FISCHERSCOPE® X-RAY XDV®-SDD

X-ray fluorescence spectrometer with a programmable X/Y-stage and Z-axis for automated measurements of very thin coatings and for trace analysis

Description

The FISCHERSCOPE®-X-RAY XDV®-SDD is a universally applicable energy-dispersive x-ray spectrometer. It is particularly well suited for the non-destructive analysis of very thin coatings, for trace analysis and for automated measurements.

To create ideal excitation conditions for every measurement, the XDV-SDD features electrically changeable apertures and primary filters. The modern silicon drift detector achieves high accuracy and good detection sensitivity. Due to large apertures (collimators) and a very fast pulse processor, it is ideally suited for capturing high count rates.
The XDV-SDD x-ray spectrometer has an excellent long-term stability, which among other things is reflected in a significantly reduced calibration effort.
Using the fundamental parameter method, coating systems as well as solid and liquid samples can be analyzed standard-free. It is possible to detect up to 24 elements in a range from aluminum (13) to uranium (92) simultaneously.

The XDV-SDD is especially well suited for measuring and analyzing very thin coatings or small concentrations in the trace analysis. With its fast, programmable X/Y-stage, it is the fitting measuring instrument for automated sample measurements.

Typical areas of application are:

- Analysis of very thin coatings,
  e.g., gold/palladium coatings of ≤ 0.1 µm
- Trace analysis on pc boards according to RoHS and WEEE requirements
- Gold analysis
- Measurement of functional coatings in the electronics and semiconductor industries
- Determination of complex multi-coating systems
- Automated measurements, e.g., in quality control

Design

The FISCHERSCOPE X-RAY XDV-SDD is a user-friendly bench-top instrument with a high-precision, programmable X/Y-stage and electrically driven Z-axis. The sample stage moves into the loading position automatically, when the protective hood is opened. A laser pointer serves as a positioning aid and supports the orientation of the sample to be measured. A high-resolution color video camera with powerful magnification simplifies the precise determination of the measurement locations and visualizes the measurement procedure in process. Fine adjustments can be made directly at the instrument manually or using a joystick - or from the PC using a mouse and the keyboard.
The entire operation, the evaluation of the measurement as well as the clear presentation of the measurement data is done on a PC using the powerful and user-friendly WinFTM® Software.

XDV-SDD spectrometers are fully protected instruments with type approval according to the German regulations „Deutsche Röntgenverordnung-RöV“.

General Specifications

Intended use	Energy dispersive x-ray fluorescence spectrometer (EDXRF) to determine thin coatings, small structures, trace elements and alloys
Element range	Aluminum Al (13) to Uranium U (92) – up to 24 elements simultaneously
Design	Bench-top unit with the hood opening upwards X/Y- and Z-axis electrically driven and programmable Motor-driven changeable apertures and filters Video camera and laser pointer for orienting the sample
Measuring direction	From top to bottom

X-ray source

X-ray source	Micro focus tube with beryllium window
High voltage	Adjustable 10 kV, 30 kV, 50 kV
Anode Current	Max. 1 mA (0.001 A)
Apertures (collimators)	4x changeable: Ø 0.1 mm; Ø 0.3 mm; Ø 1 mm; Ø 3 mm other sizes and combinations on request
Primary filter	6x changeable (Ni; free; Al 1000 µm; Al 500 µm; Al 100 µm; Mylar® 100 µm)
Measurement spot	Depending on meas. distance and aperture; at test spot approx. aperture value + 10%, the actual measurement spot size is shown in the video image. Smallest measurement spot: approx. Ø 0.15 mm
Measuring distance	0 ... 80 mm, in the non-calibrated range using the patented DCM method
e.g., for measurements in recesses	0 ... 20 mm, in the calibrated range using the patented DCM method

X-ray detection

X-ray detector	Silicon drift detector with peltier cooling
Resolution	≤ 140 eV (fwhm at Mn-Kα)

Sample orientation

Video microscope	High-resolution CCD color camera for optical monitoring of the measurement location along the primary beam axis Crosshairs with a calibrated scale (ruler) and spot-indicator Adjustable LED illumination of the measurement location Laser pointer to support accurate sample placement
Zoom factor	up to 180x (Optical: 20x, 45x; Digital: 1x, 2x, 3x, 4x)
Focusing	Auto-focus and manually controlled motor focus Manual movement of the focal plane in a range from 0 to 80mm
Sample stage	Fast, programmable X/Y-stage with second Y-axis (tongue function)
Maximum travel	X/Y-axis: 250 mm x 250 mm; Z-axis: 140 mm
Max. travel speed X/Y	25 mm/s
Repeatability precision X/Y/Z	≤ 0.005 mm (unidirectional)
Usable sample placement area	Width x depth: 370 mm x 320 mm
Max. sample mass	5 kg, with reduced approach travel precision 20 kg
Max. sample height	140 mm

Electrical data

Line voltage, line frequency	AC 115 V or AC 230 V 50 / 60 Hz
Power consumption	max. 120 W (without evaluation PC)
Protection class	IP40

Dimensions

Exterior dimensions	Width x depth x height [mm]: 660 x 835 x 720
Weight	approx. 140 kg
Interior dimensions meas. chamber	Width x depth x height [mm]: 580 x 560 x 145

Environmental Conditions

Temperature: Operation	10 °C – 40 °C / 50 °F – 104 °F
Temperature: Storage/Transport	0 °C – 50 °C / 32 °F – 122 °F
Humidity of ambient air	≤ 95 %, non-condensing

Evaluation unit

Computer	PC system with extension cards
Software	Fischer WinFTM®

Standards

CE conformity	EN 61010
X-ray standards	DIN ISO 3497 and ASTM B 568
Approval	Fully protected instrument with type approval according to the German regulations „Deutsche Röntgenverordnung-RöV“

Order

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