000
*3 Microsoft Office is not included.

Installation Example



Vacuum measurement unit (optional) consists of a control switch box and rotary pump.

This product conforms to Shimadzu's Eco-labeled designation.

* Energy savings: 44.1% reduction as compared to the previous model

Options

Vacuum Measurement Unit P/N 212-25425-42

Use this unit for sensitive measurements of light elements. It requires space for installation of a rotary pump and switch box at the side or rear of the desk supporting the main unit.

Helium Purge Unit P/N 212-25440-41

This unit is used for highly sensitive measurements of light elements in liquid samples. Does not include a helium cylinder or regulator.

(Option for EDX-7000)

Turret Unit P/N 212-25389-41

Turret for 12 samples. It permits continuous measurements of samples up to 32 mm in diameter. It improves throughput, especially for measurements in a vacuum or helium atmosphere.

Screening Analysis Kits

P/N 212-25475-41
RoHS/ELV Screening Analysis Kit
With check samples for five elements

P/N 212-25476-41
RoHS and Halogen Screening Analysis Kit
With check samples for six elements

P/N 212-25477-41
RoHS, Halogen, and Antimony Screening Analysis Kit
With check samples for seven elements

Mylar Film

P/N 202-86501-56 (500 sheets/set)
Sample-holding film (for heavy element analysis)

Polypropylene Film

P/N 219-82019-05 (73 mm W × 92 m roll)
Sample-holding film (for light element analysis)

Sample Cells

3571 General Open-End X-Cell (no lid)

P/N 219-85000-55 (100 cells/set)
(Outer diameter: 31.6 mm, volume: 10 mL)
Polyethylene sample cell for liquid and powder samples.

3529 General X-Cell (with lid)

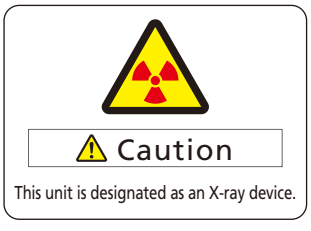
P/N 219-85000-52 (100 cells/set)
(Outer diameter: 32 mm, volume: 8 mL)
For liquid samples. Equipped with a relief hole and liquid retainer in case of liquid expansion.

3577 Micro X-Cell

P/N 219-85000-54 (100 cells/set)
(Outer diameter: 31.6 mm, volume: 0.5 mL)
For trace samples. Recommended for use with a collimator.

3561 Universal X-Cell

P/N 219-85000-53 (100 cells/set)
(Outer diameter: 31.6 mm, volume: 8 mL)
For liquid and thin-film samples. Equipped with a relief hole and liquid retainer in case of liquid expansion. Equipped with a ring to tightly hold thin-film samples with film.



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